UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE PATENT TRIAL AND APPEAL BOARD

_____

APPLE INC.,

Petitioner,

v. IPR2024-01083

SMITH INTERFACE TECHNOLOGIES, LLC, Patent No. 10,642,413

Patent Owner.

_____

VIDEOTAPED DEPOSITION OF CRAIG ROSENBERG, PH.D.

July 10, 2025
8:00 a.m. Pacific Time

Reported by: Lori J. Goodin, RPR, CRR, RSA,
California CSR #13959

_____

DIGITAL EVIDENCE GROUP
1730 M Street, NW, Suite 812
Washington, D.C. 20036
(202) 232-0646



APPLE 1024
Apple v. Smith Interface
IPR2024-01256

1 VIDEOTAPED REMOTE DEPOSITION of
2 CRAIG ROSENBERG, PH.D.,
3 in the above-titled action, held on Thursday,
4 July 10, 2025, commencing at approximately 8:00
5 a.m. before Lori J. Goodin, RPR, CRR, RSA,
6 California CSR #13959, Registered Professional
7 Reporter, Certified Realtime Reporter, Realtime
8 Systems Administrator, and Certified Shorthand
9 Reporter, and Notary Public of the State of
10 Florida, State of California, State of Maryland,
11 District of Columbia, and State of Delaware.
12
13
14
15
16
17
18
19
20
21
22

1 REMOTE APPEARANCES:

2

3 ON BEHALF OF PETITIONER:

4 FISH & RICHARDSON PC

5 BY: DAVID HOLT, ESQUIRE

6 1000 Maine Avenue, Southwest

7 Suite 1000

8 Washington, D.C. 20024

202-783-5070

9 dth@fr.com

10

11 ON BEHALF OF PATENT OWNER:

12 NORTON ROSE FULBRIGHT US, LLP

BY: CHAD WALLIS, ESQUIRE

13 98 San Jacinto Boulevard

Suite 1100

14 Austin, Texas 78701

512-474-5201

15 chad.wallis@nortonrosefulbright.com

16

17

18

19

20

21

22

1 INDEX TO EXAMINATION

2

3 WITNESS: CRAIG ROSENBERG, PH.D.

4

5 EXAMINATION BY PAGE

6 MR. HOLT 6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

1 INDEX TO EXHIBITS

2 CRAIG ROSENBERG, PH.D.

3 Apple Inc. v. Smith Interface Technologies LLC

4 Thursday, July 10, 2025

5 Lori J. Goodin, RPR, CRR, RSA,

6 California CSR #13959

7

8

9 PREVIOUSLY MARKED EXHIBITS

10 PRIOR MARKED EXHIBITS FIRST REFERRAL

11 1004, Ahn reference 28

12

13 (Previously marked exhibits retained by counsel.)

14

15

16

17

18

19

20

21

22

1 THURSDAY, JULY 10, 2025, 8:00 a.m.
2 PROCEEDINGS
3
4 * * *
5 Whereupon,
6 CRAIG ROSENBERG, PH.D.,
7 a witness called for examination, having been
8 first duly sworn, was examined and testified as
9 follows:
10 THE REPORTER: Unless an objection
11 is heard at this time, all parties to this
12 deposition are appearing remotely and have
13 agreed to the witness being sworn in
14 remotely.
15 * * *
16 EXAMINATION
17 BY MR. HOLT:
18 Q. Hello, sir.
19 A. Good morning.
20 Q. How are you doing today?
21 A. I am doing well, too. How are you?
22 Q. Good. Can you state your full name

1 for the record, please.
2 A. Craig Stewart Rosenberg.
3 Q. Okay. And if I call you
4 Dr. Rosenberg, that is okay?
5 A. Yes, it is.
6 Q. Awesome.
7 Have you been deposed before,
8 Dr. Rosenberg?
9 A. Yes, I have.
10 Q. About how many times would you say?
11 A. Approximately 60 times.
12 Q. Okay. I think one of those cases
13 may have been involving the parties, Apple and
14 Neonode.
15 Do you remember that?
16 A. I do recall that, yes.
17 Q. I was in that deposition. So, I
18 have sat with you in deposition before.
19 I'm sure you are familiar with the
20 general outlines of the rules of the deposition,
21 but I would like to run through a couple, if that
22 is okay with you?

1 A. Of course.
2 Q. Just so that we have a clear record
3 and to help the court reporter out, can we agree
4 that you will let me finish asking a question
5 before you answer, and I will try to do the same,
6 let you finish answering before I ask a question?
7 A. Yes.
8 Q. All right. Do you have any notes or
9 anything open on a computer around you?
10 A. I have a printout of an unmarked-up
11 printout of my declaration. And I have a PDF
12 browser that has a digital copy of my
13 declaration.
14 And the '413 patent and the three
15 primary references on Chaudri and Hinckley.
16 And, Dr. Trabean's declaration. All
17 unmarked-up.
18 Q. Okay.
19 A. And I have the Zoom browser, the
20 Zoom application open.
21 Q. Okay. And all of those digital
22 copies, you said are unmarked. They don't have

1 anything additional in them but what was filed
2 with the Board; is that correct?
3 A. That's correct, yes.
4 Q. Okay, great. Do you agree that
5 during the, at least the initial
6 cross-examination portion, if you will, of the
7 deposition, that you will not talk to anybody
8 including counsel for patent owner, either
9 through chat on your computer or otherwise, text
10 message or anything like that?
11 A. I agree.
12 Q. If you happen to have anybody come
13 in the room, just let me know. We can always
14 take a break if necessary.
15 I know on these remote things it can
16 be kind of difficult to predict what is going to
17 happen. But, just let us know and we can take a
18 break if necessary.
19 Does that make sense?
20 A. It sure does, yes.
21 Q. And on the topic of breaks, I will
22 probably try to take one at about every hour.

1 But if you need a break, no problem
2 at all. Just let us know.
3 But all I would ask is that if there
4 is a question pending that you give your answer
5 before we take the break. Is that okay?
6 A. Of course.
7 Q. Great. What did you do in
8 preparation for the deposition today?
9 A. I reviewed the '413 patent. I
10 reviewed the Ahn reference, the Chaudri
11 reference, and the Hinckley reference.
12 I met with Chad Wallis on probably
13 four different times for part, you know, not full
14 days each time.
15 And, basically just reviewed my
16 declaration, of course.
17 Q. Were there any other documents you
18 could think of that you reviewed in preparation?
19 A. I reviewed -- did I mention
20 Dr. Trabean's declaration? If I didn't, I
21 reviewed sections of that.
22 Q. Okay.

1 A. I reviewed some of the exhibits that
2 are in my declaration around the use of radial
3 menus.
4 Q. About how long would you say you met
5 with Mr. Wallis for, in preparation, I guess I
6 should say, for the deposition?
7 A. It was over probably four different
8 days. As you know the deposition was scheduled
9 and then pushed off.
10 So, probably two days before the
11 first scheduling and two or three days before the
12 second one. Maybe 15 hours would be my guess.
13 10 to 15 hours. Something like that.
14 Q. Okay. Thank you. And I would say I
15 appreciate the rescheduling. There was a bit of
16 a snafu on our end. So, thank you very much for
17 bearing with us.
18 A. Yeah, no worries at all.
19 Q. Okay. So, I guess to step back to
20 one of the rules generally quickly. If I am
21 asking questions along the way and I -- and you
22 give an answer, can I assume that you have

1 understood the question?
2 A. Yes.
3 Q. And you will ask for clarification
4 if you are unsure about the nature of the
5 question?
6 A. I will.
7 Q. Okay. Great. All right. And is
8 there any reason today that you wouldn't be able
9 to give full and truthful answers, any conditions
10 or medications or anything like that?
11 A. No.
12 Q. Okay, great. All right.
13 So, before we kind of dive into some
14 of the specifics of the actual documents, I
15 wanted to step back and ask kind of generally
16 about user interface design and specifically
17 touchscreen user interface design.
18 Could you tell me what are some of,
19 or the ones you can think of, input variables or
20 dimensions that make up a gesture for a
21 touchscreen?
22 A. Are you talking about the various

1 kinds of attributes of the touch itself that
2 could be recognized by software?
3 Is that kind of the nature of your
4 question?
5 Q. Yes. I think maybe the patent
6 refers to this as a face space, if I'm not
7 mistaken.
8 A. Yes, that's right.
9 Q. But I believe it is the dimensions
10 that represent the gesture.
11 A. Sure. Sure. So, some of the
12 various dimensions that can be input, you know,
13 varied by the user, input by the user, and
14 recognized by the hardware and software
15 combination that represents the touchscreen,
16 would be where the finger or stylus is touching
17 on the screen.
18 If it is a multi-touch gesture,
19 there may be more than one at a time. The
20 pressure, some systems can recognize pressure as
21 well.
22 Oftentimes when you have pressure,

1 it can -- you can have more than just an XY, but
2 it will create a broader radius, if you will.
3 The duration of the touch, the
4 direction of movement of that touch, potentially
5 entire path that that finger or stylus is taking
6 as it makes contact with the screen.
7 I think I mentioned duration. So,
8 in addition to the path would be the speed. So,
9 you could compute the speed, the distance,
10 divided by the time. You could compute
11 acceleration, you know, the derivative of speed.
12 Those are some that come to mind.
13 Let's see I mentioned multi-touch. I mentioned
14 pressure. I mentioned time, such as duration
15 that a finger or stylus is down.
16 I mentioned speed, acceleration.
17 Whether -- certainly the beginning location and
18 the end location. Even you could set off time,
19 if it is a multi-part gesture that involves
20 finger stylus down and then up and then down
21 again.
22 You can start and stop various

1 timers to see how long the fingers were on the
2 screen -- finger or fingers were on the screen
3 versus off the screen.
4 The, as you know, there is the
5 concept of bezels, too. So, potentially a sensor
6 that can detect a touch on the bezel, not on the
7 screen itself. That could be part of the face
8 base that is representing the entirety of the
9 gesture.
10 There is some systems that can
11 detect proximity, really, so you don't actually
12 have to be touching the screen but hovering near
13 the screen.
14 Those are some variables that come
15 to mind at the moment.
16 Q. Okay. Would you say all of the
17 variables you just mentioned and the manner in
18 which you talked about them, were known as of the
19 critical date for this patent?
20 A. Well, I didn't, I didn't
21 specifically research. There is many variables,
22 as you know, I just mentioned.

1 And I didn't dig into the invention
2 date, if you will, for all of those.
3 But, it is my understanding that
4 the '413 patent isn't claiming the invention of
5 one or more of those variables or ways of
6 interacting with a touchscreen.
7 It is the specific combination and
8 how input is received from that touchscreen and
9 importantly the resultant output from a graphical
10 point of view, as far as what is being displayed
11 on that touchscreen that seems to be the focus of
12 the invention of the '413 patent.
13 Q. Okay. And I think I mentioned the
14 patent in my question, and you mentioned the '413
15 patent in your response.
16 I just want to clarify for the
17 record we are talking about U.S. Patent
18 Number 10,4 -- or excuse me, 642,413; is that
19 correct?
20 A. Yes. 10,642,413.
21 Q. Okay. And if we refer to that as
22 the '413 patent, that is okay, as you did in your

1 last response?
2 A. Yes, it is.
3 Q. Okay, great. I know you've got
4 copies opened, so I will probably speak to those,
5 except I would like when we start to talk a bit
6 about your declaration to go ahead and provide
7 the copy that was filed, just so that you can
8 verify that it was the declaration that you
9 signed.
10 But, stepping back to the questions
11 we were talking about before, you discussed, I
12 don't know, a half a dozen, maybe more
13 dimensions, I think, of these gestures.
14 If any of those dimensions change,
15 is it a different gesture?
16 MR. WALLIS: Objection, scope.
17 THE WITNESS: I think that that
18 would -- I mean you are asking sort of a high
19 level general question, perhaps devoid of the
20 issues in this case.
21 Just in general if a software
22 engineer were to have a hardware system that

1 could detect everything that I mentioned
2 previously, it would be possible for them to
3 build a gesture recognition module in
4 software that could be sensitive to changes.
5 Like I said, if the hardware
6 supported all of what I mentioned, to the
7 degree and specificity of what I mentioned, a
8 gesture recognition module could be built
9 that would detect the changes in pressure,
10 the changes in where the pen-down point and
11 the pen-up point, the path, you know, Path A
12 could be detected different as Path B.
13 So, yes, it is possible. But, it is
14 also possible that that software detection
15 module, if you will, that software
16 recognition module could purposely or just
17 through lack of programming be insensitive to
18 a difference of one gesture versus another.
19 So, it really depends on the
20 specific implementation.
21 BY MR. HOLT:
22 Q. Okay. That makes sense. So, let's

1 look at one of those dimensions you talked about.
2 I think you mentioned a touch-down
3 point on the screen. So, that would be where a
4 user, for instance, either touches the screen
5 with their finger or maybe a stylus and where
6 that location is. That is one of these
7 dimensions potentially.
8 Is that right?
9 A. That's right.
10 Q. Okay. And, so if I touched down at
11 one edge of my display, that would be potentially
12 one starting position for a gesture. Is that
13 fair to say?
14 A. Yes. And it could be defined in
15 more specificity than that -- an edge, if you are
16 talking about the left edge, let's say, it could
17 be that that is, let's say X equals zero, if it
18 is all of the way to the left.
19 Q. Uh-huh.
20 A. But it could have multiple different
21 Y points.
22 If you are just saying on the left

1 edge of the display, there is many, many pixels
2 that would satisfy the left edge of the display.
3 Or you could be more specific --
4 when I say you could be, I mean a software
5 engineer that is implementing such a system could
6 say it needs to be at row -- Column 0, left edge
7 of the display, between pixels 40 and 90,
8 something like that.
9 So -- but, hopefully that answers
10 your question.
11 Q. I believe it does. And one thing I
12 would ask with respect to these questions, you
13 were talking about a software engineer.
14 I guess going forward, if we can
15 maybe speak from the perspective of the person of
16 ordinary skill in the art or POSITA in this case;
17 is that fair?
18 A. Yes, it is. And I know that is
19 appropriate.
20 But in my mind a POSITA would be
21 someone that is able to design and implement such
22 a system.

1 Q. Uh-huh.
2 A. So, that is why I mention software
3 engineer.
4 But, I was answering from the
5 perspective of a POSITA, yes.
6 Q. Okay. Perfect. I just wanted to
7 clarify that for the record and make sure that we
8 were talking about the same type of person, I
9 suppose, who might be looking at these types of
10 systems.
11 A. Uh-huh.
12 Q. Okay. So, I think what I heard you
13 say is that my touch-down position on a screen
14 might have, for example, at least two
15 coordinates, X and Y, we will say, which might
16 define the plane of the touch surface.
17 Is that fair?
18 MR. WALLIS: Objection, form.
19 THE WITNESS: Typically a flat
20 touchscreen has a coordinate system.
21 BY MR. HOLT:
22 Q. Uh-huh.

1 A. Typically the upper left is the
2 origin. It doesn't have to be.
3 Q. Uh-huh.
4 A. But, typically the upper left is 00.
5 And X goes positive to the right, and Y goes
6 positive down.
7 So, you know, if it was a 1,000
8 high -- 1,000 high pixels, and 2,000 Y pixel
9 display, the upper left pixel would be 00. The
10 lower right pixel would be a 2,000, 1,000.
11 So, that is a typical coordinate
12 system for computer graphics on a 2D display.
13 Q. Okay, great. You have been talking
14 about pixels with respect to both the display and
15 the input.
16 Was it common at the time of the
17 patent that those would be one-to-one? That is
18 to say the fidelity at which I detected an input
19 would be approximately the fidelity of the
20 display, the number of pixels of the display?
21 MR. WALLIS: Objection, form.
22 THE WITNESS: I -- counsel, I will

1 give you a moment to object if you want.
2 I can't speak to how frequently it
3 is one-to-one versus it is different.
4 It certainly doesn't have to be.
5 The grid of detecting a touch does not have
6 to map to the pixel display. It could be
7 finer grained. There would be no reason it
8 would need to be finer grained, most likely.
9 But, it could be coarser grained,
10 too. And I just really haven't researched
11 if, if it was very typical to be one-to-one,
12 or if it was more common that the display
13 resolution was a little bit higher than the
14 touch resolution, so --
15 BY MR. HOLT:
16 Q. Okay. So, in some systems it may be
17 possible for the touch coordinate system to be
18 somewhat different than the display coordinate
19 system.
20 Is that fair to say?
21 A. It is possible that they were
22 different. It is possible they were different,

1 yes.
2 I think from a user experience point
3 of view, as long as the touch resolution was high
4 enough for the user to position their finger and
5 position, you know, start the gesture in the
6 gesture to accomplish the task at hand, that
7 would be sufficient.
8 And that there wouldn't be a
9 requirement to -- that it be a one-to-one match,
10 as long as it is supported the various kinds of
11 gesture recognitions that the designers
12 envisioned and needed for their product.
13 Q. Okay. That makes sense.
14 The start position, I think perhaps
15 conceptually, one way to think about it would be
16 that the start position is one coordinate within
17 the coordinate system of inputs we were just
18 talking about.
19 Is that fair?
20 MR. WALLIS: Objection, form.
21 THE WITNESS: Yeah. It would be one
22 position, one XY position. One XY value, if

1 you will, or pair, within the coordinate
2 system of the screen.
3 BY MR. HOLT:
4 Q. Okay. Would it also be possible
5 that a touch might take up multiple positions, a
6 single touch, that is, take up multiple positions
7 at once?
8 A. Well, I did describe a, the
9 possibility of a system where as the finger goes,
10 you know, applies more pressure, you have more
11 surface area of the pad of your finger that is
12 touching the display.
13 And depending on the hardware, there
14 may be the possibility for that hardware to
15 report multiple different pixels within the,
16 essentially, the radius of that centroid to be,
17 you know, triggered as being active at that
18 moment.
19 Q. Okay. Makes sense.
20 A. If that answers your question.
21 Q. Yes. Let's assume for the sake of
22 argument that for the next question when a touch

1 down happens, it is at an X and a Y, I think you
2 called it, a single coordinate position within
3 the coordinate plane of the touchscreen.
4 Is that -- do you understand that?
5 A. I do.
6 Q. Okay. If a user were to touch down
7 at, I'm just going to throw some numbers out
8 there, ten on the X-axis and 12 on the Y-axis.
9 Is that a different input than if
10 they went to, let's say, 20 on the X-axis and 15
11 on the Y-axis?
12 MR. WALLIS: Objection, form.
13 THE WITNESS: Well, it is a
14 different start position. So, if the gesture
15 recognition system is sensitive and applies
16 some condition or value or meaning to start
17 position, then yes, it would be a different
18 input.
19 It doesn't have to be, always. If
20 you are, if the gesture recognition is, just
21 cares about the direction of travel, no
22 matter where it starts, and let's say you are

1 just looking for travel at least 30 pixels in
2 one direction, you know, north, south, east,
3 or west, then it really wouldn't matter where
4 the start position was.
5 You are just, you are looking for
6 that Delta between the start and end.
7 But, in other systems, it may value
8 very much, because you are either starting on
9 a target or in your second example maybe you
10 are starting off the target.
11 So, something might happen if you
12 are starting on the target and maybe nothing
13 will happen if you are starting off the
14 target.
15 So, so many of -- you know, so much
16 depends on the specifics of the system that
17 is being designed and what is needed.
18 BY MR. HOLT:
19 Q. Okay. That is helpful. Thank you.
20 I think you talked about a target.
21 What might a target be in these
22 systems?

1 A. Well, I'm thinking of 1800 of Ahn.
2 Q. Okay.
3 A. We can, if you want, go to Ahn. I
4 recall it as being Element 1800 which was like a
5 start target to launch a menu.
6 Q. So, when you say Ahn, just to
7 clarify for the record, we are talking about
8 Exhibit 1004; is that correct?
9 (Whereupon, previously marked
10 Exhibit 1004,
11 first referral.)
12 THE WITNESS: I haven't memorized
13 the exhibit number. Yes, it is. Actually, I
14 see it in the title of my digital copy.
15 BY MR. HOLT:
16 Q. Okay.
17 A. 1004.
18 Q. I believe for what it is worth, if
19 you have the filed copy open at the lower right
20 of the first page, it says Apple 1004.
21 Do you see that?
22 A. I do see that, yes.

1 Q. Excellent. And so you were
2 asking -- I should say, talking about the
3 Figure 18; is that correct?
4 A. Yes, Figure 18A and B show what I
5 had referred to as the target.
6 Q. Okay. And what aspect of what is
7 shown in Figure 18 would be this target?
8 A. The cross hatched area, 1800.
9 Q. Okay. I believe Ahn refers to that
10 as a graphical shadow, 1800.
11 A. That's correct.
12 Q. Okay. So, what would define that
13 graphical shadow as a target for the user
14 interface?
15 A. Well, it could be defined in a
16 number of different ways. It could be defined
17 logically just in an algorithm. If -- you know,
18 if the Y position of the touch-down point is
19 between A and B, if the X position is between C
20 and D, then you have defined a rectangle,
21 essentially. You have defined a bounding box on
22 the screen.

1 So, that would be, you know, a
2 programmatic way to define it. And then,
3 graphically, you want to show that graphic shadow
4 so that the user sees something on their display.
5 And that would be defined in the graphics
6 routines that is doing the draw, the draw
7 procedures.
8 And it would be defined in the same
9 way to, you know, paint pixels in a certain color
10 or a certain pattern on this area of the screen.
11 Q. Okay. You had talked about defining
12 a rectangle for the target with respect to the
13 touch input; is that correct?
14 A. It could be a rectangle. It could
15 be an arbitrary shape. This looks like it is a
16 rectangle with rounded corners that is partially
17 clipped by the side of the display.
18 So, it is not exactly a rectangle.
19 But, it could be a rectangle or it could be an
20 arbitrary shape.
21 Q. Okay. Who defines the shape of the
22 target?

1 MR. WALLIS: Objection, form.
2 THE WITNESS: Well, a POSITA that is
3 implementing a system, the designers, and the
4 programmers. It might be the same person.
5 It might be two different people if they have
6 slightly different skill sets.
7 The designers of the software
8 would -- the user interface designers would
9 typically, you know, make mock-ups. And if
10 they have the software skills to implement
11 them they would, they would implement it in
12 source code as well.
13 Otherwise it would be given to the
14 different software engineer that would
15 implement it.
16 BY MR. HOLT:
17 Q. Okay. So, to your knowledge does
18 Ahn teach that level of detail of implementation
19 for its user interfaces?
20 A. Not that I recall. I mean, I think
21 that Ahn is more focused on the user interface
22 design and the interaction design as opposed to

1 the specifics of how the algorithms would work.
2 But, a POSITA would know that it
3 doesn't happen by magic, so to speak. You know,
4 you can't go from wire frames to running software
5 without, without implementing them in code and
6 compiling a, an executable.
7 Q. So, you would say that the process
8 of implementing them with the code was something
9 a POSITA would have known how to do.
10 Is that fair?
11 A. Yes. I would say so, yes.
12 Q. Okay. So, even though Ahn doesn't,
13 for example, talk about defining the target
14 rectangle that we were talking about a little bit
15 earlier, a POSITA reading Ahn would have
16 generally known how to create that as part of the
17 input system; is that fair?
18 MR. WALLIS: Objection. Form.
19 THE WITNESS: Well, I would say Ahn
20 does show the design. You say Ahn -- I
21 believe you phrased it Ahn doesn't talk about
22 the design.

1 Right here I am looking at
2 Figure 18A and B of Ahn, and that shows the
3 design, at least from a graphical point of
4 view.
5 In Ahn it would be well known how to
6 implement that in software.
7 So, I guess I'm taking a little bit
8 of exception to your phrase that Ahn doesn't
9 talk about the design of the graphical
10 shadow.
11 I think that at least the user
12 interface design of the graphical shadow is
13 displayed on 18A and B.
14 BY MR. HOLT:
15 Q. Okay. I agree with that, for what
16 it is worth.
17 A. Okay.
18 Q. I think I was perhaps talking more
19 specifically about going from what we see in
20 Figure 18 to a working system.
21 Does that make sense?
22 A. It does, yes.

1 Q. So, these figures on their own don't
2 define the operation of a system; is that fair?
3 MR. WALLIS: Objection, form.
4 THE WITNESS: Well, I mean Ahn does
5 provide, in the specification itself,
6 descriptions of how the system of Ahn works.
7 It doesn't define the specifics of
8 the C language or the Java language or
9 whatever software language you would use to
10 implement it, because there is many ways to
11 implement it with many kinds of software
12 languages.
13 BY MR. HOLT:
14 Q. Uh-huh.
15 A. But, it does describe how the system
16 works from a user interaction point of view and
17 user interface point of view.
18 Q. Okay. That makes sense.
19 A. Uh-huh.
20 Q. So, there is some detail that a
21 POSITA would have to bring to the table in order
22 to read on and get to a working system. Is that

1 fair?
2 A. I think that a well-defined
3 specification could be given to a dozen different
4 software engineers and you would get back the
5 same, you would get back the same software from
6 all dozen teams.
7 So, it seems to me that Ahn is a
8 well-designed specification, if you will. It
9 really describes how the system works.
10 And to the extent that your question
11 implies that there is a lot of uncertainty in
12 Ahn, and that it is under described and different
13 software engineers could build completely
14 different systems, I would -- I don't think I
15 would agree with that.
16 I think that the way that the system
17 of Ahn is described, it is clear to a POSITA, as
18 far as what is needed, you know, what it is
19 describing the software to do. And then the
20 software engineer is just implementing the
21 specification, if you will, that is the document,
22 Ahn.

1 Q. Okay. That makes sense. If the
2 designer, one of these software teams you talked
3 about, I think maybe ten software teams would
4 come to the same conclusion, if one of the
5 software teams looked at this, a POSITA looked at
6 Figure 18, would they necessarily always design
7 the graphical shadow 1800 exactly as it is shown
8 in Figure 18?
9 MR. WALLIS: Objection, form.
10 THE WITNESS: Well, Figure 18 is
11 part of what I call the spec or the
12 specification.
13 BY MR. HOLT:
14 Q. Uh-huh.
15 A. Oftentimes the, one of the first
16 steps in software -- in the software engineering
17 life cycle is to look at the, whether the
18 requirements of the system, what all of the
19 functions it needs to do to build a detailed
20 specification.
21 Q. Uh-huh.
22 A. And then to program it. And these

1 figures show from a graphical point of view what
2 the graphical shadow should look like.
3 And the description and the
4 specification of Ahn describes how it works. And
5 also, you know, combined with the other figures,
6 too, and the differences, in terms of the
7 interaction, the differences between other
8 figures in terms of what has to happen, like is
9 that graphical shadow moving or not.
10 The specification, if you will, and
11 I guess I'm using that word, that word is
12 overloaded, meaning two things, the specification
13 of the patent and also I am describing this,
14 because in your hypothetical, this is a
15 specification for a software engineer or a
16 software engineering team.
17 They knew how to describe what it
18 would -- you know, how to describe if the
19 graphical shadow needs to move. And I am
20 thinking of, like Figure 6A which --
21 Q. Okay.
22 A. -- which shows a graphic moving over

1 time.
2 Q. Okay. Turning to Figure 6A really
3 quickly so that I can -- okay.
4 A. Also Figure 8B would be another
5 example of that.
6 Q. Okay. So, would a POSITA looking at
7 Ahn, have understood it to teach a set of
8 constraints or goals of the system and sought to
9 implement them as they are taught here.
10 A. Can you ask that question one more
11 time to make sure that I understood it, please?
12 Q. Yes. This goes back to I think what
13 you were getting at, I'm not quite sure, with
14 respect to the word "specification" as being
15 loaded.
16 You talked about the specification
17 being a word for this actual document and its
18 description. Is that correct?
19 A. Yeah, I think I used the word
20 "overloaded" which is actually a software
21 engineering term.
22 Q. Okay.

1 A. Yes. The specification of the
2 patent itself, or you can think of a
3 specification that is given to a software team,
4 that is really, it is the, what -- it is the
5 description of what is needed to be built by that
6 software team.
7 Q. Okay. Those two things are
8 different from one another; is that correct?
9 A. Well, in a -- yeah, they are
10 different typically. A patent is to file with
11 the Patent Office and, you know, claim an
12 invention, hopefully get a patent for an
13 invention.
14 So, that is the purpose of a patent
15 of which the specification is the, you know, the
16 majority of the patent itself.
17 The purpose of the software
18 specification -- it has nothing to do with
19 patents. And it is to describe a software system
20 so that a software engineering team can build
21 said system.
22 That said, I kind of equated the two

1 a little bit by saying this patent, the Ahn
2 patent could be treated as a specification or at
3 least a good part of it.
4 It doesn't describe potentially
5 everything. Like, is this running on iOS or is
6 it running on android? You know, like some of
7 the basic things aren't described.
8 But, in terms of what the
9 application, or operating system, or set of
10 applications combined with an operating system
11 needs to do, that is -- it could be used in that
12 way.
13 Q. You are saying it could be used in
14 that way. And I guess the question I would have
15 is: Would the POSITA have approached Ahn in the
16 way you just described, looking at Ahn as a
17 specification for how precisely the system works?
18 MR. WALLIS: Objection, form.
19 THE WITNESS: I think the reason --
20 the whole reason that we got on to this line
21 of questioning and me characterizing this as
22 a, as a specification is there is a question

1 that you had of me that seemed to imply that
2 it was under-specified, so to speak.
3 That the, this Ahn patent left a lot
4 of room for many different kinds of
5 implementations.
6 And, I think we need to dive into
7 the specifics about what we are talking
8 about, you know, what specifically. But I
9 pushed back on that because I didn't
10 necessarily agree.
11 I think there are descriptions in
12 Ahn, that describe -- and this goes, it is
13 the same for Chaudri and Hinckley.
14 BY MR. HOLT:
15 Q. Uh-huh.
16 A. That is descriptive in how the
17 system of Ahn, Chaudri and Hinckley work.
18 And if they were given to a software
19 engineering team, or multiple teams, one would
20 expect those teams to build the system in
21 accordance with the patents themselves.
22 Q. Okay. You said build them in

1 accordance with the patents themselves.
2 A. Uh-huh.
3 Q. I'm curious if maybe you could
4 expand on that a little bit.
5 What does it mean to build the
6 system in accordance with the patents themselves?
7 A. To use the description in the
8 specification of the patents as the guidance as
9 to what is needed, what needs to be designed and
10 programmed and released, deployed, if you will.
11 Q. Uh-huh, uh-huh.
12 A. That is what I mean by in accordance
13 with the specification of the patent.
14 Q. Okay. So, for example, let's take a
15 look back at 18 and maybe the description of
16 Figure 18.
17 So, I believe this description is in
18 Paragraph 118 of Ahn, and then goes into 119.
19 Can you pull those up?
20 A. Yes. I am looking at 118 now.
21 Q. Okay. There is a, I think a second
22 sentence of Paragraph 118 that starts with the

1 phrase, "For example, referring to."
2 Do you see that?
3 A. I do see that sentence.
4 Q. It says, "For example, referring to
5 Figure 18A, if the user drags in a right
6 direction after touching the screen, a graphical
7 shadow 1800 is displayed in the display 40. And
8 the menu list 1500 shown in Figure 15B can be
9 displayed in the display 40."
10 Is that an accurate read of that
11 sentence?
12 A. Yes, it is.
13 Q. Okay. So, if a POSITA were to read
14 this sentence, how would they implement this
15 sentence?
16 A. They would implement it where the --
17 when the finger is dragged in the right
18 direction, then the, afterwards, the menu is
19 displayed.
20 Q. Okay. You say the finger is dragged
21 in the right direction.
22 A. Yes.

1 Q. Is that the only variable of the
2 gesture that is being considered in this?
3 A. No. You need to, after touching the
4 screen -- so, I mean the drag implies that you
5 first touch and then you swipe and the finger
6 stays down on the screen and moves in the right
7 direction.
8 Q. Okay.
9 A. And then the first sentence talks
10 about the start position. So, it needs to be
11 within the boundaries. Earlier in the deposition
12 I talked about that bounding box.
13 You know, if X was between A and B,
14 and Y was between C and D. So, you got the start
15 position. You got finger down. You have a swipe
16 in a certain direction. All of those things
17 would be the, the triggering -- I don't know the
18 best way to describe it.
19 What would the gesture recognition
20 would tune into in order to determine whether
21 that left menu would be displayed.
22 Q. Okay. So, I think you mentioned the

1 bounding box of X and Y positions as a start
2 position for a gesture.
3 And you talked about a direction, a
4 user drags a finger on the display from that
5 start position.
6 Is that right?
7 A. Yes.
8 Q. Okay. So, looking at Paragraph 18,
9 looking at Figure 18, a POSITA is looking at
10 these two things and trying to implement the
11 system. Where must the user touch on the screen
12 in order to open the menu?
13 A. Well, the first sentence says,
14 "Figure 18 illustrates an example of a screen for
15 displaying a graphical display for notifying a
16 start position of a touch and drag operation to a
17 user.
18 So, in looking at Figure 18, it
19 would be in that cross hatched area.
20 Q. Okay. So, if a user were to touch
21 down outside of that cross hatched area and drag
22 to the right, would the menu open?

1 A. I think this is one embodiment that
2 uses a graphical shadow that would imply that it
3 would need to have that -- along with that first
4 sentence of Paragraph 118, that it would need to
5 be in that.
6 I think there are other embodiments
7 that don't have the graphical shadow, that you
8 could start from a broader range of Y positions.
9 Q. Okay. So, if a user is implementing
10 the graphical shadow 1800, they are definitely
11 going to limit the start location to within the
12 graphical shadow.
13 Is that correct?
14 MR. WALLIS: Objection, form.
15 THE WITNESS: I'm not sure I would
16 say it so strongly.
17 It would -- no, I, I don't think it
18 would absolute -- I mean you say definitely.
19 BY MR. HOLT:
20 Q. Uh-huh.
21 A. There could be some flexibility in
22 that the graphical shadow is just showing it is

1 from this left side of the display that the menu
2 emerges from, so to speak.
3 Q. Okay.
4 A. But, yeah.
5 Q. So in that case, perhaps the
6 graphical shadow isn't necessarily altering the
7 place of touchdown to open a menu as compared to
8 earlier figures.
9 Is that what you are saying?
10 A. I think that it doesn't necessarily
11 have to be 100 percent.
12 But, in this figure, I think that
13 this represents an embodiment that includes a
14 graphical shadow.
15 Q. Uh-huh.
16 A. And I don't believe all of them do.
17 Q. Uh-huh.
18 A. So, it would seem reasonable that it
19 could be implemented such that the start position
20 needs to be within that cross hatched area.
21 But, I can also see that, depending
22 on the implementation, that it just becomes an

1 indication, something called an affordance, if
2 you are familiar with that term.
3 Q. Uh-huh, yes.
4 A. It becomes an affordance to let the
5 user know that there is something hidden on the
6 left-hand side that could come out. And maybe
7 the designers didn't want to be so restrictive as
8 to limit the Y start position.
9 So, I guess I'm pushing back on the
10 term "definitely."
11 Q. Uh-huh.
12 A. Ahn seems to have other embodiments
13 that don't use a graphical shadow, which would
14 imply that Ahn is contemplating both, both the
15 very specific start position or a more
16 generalized start position that just needs to be
17 all on the left-hand side of the display versus
18 left-hand side bracketed between a certain Y
19 value and Y prime value.
20 Q. Okay. But, I believe you were
21 suggesting earlier, and please correct me if I'm
22 wrong, that with respect to Figure 18A and the

1 use of the graphical shadow, it could be that the
2 designer limits the touchdown position to just
3 where the graphical shadow is displayed or could
4 implement it so that the user can touch down
5 anywhere near the edge where the graphical shadow
6 is displayed.
7 Is that what I heard you discuss?
8 A. It is what you heard me discuss.
9 Both are possible implementations, yes.
10 Q. Okay. In Figure 18 of Ahn and in
11 its description here in Paragraph 118, does Ahn
12 talk about those two options, specifically?
13 A. One moment, I just clicked away from
14 it onto the figure.
15 If I go back to 118, in this
16 paragraph -- this Paragraph 118 specifically
17 concerns the graphical shadow.
18 Q. Uh-huh.
19 A. But when I say other embodiments,
20 there is descriptions of launching menus earlier
21 in the patent without, without discussing a
22 graphical shadow.

1 That is why I discuss, you know, Ahn
2 seems to contemplate both possibilities.
3 Q. Yes, I think that makes sense.
4 I guess the question I have though
5 is, if I'm understanding you correctly, a POSITA
6 who is reading Ahn would look at the disclosure
7 of Figure 18 and the Figure 18 itself and its
8 description, and they could implement it either
9 such that the user has to have the start position
10 within where the graphical shadow is displayed,
11 or they could have it that the user can touch
12 down anywhere along the edge as it is described
13 earlier in Ahn.
14 Is that correct?
15 A. It is possible. I mean a software
16 engineer can implement whatever they choose.
17 If I were implementing the system
18 myself, in a different, and there is multiple
19 embodiments in my software, so, you know, in some
20 places there is no graphical shadow.
21 I personally may be inclined to say
22 anywhere along the, you know, where X equals --

1 I'm sorry, yeah, X equals zero, the column is X.
2 And Y could be from zero to Y MAX.
3 Q. Uh-huh, uh-huh.
4 A. But on this section of the interface
5 where it is specified that there is a graphical
6 shadow, I personally might -- I can see
7 advantages both ways, but I might have the system
8 do nothing, if you are above or below the
9 graphical shadow.
10 Q. Okay. So would you say this is
11 maybe a design choice of the POSITA when they are
12 looking at Figure 18 and determining how to
13 implement it?
14 MR. WALLIS: Objection, form.
15 THE WITNESS: So, first off, we are
16 just talking about start position, right?
17 BY MR. HOLT:
18 Q. Right.
19 A. We are not talking about whether the
20 graphic moves. Because that is, that is
21 different. I think that is well specified and
22 that wouldn't be a design choice, because I think

1 the specification of Ahn is very clear when a
2 graphic moves and when it doesn't move.
3 Q. Uh-huh.
4 A. As I pointed out earlier. So, I
5 will just read aloud the first sentence of 118.
6 "Figure 18 illustrates an example of a screen for
7 displaying a graphical display for notifying a
8 start position of a touch and drag operation to a
9 user."
10 I would say given that first
11 sentence and the very distinct cross hatch area
12 of Figure 18A and B --
13 Q. Uh-huh.
14 A. -- and it says it is specifying --
15 doesn't use the word "specifying."
16 For displaying a graphical display,
17 for notifying a start position of a touch and
18 drag, I believe that a POSITA would implement
19 this, that it would need to be in that cross
20 hatched area.
21 Because otherwise you are not in the
22 start position, so why should the gesture

1 recognizer recognize that gesture if you are off
2 of it.
3 Like, if you were above or below,
4 you are off of it.
5 Q. Uh-huh.
6 A. Then all of a sudden, well, if you
7 are to the right of it, let's say you are in the
8 middle of the screen and 60 percent across, you
9 know, toward the right edge, should that be a
10 start position for bringing out the left menu?
11 Q. Uh-huh.
12 A. Let's say you are 90 percent and you
13 are trying to bring up the left menu and you are
14 all of the way close to the right.
15 It just wouldn't, I think, make as
16 much sense from a user experience point of view.
17 So, especially given there are other
18 situations without a graphical shadow. If there
19 is a graphical shadow, I believe a POSITA would
20 be motivated to implement this as, especially
21 given the first sentence, to have that start
22 position to be within the cross hatched area of

1 Element 1800.
2 Q. Okay. You had, I think in an answer
3 to a question just a moment ago, said that you --
4 and I might not be getting the words exactly
5 right.
6 But I think you said that there
7 could be advantages to either having it be that
8 the start position is within the shadow or that
9 the start position is just somewhere along the
10 edge where the shadow is.
11 Is that correct?
12 A. The only advantage I could think of
13 is, is let's say the user swiped and there were
14 two pixels above the graphical shadow or two
15 pixels below the graphical shadow. They were
16 very close but they were off.
17 Q. Uh-huh.
18 A. If the system does nothing in that
19 case, the user might think well, I swiped on the
20 graphical shadow and nothing happened.
21 In reality they were a couple of
22 pixels too high or a couple of pixels too low,

1 and they may think that the system doesn't work
2 very well or wasn't designed very well.
3 Q. Uh-huh.
4 A. Because, in reality they were off of
5 the start point.
6 Q. Uh-huh.
7 A. They thought they were on the start
8 point.
9 So, if I were implementing it, I
10 might build an invisible buffer, if you will.
11 Have that touch -- the tolerance of the touch be
12 a little bit higher or lower.
13 So, that could be an advantage of
14 being technically off of the graphical shadow,
15 yet still doing what the user likely intended the
16 software to do.
17 Q. Uh-huh. Okay. And I think you said
18 that might be how you implement it.
19 A. Uh-huh.
20 Q. Do you think a POSITA at the time of
21 the patent might have recognized that same
22 advantage of creating I think what you called an

1 invisible buffer.
2 A. Yeah, maybe buffer is not the right
3 word. But a border, to a visible, you know,
4 extra degree of tolerance about it.
5 Not every POSITA, I mean maybe
6 legally you would know better than I if ever --
7 if you have two different POSITAs, if they are
8 assumed to have the exact same training and the
9 exact same experience and do the exact same
10 design choices.
11 In reality we know that that is not
12 the case. Every person is an individual. So,
13 some may have recognized that and some may not
14 have.
15 Q. Okay.
16 A. I think, technically to, if you were
17 just to stick with what is in 118, you would
18 implement it just as described in 118.
19 You need to start on the graphical
20 shadow and you need to swipe in the right
21 direction. Drag your finger in the right
22 direction after touching the screen. That is

1 this embodiment.
2 Q. Okay. So, even though there were
3 advantages that you talked about to maybe having
4 a couple of pixels outside of the shadow and
5 helping the user experience that way, a POSITA
6 looking at Ahn would not do that.
7 Is that what you are saying?
8 A. I think a POSITA would implement
9 this as the start position would need to be on
10 the graphical shadow, yes.
11 Q. Okay.
12 A. It is probably getting more creative
13 and just thinking that I knew more than what the
14 designers intended and implemented. You know,
15 just me wanting to implement something different
16 and in my mind potentially better.
17 But I don't think that is what is
18 described in Ahn. I think what is described in
19 Ahn is the start position needs to be on the
20 graphical shadow.
21 Q. Okay. So your opinion is that a
22 POSITA reading Ahn and implementing what it

1 teaches would definitely implement it such that a
2 user would have to touch down with their gesture
3 inside of the shadow that is displayed and then
4 swipe right in order to open the menu?
5 A. Yes. For this, for this embodiment.
6 Speaking about 118. 118 specific --
7 Paragraph 118 specifically. Yes.
8 I don't think graphical shadows are
9 displayed everywhere or discussed everywhere.
10 That is why I couched it in that way.
11 Q. Okay. But where there is a
12 graphical shadow, the user would have to touch
13 down within the graphical shadow to open the
14 menu.
15 Is that correct?
16 A. I think given that first sentence
17 of 118 it says it is displaying a graphical
18 shadow. The purpose is for notifying a start
19 position of a touch and drag operation.
20 So, I think a POSITA would
21 understand that as if, if you are outside of the
22 graphical shadow, then you are not in a valid

1 start position.
2 So, yes. So, it shouldn't open the
3 menu. I use my example, if you are 90 percent to
4 the right-hand side of the screen, it just
5 wouldn't make sense to open a left-hand, a
6 left-side menu.
7 You typically want to be close to
8 the left-hand side and that is where the
9 graphical shadow is drawn in Figure 18.
10 Q. Okay. But there is a difference
11 between being 90 percent across the screen and
12 being a few pixels outside of the graphical
13 shadow, right?
14 A. Yes. There is a difference.
15 Q. But, Ahn here is not going to
16 acknowledge that difference. And it requires
17 that a designer design the system such that the
18 user touch down within the graphical shadow; is
19 that correct?
20 A. Yeah. Ahn isn't talking about this
21 border that I hypothesize could potentially be a
22 benefit.

1 You know, that is not the invention
2 of Ahn. That is just Craig inventing things on
3 the fly.
4 Q. So, when a POSITA read Ahn at the
5 time of the patent, they would have read
6 Paragraph 118 as dictating that they must have
7 the user touch down within the graphical shadow
8 and then swipe right in order to open the menu.
9 There is no room for the POSITA
10 having read Paragraph 118 to have implemented it
11 any differently; is that correct?
12 A. Again, when you put things so
13 absolutely like that, I question it.
14 Because if you look at the second
15 sentence now it says, "For example," referring to
16 Figure 18A, "if the user drags in a right
17 direction after touching the screen."
18 So, there it is not so, not so
19 absolute. It is not saying after touching the
20 screen on the graphical shadow. It is just
21 saying after touching the screen.
22 Q. Uh-huh. So, accounting for that

1 second sentence, where would a user have to touch
2 and then drag in the right direction in order to
3 open the menu?
4 A. But I'm just -- let me just think
5 for a moment. I'm just trying to rectify
6 sentence one and sentence two of Paragraph 118.
7 Q. Okay.
8 A. I think a POSITA on reading 118
9 would say that the start position for the touch
10 and drag operation needs to be within the
11 graphical shadow.
12 So, I think that would be the most
13 probable implementation, the most probable
14 understanding. In the, in this embodiment, if
15 there is graphical shadow display, that that
16 start position would need to be within that cross
17 hatched area.
18 Q. Okay. So, at the time of the
19 patent, a POSITA grabs Ahn and wants to create a
20 system.
21 When they read Paragraph 18, when
22 they looked at Figure 18, that POSITA would say I

1 absolutely have to, in implementing the system,
2 have the user touch down within the graphical
3 shadow in order for them to be able to open the
4 menu?
5 A. For this embodiment, yes. But, if
6 there is a graphical shadow -- but, like I said I
7 don't believe that in all cases Ahn defines that
8 there is graphical shadows that indicate where
9 menus will come out of.
10 This is an example of a screen for
11 displaying a graphical shadow. If there was no
12 graphical shadow, I think that there would be
13 more flexibility as to where the Y position of
14 that start point, the start touch could happen.
15 Q. Okay. Let's assume there is a
16 graphical shadow.
17 A. Uh-huh.
18 Q. The POSITA decides I like this idea
19 of a graphical shadow in Figure 18. That makes a
20 lot of sense to me. I think you called it an
21 affordance.
22 As I understand it, UI standards

1 love affordance; is that correct?
2 A. Yes, they are helpful to users.
3 Q. Okay. So we have an affordance
4 here, Graphic 1800. And a POSITA picking up on
5 at the time of the patent would have been
6 constrained in light of this disclosure in
7 designing the system to only implement it such
8 that the user touched down inside of the
9 graphical shadow and then swiped right in order
10 to open the menu.
11 A. It is -- I believe that would be the
12 most common understanding from a POSITA on
13 reading this, or if it was a POSITA that was
14 tasked to implement this, the most common way it
15 would be implemented.
16 When you are so absolute about it
17 would have been impossible for any other POSITA
18 to see it any other way, I kind of go back to
19 what I said about ten minutes ago which is I
20 don't believe every POSITA are, you know,
21 identical clones of each other.
22 And some, some POSITAs would have

1 slightly -- I mean, you, you have seen the
2 description of the POSITA and what educational
3 background and what experience background.
4 Just two people that have the same
5 computer science degree and two years of
6 experience designing user interfaces doesn't mean
7 that they have the exact same design ideas just
8 because they, they both match identically what a
9 POSITA is.
10 Q. Uh-huh.
11 A. So, so, it is hard for me. I guess
12 I, I can't agree, unless you tell me, that the
13 law says that every POSITA is identical.
14 We know that people are not. Just
15 because you have a computer science degree and
16 two years working at Apple or Microsoft or
17 something, designing user interfaces, doesn't
18 mean that you have the exact same tendencies when
19 it comes to user interface design.
20 So, I would think that the
21 majority -- I guess this is as far as I could go.
22 The majority of POSITAs that have all of the, you

1 know, that meet the criteria of the POSITA, but
2 because they are individuals would implement 18,
3 Figure 18 as having the start position to be
4 within the graphical shadow, that cross hatched
5 area.
6 Q. Okay. But there sounds like there
7 is some minority of POSITAs who would read this
8 differently; is that correct?
9 MR. WALLIS: Objection, form.
10 THE WITNESS: Like I said earlier,
11 I, just thinking, you know, well, I am a
12 programmer that knows more than Ahn, this
13 designer. You know, some ego and some
14 programmer could say well, I can make it --
15 yeah, that's pretty good but I can make it
16 better. I could add a little border around
17 it. Or, I can -- you know, there is a lot of
18 ways to modify it.
19 So, but it is not what it says. I
20 think we need to go by what it says and what
21 a POSITA would understand.
22 BY MR. HOLT:

1 Q. Uh-huh.
2 A. And I believe what it says and what
3 a POSITA would understand is that the start
4 position needs to be within the graphical shadow
5 for this use case.
6 Q. So, that minority of POSITAs that we
7 were just talking about who might think of some
8 of these modifications, I think is the word you
9 used in your last answer, do we ignore those?
10 Are those POSITAs not the POSITAs we are talking
11 about?
12 MR. WALLIS: Objection, form.
13 THE WITNESS: I think we -- it, to
14 me, it becomes just very complicated to talk
15 about multiple POSITAs.
16 I think we need to go back to just a
17 typical POSITA with the qualifications that
18 are described in terms of their educational
19 background and their experience.
20 And I think a typical POSITA, a
21 POSITA, I will just say singular, would
22 implement this as being within the, within

1 the graphical shadow 1800.
2 BY MR. HOLT:
3 Q. Okay. So, the software engineer
4 POSITA we have been talking about, this typical
5 person, would pick up on at the time of the
6 patent, read 118, 119, they would see Figure 18,
7 they would read all of Ahn.
8 And they would say to themselves, I
9 have to implement the system such that the user
10 touches down inside of the graphical shadow and
11 drags right in order to open the menu. If the
12 touch down position is anywhere else, it cannot
13 open the menu.
14 A. I think that would, that would be
15 understood by a POSITA reading 118, yes.
16 Q. Okay. So, Ahn constrains them in
17 their ability to design this system such that
18 they would feel that they have to make sure that
19 the user touches down within the graphical
20 shadows; is that right?
21 A. For this embodiment. I don't
22 believe graphical shadows are part of every time

1 a menu is open in Ahn that there is always a
2 graphical shadow.
3 Q. Uh-huh.
4 A. And if there is no graphical shadow,
5 I would think that there would be more leeway in
6 terms of where that start position could be.
7 Q. Okay. So, where there is no shadow,
8 there is some leeway is what you are saying?
9 A. I would say there is greater leeway.
10 If the menu is emerging from the
11 left, I would say the full range of Y, the full
12 height along the left-hand side --
13 Q. Uh-huh.
14 A. -- would be valid start positions.
15 Same thing if the menu, you know, emerges from
16 the right, then it would be the full range of Y
17 positions along the right-hand side.
18 So, the graphical shadow is, is more
19 limiting, I think, than when the start -- if
20 there is a graphical shadow, it constrains the
21 start position to a greater degree than if there
22 is no graphical shadow.

1 Q. And that is a, that is a requirement
2 of Ahn?
3 A. Well, it doesn't explicitly say
4 that. You are not going to find a sentence in
5 Ahn that says if there is a graphical shadow it
6 needs to be within that border. If there is not,
7 you have more leeway.
8 But, I think a POSITA when reading
9 Ahn and reading the entirety of Ahn and the
10 various embodiments would understand that.
11 Q. Okay. Does it matter whether or not
12 we are talking about -- and this is going to go a
13 little bit to the legal part of things.
14 Does it matter whether or not we are
15 talking about anticipation or obviousness with
16 respect to how a POSITA is looking at Ahn?
17 MR. WALLIS: Objection, form.
18 THE WITNESS: I think that requires
19 a legal conclusion and I'm not sure if -- I
20 don't think I'm qualified to answer that.
21 I mean I know what anticipation is
22 versus obviousness, but I don't think I can

1 apply those to your specific question.
2 BY MR. HOLT:
3 Q. Okay. I guess what I'm trying to
4 get at is, what would a POSITA -- just looking at
5 Ahn. I'm not even talking about any of the other
6 references here.
7 Just looking at Ahn, what would a
8 POSITA have found obvious when looking at Ahn
9 with respect to the graphical shadow?
10 MR. WALLIS: Objection, form.
11 Scope.
12 THE WITNESS: What would they have
13 found obvious?
14 It is such an open-ended question,
15 I'm not sure.
16 BY MR. HOLT:
17 Q. Well, let me constrain that a little
18 bit. That is fair.
19 A. Yeah, uh-huh.
20 Q. If a POSITA read Paragraph 118, in
21 the context of Ahn overall, would a POSITA have
22 found it obvious to give some leeway, is I think

1 the word you used, about where the start position
2 is with respect to the graphical shadow?
3 MR. WALLIS: Objection, form.
4 Scope.
5 THE WITNESS: No. I mean it is not
6 something I analyzed specifically.
7 But, in, in general, if the POSITA
8 implemented something different than what was
9 described in 118, that would be the POSITA
10 going off and implementing what they felt was
11 best and not what is described.
12 We really have to stick with what
13 is, you know, what is disclosed in Ahn
14 itself. And I think in Paragraph 118 it is,
15 it is that the start position needs to be
16 within the graphical shadow, given that first
17 sentence.
18 BY MR. HOLT:
19 Q. Okay. And so, I think that is what
20 I have been getting at with my questioning is
21 when we consider this, the teachings of Ahn from
22 the perspective of a POSITA, it is your position

1 that they would be constrained by Paragraph 118
2 to begin the gesture inside of the graphical
3 shadow?
4 A. Yes. For this embodiment. For an
5 embodiment where there is a graphical, if there
6 is a graphical shadow, if there is a graphical
7 shadow, so, yeah, the figure that shows a
8 graphical shadow, and you have a description that
9 says Figure 18 illustrates an example of a screen
10 for displaying a graphical display --
11 Q. Uh-huh.
12 A. -- for notifying a start position of
13 a touch and drag operation to a user.
14 Well, it is pretty apparent that
15 given you've got a finger that is pressing down
16 on element 1800 that is described as the
17 graphical shadow, that is the start position.
18 The finger is drawn right on that graphical
19 shadow.
20 And it says for notifying a start
21 position of a touch and drag operation to a user.
22 It seems pretty clear to me that what is being

1 described is the start position needs to be on
2 the graphical shadow.
3 So, I'm just saying that if a
4 graphical shadow is displayed --
5 Q. Uh-huh.
6 A. -- this paragraph seems to be saying
7 that the start position needs to be on that
8 graphical shadow.
9 Q. Okay. And it is your opinion that
10 having read the sentences you just talked about,
11 the POSITA would never think to stray from that
12 particular teaching.
13 That they would never implement this
14 such that the user could touch down anywhere
15 else?
16 A. That is, that is --
17 This -- I mean, we have had long
18 discussions about, maybe all POSITAs aren't
19 identical to each other --
20 Q. Uh-huh.
21 A. -- and some may second guess or feel
22 they have the better design.

1 But, what this says, and I think
2 that is what we have to go on, is that a POSITA
3 reading this would understand that this is
4 specifying in the specification of Ahn, that the
5 start position needs to be on the graphical
6 shadow itself.
7 So, that is what a POSITA would
8 understand in reading 118. If there is a
9 graphical shadow, that is specifying the start
10 position.
11 Q. Okay. And when you were evaluating
12 Ahn and, you know, maybe even some of the other
13 prior art references, you were reading the things
14 that were said as dictates as to how a POSITA
15 must implement a system of those teachings; is
16 that correct?
17 MR. WALLIS: Objection, form.
18 THE WITNESS: I would characterize
19 it as how a POSITA would understand.
20 We got into this whole discussion of
21 implementation, I think largely out of, you
22 know, I don't know if it is proper to call it

1 a hypothetical.
2 But, the discussion of, you know,
3 could this be a specification to a software
4 engineering team.
5 BY MR. HOLT:
6 Q. Uh-huh.
7 A. I think what is, what is really the
8 way that this should be read is a POSITA reading
9 the patent, what would they understand.
10 It is atypical. It is that -- you
11 know, the standard isn't a POSITA reads a patent
12 because they want to implement the software --
13 the system themselves.
14 I think the standard and the
15 understanding is a POSITA reads the patent just
16 to know what was disclosed, just to know what,
17 what the POSITA would understand in the prior
18 art.
19 So, I think that is the lens or the
20 standard or the metric that we have to, that we
21 have to go by as opposed to continuing to go down
22 this route of this patent is a specification for

1 a software team.
2 Q. Uh-huh.
3 A. It is really what would a POSITA
4 understand when reading the patent itself. And I
5 believe a POSITA, when reading 118, would
6 understand that if there is a graphical shadow,
7 the start position needs to be within the
8 graphical shadow.
9 Q. Okay. When reading this paragraph,
10 Ahn more generally, some of the other prior art
11 references, could a POSITA bring their own
12 knowledge about user interface design to their
13 understanding of the writing and how the writing
14 might be useful in creating a system?
15 MR. WALLIS: Objection, form.
16 THE WITNESS: I want to understand
17 your question, so when I answer, I am
18 answering the question asked.
19 You are saying when a POSITA reads a
20 patent, do they bring their own knowledge in
21 interpreting that?
22 BY MR. HOLT:

1 Q. Uh-huh.
2 A. Yes, in general. Yes. It is their
3 education and training that gave them the
4 experience and the knowledge for, you know, that
5 they used to interpret what they are reading.
6 Q. Okay. In bringing that knowledge to
7 the reading of a reference like Ahn, are they
8 allowed, or is it, I guess, in -- let me ask this
9 more specifically.
10 When you were evaluating what a
11 POSITA would have known in light of this prior
12 art, and specifically let's say Paragraph 118,
13 was it your understanding that the POSITA in
14 reading 118 would have to be constrained by the
15 teachings of 118?
16 MR. WALLIS: Objection, form.
17 THE WITNESS: It is my opinion that
18 a POSITA in reading 118 would understand what
19 is disclosed in 118 which is that the start
20 position needs to be within that graphical
21 shadow 1800.
22 That they would -- it seems

1 unambiguous. It seems like that is what the
2 POSITA would understand.
3 The POSITA in the back of their mind
4 might think oh well, I know a different way
5 to implement it.
6 BY MR. HOLT:
7 Q. Uh-huh.
8 A. I know what I think is a better way
9 to implement it. But, the POSITA would say I
10 understand what Ahn is describing.
11 Q. Okay.
12 A. They are describing X, and I
13 understand X.
14 So, yes, a POSITA could come up with
15 different ideas or modifications to what Ahn is
16 describing. But, I think that what Ahn is
17 describing is pretty clear.
18 Q. Okay. What would a POSITA do with
19 those ideas, modifications that they have.
20 Would they ignore them?
21 MR. WALLIS: Objection, form.
22 THE WITNESS: I'm not sure how to

1 answer your question. What is the task of
2 the POSITA?
3 Isn't -- are, it seems like we are
4 still in the domain of the POSITA's task to
5 build a software system, which I said was
6 probably not even applicable from a legal
7 point of view here, because that is not what
8 we are talking about.
9 We are talking about just what the
10 prior art discloses. So, that is the whole
11 reason that we are looking at Ahn.
12 BY MR. HOLT:
13 Q. Uh-huh.
14 A. Ahn, it is my understanding is prior
15 art, and so what did it disclose and what didn't
16 it disclose.
17 So, if the POSITA has all sorts of
18 other ideas that is not Ahn but something
19 different from Ahn, that is irrelevant to what a
20 POSITA would understand as the disclosures of Ahn
21 itself.
22 Q. Okay. But, before you had talked

1 about the concept of obviousness and that you
2 understood what obviousness is; is that correct?
3 A. Yes. I, I do understand
4 obviousness. And in general, if you have two
5 different references that are -- if reference A
6 discloses X and reference B discloses Y, and
7 there is sufficient motivation to combine those
8 two references, it could be argued that the two
9 references in combination will -- you know, it is
10 obvious to combine those two --
11 Q. Okay.
12 A. -- for certain benefit. So, you
13 know, that may or may not map to what is
14 described in the subject patent.
15 That is my understanding of
16 obviousness.
17 Q. Okay. Does -- you talked about
18 there being a teaching and a second reference.
19 Does there always have to be a
20 second reference for obviousness?
21 A. I think there is a concept that is
22 called single-reference obviousness.

1 I am not an attorney. I think
2 typically obviousness are several to -- a
3 plurality of references.
4 But, I do believe that there is this
5 concept of single-reference obviousness. But, I
6 can't claim to be an expert on what distinguishes
7 that or not.
8 Q. Yeah. I guess I'm trying to
9 understand from your perspective in evaluating
10 what a POSITA would have done with this prior
11 art, you know, what your understanding of that
12 POSITA is and how they would approach this art,
13 is where I'm getting at with these questions.
14 And so, it is possible you
15 understand that there exists a concept of single
16 reference obviousness you said, but you don't
17 know what that means. Is that correct?
18 MR. WALLIS: Objection, form.
19 THE WITNESS: Yeah, I believe that
20 was mentioned in another case a long time
21 ago. It may have been described to me at the
22 time, but I have forgotten the specific

1 attributes of what it -- you know, what a
2 reference would have to have or what kind of
3 arguments would be made.
4 I don't, I don't study that. I
5 haven't studied that. So, if your question
6 is do you -- you know, can you define
7 single-reference obviousness or what does it
8 mean, I wouldn't be able to give you a good
9 answer on that.
10 I think it is a legal, a legal term.
11 I, I mean I could speculate, but, on what it
12 might mean.
13 BY MR. HOLT:
14 Q. Your opinions were from the
15 perspective of a POSITA; is that right?
16 A. Yes, they were.
17 Q. Okay. And so again I guess what I'm
18 trying to get at is, what a POSITA would be
19 considering as obvious in light of a teaching.
20 Does that make sense?
21 MR. WALLIS: Objection, form.
22 THE WITNESS: I think so. It is a

very high level question or concept.

What -- so, there is the teaching in 118.

BY MR. HOLT:

Q. Uh-huh.

A. And if you ask what they would consider, what a POSITA would consider obvious --

Q. Uh-huh?

A. -- in terms of 118, well, that you are touching on the graphical shadow that is the start position.

Q. Uh-huh.

A. That you are dragging to the right after touching the screen.

Q. Uh-huh.

A. The screen is presumably on the graphical shadow per the first sentence.

Q. Uh-huh.

A. So, I think those are certainly obvious.

Maybe you are implying that there is additional things that are obvious that aren't

1 mentioned. I'm not sure. You have to be more
2 specific in your question and I will do my best
3 to answer.
4 Q. Okay. Would a POSITA have found it
5 obvious after reading Ahn that a user could touch
6 down outside of the graphical shadow and still
7 open the menu?
8 MR. WALLIS: Objection, form.
9 Scope.
10 THE WITNESS: I don't know if I
11 would call it obvious. It is certainly not
12 what is described.
13 BY MR. HOLT:
14 Q. Uh-huh.
15 A. I think a POSITA would understand
16 that one doesn't have to have a graphical shadow
17 to open a menu.
18 Q. Uh-huh.
19 A. Which is described in Ahn. So --
20 Q. Let's assume for the sake of the
21 question there is a graphical shadow. Again, the
22 POSITA sees the graphical shadow as an

1 affordance, loves affordances, wants the
2 affordance. So they want the graphical shadow.
3 My question is that would it have
4 been obvious to that POSITA, the person that we
5 are talking about, the typical person that has
6 the background we were talking about before, a
7 POSITA as it was defined in this proceeding.
8 Would it have been obvious to that
9 POSITA that a user could touch down outside of
10 the graphical shadow and still open the menu?
11 MR. WALLIS: Objection, form, scope.
12 THE WITNESS: That is not something
13 I specifically analyzed for this. I wasn't
14 asked to analyze that.
15 It is certainly not what is
16 described in 118. This is different
17 than 118.
18 I mean, you could say, well,
19 wouldn't it be obvious that they could just
20 tap on the graphical shadow and it would open
21 the menu, too.
22 BY MR. HOLT:

1 Q. Okay.
2 A. Or, you know, that they could do,
3 put two fingers and splay the two fingers to, you
4 know, do an enlarging kind of operation.
5 I mean, you could think of all kinds
6 of things. Wouldn't it be obvious to do X, Y and
7 Z? That is not what is described in 118.
8 So, POSITAs can be creative and
9 think of all kinds of things, but I don't think
10 that what you are describing of putting the
11 finger down somewhere else that is not on the
12 graphical shadow and opening that menu, it is
13 just really not what is described.
14 So, I believe the standard is, is
15 what would a POSITA have understood when reading
16 Ahn, or more specifically when reading Ahn 118.
17 And I don't believe that they would have
18 understood that it is possible -- possible might
19 not be the best. Anything is possible when it
20 comes to computer graphics pretty much.
21 But that is not what is described.
22 That is not how Ahn was intended to work when

1 there is a graphical shadow. So, I think I
2 answered the question no.
3 From the disclosure in 118, I don't
4 believe that it would be obvious to, you can
5 start in the graphical shadow or outside. I mean
6 it is explicitly saying, here is the graphical
7 shadow. We are going to start in the graphical
8 shadow.
9 And if I were to agree with you,
10 which I don't, it is like yeah, you can ignore
11 the graphical shadow. There is really no
12 purpose. It says you need to start in the
13 graphical shadow, but it would be obvious to
14 start anywhere.
15 So, I don't think a POSITA would
16 understand, would understand that from reading
17 118 of Ahn.
18 Q. Okay. You had mentioned tapping.
19 A. I'm sorry, mentioned what?
20 Q. You mentioned tapping the graphical
21 shadow 1800.
22 Do you recall that?

1 A. Yes, that was just throwing out
2 examples of other ways to open the menu that are
3 not described in 118.
4 Q. Okay. A POSITA having read Ahn, and
5 all of Ahn, what would they think a system would
6 do if a user tapped the graphical shadow?
7 MR. WALLIS: Objection, form.
8 THE WITNESS: I think they would,
9 they would think that nothing happens.
10 BY MR. HOLT:
11 Q. Okay.
12 A. It is responsive to a swipe and not
13 a tap.
14 Q. Okay. So, because Ahn doesn't
15 describe what happens when a user taps graphical
16 shadow 1800, that POSITA would understand that to
17 mean that nothing can happen -- nothing is
18 allowed to happen in response to the tap.
19 A. Well, in reading further,
20 actually 119, it says referring to 18B, so this
21 is the right-hand side of 18.
22 If the user touch drags to the left,

1 the menu list shown in Figure 15B -- let me just
2 look at 15B real fast.
3 Okay. I see 15B. Let me go back
4 to 119. If the user touch drags to the left, the
5 menu list 1500 shown in 15B can be displayed in
6 the display 40.
7 In this case as the user may press
8 the graphic 1800 with a finger, the graphic
9 gradually disappears in the display, and the menu
10 list 1500 can be displayed as emerging from the
11 left side of the display, while graphic 1800
12 disappears in 40.
13 As emerging from the left in
14 side 15 -- one moment. Let me look at 1500
15 again.
16 Okay. So, so this is describing a
17 press operation. The user may press the
18 graphic 1800 with the finger. The graphic 1800
19 gradually disappears in the display, and the menu
20 list 1500 can be displayed as emerging.
21 So, so, it seems to be describing a
22 way to use a press to get menu 15B to be

1 displayed.
2 Q. Okay. So, considering
3 Paragraphs 118 and 119 together, how would a
4 POSITA understand the menu 1500 to open?
5 A. Let me get that -- I'm going back
6 and forth between the spec and the figures, so it
7 will take a moment.
8 Q. Uh-huh.
9 A. So, I will just read aloud the
10 second sentence of figure -- of Paragraph 118.
11 "For example, referring to
12 Figure 18A, if the user drags in the right
13 direction after touching the screen, the
14 graphical shadow 1800 is displayed in the
15 display 40 and the menu list 1500 shows -- shown
16 in Figure 15B can be displayed in the
17 display 40."
18 So, they would swipe right starting
19 on the graphical shadow 1800 that is displayed in
20 Figure 18A. And that would get the menu
21 list 1500 that is shown in 15B to be displayed.
22 That is how they would display 1500.

1 Q. Are there any other ways that
2 menu 1500 would be displayed?
3 A. I am going back and forth. One
4 moment.
5 In Paragraph 119 it says, "Further,
6 for example," referring to 18B, "if the user
7 touch drags to the left, the menu list 1500 shown
8 in Figure 15B can be displayed."
9 So, I just want to look at these
10 two. It is really only showing one menu, which
11 is 15B. That is the only menu that is displayed.
12 The user touch drags to the left.
13 The menu 1500, shown in Figure 15B, can be
14 displayed in display 40.
15 In this case, as the user may press
16 the graphic 1800 with a finger, the graphic 1800,
17 the graphic 1800 gradually disappears into the
18 display, and the menu list 1500 can be displayed
19 as emerging from the left side of the display 40,
20 while the graphic disappears in the display 40.
21 So, a touch on 1800, on the second
22 sentence of 119, says a press on graphic 1800

1 will disappear element 1800 and display menu
2 list 1500.
3 So, that is disclosed as well.
4 Q. So, between Paragraphs 118 and 119
5 of Ahn, how many ways are there for a user to
6 open the menu 1500 with respect to Figure 18?
7 A. You can swipe right or you can
8 press. Yeah, you can swipe right on the
9 graphic 1800 or you can do a press. But neither
10 of these are mapping to two different durations
11 of touch that, you know, Claim 1 and 1 of 1 are
12 describing.
13 Q. Okay. I'm really more interested in
14 just trying to understand how Ahn works and how a
15 POSITA would have understood it to work.
16 When Paragraph 119 says, "In this
17 case as the user may press the graphic 1800 with
18 a finger, the graphic 1800 gradually disappears
19 in the display 40 and the menu list 1500 can be
20 displayed as emerging from the left side of the
21 display 40, while the graphic 1800 disappears in
22 the display 40."

1 Is that sentence talking about a
2 different method for opening menu 1500 than the
3 drag talked about in the first sentence?
4 A. Yes. It appears to, it appears to
5 be a different method.
6 Q. Okay. So, in light of
7 Paragraph 119, there is at least two ways to open
8 menu 1500 in Figure 18.
9 Is that correct?
10 A. Seems to be. Seems to be a swipe to
11 the right starting on the graphical shadow, or a
12 press on the, a press on the 1800.
13 Q. Okay. When a POSITA read the word
14 "press," how would they have understood that?
15 A. To take the finger and to press it
16 against the screen itself on the graphical
17 shadow 1800.
18 Q. Okay. Would any touch of a finger
19 within the graphic 1800 be considered a press?
20 A. Well, I don't think it would -- it
21 would not be broad enough to include a swipe.
22 But, to the extent you are asking is a press

1 similar to a tap, I think it could be.
2 It could be. A tap implies that
3 the, that it also comes off of the finger --
4 comes off of the display soon. A press may not
5 imply that it comes off soon as well.
6 A tap does imply that it is a finger
7 down, finger up. A press implies that it is
8 finger down, but I mean ultimately the finger
9 does come up at some point.
10 There is no description of timing
11 when it, you know, how long the finger stays
12 down.
13 But, I don't -- a press is not broad
14 enough to include a swipe.
15 Q. Okay. So, with respect to the
16 second sentence of Paragraph 119, would a POSITA
17 have understood that the menu opens as a result
18 of the initial contact between the finger and the
19 screen or would it be some other part of the
20 gesture that would open the menu?
21 A. You can --
22 MR. WALLIS: Objection to form.

1 THE WITNESS: You can say it in the
2 same way, but just ask the question one more
3 time, please?
4 BY MR. HOLT:
5 Q. So, I think much earlier in our
6 conversation we were talking about gestures
7 having a lot of different dimensions.
8 And, I'm trying to understand what
9 dimensions are important for the word "press,"
10 and how a POSITA would understand the word press.
11 So, when Paragraph 119 says "press,"
12 does that mean the menu opens as soon as the
13 finger touches the screen?
14 MR. WALLIS: Same objection.
15 THE WITNESS: If your question is,
16 is it invoked on finger down versus finger
17 up, I think that it is in -- the triggering
18 action is finger down.
19 The press is finger down. It is not
20 finger up. And, what you say immediately,
21 there is, there is implications that there is
22 some animations going on here.

1 Graphic 1800 gradually disappears.
2 That is the graphic shadow animating, you
3 know, to the left off the screen.
4 And the menu list can be displayed
5 as emerging from the right-hand side of the
6 display. That that could either be an
7 animation -- emerging from the left-hand side
8 of the display.
9 That could either be an animation
10 itself or just an instantaneous coming -- you
11 know, it would appear it is from the left
12 because it is anchored to the left-hand side.
13 So, I guess I'm answering -- I
14 mentioned animations because I think you used
15 the word "immediately."
16 Q. Uh-huh.
17 A. But, but the comment that you had
18 about press and what triggers it, I would say it
19 is finger down.
20 Q. Uh-huh.
21 A. When the finger hits the display
22 on 1800, the graphic 1800 gradually disappears.

1 That would be the animation taking 1800 off the
2 display. And the menu, in the list 1500, can be
3 displayed as emerging from the left-hand side of
4 the display.
5 Q. Okay.
6 A. So, finger down.
7 Q. Okay. So, as soon as the user's
8 finger is down on the surface of the display, the
9 animations you were just talking about in your
10 previous answer begin; is that correct?
11 A. I think that is how a POSITA would
12 understand it.
13 Q. Okay.
14 A. Although implementation wise, the
15 gesture recognition piece would have to -- there
16 is really not a difference. I'm just thinking
17 this through. There is really not too much of a
18 difference.
19 We are talking about two ways of
20 getting the menu to appear that is in 15B, and,
21 you know, as described in 118 and 119.
22 One is a press and the other is a

1 drag.
2 Q. Uh-huh.
3 A. Let me read something in 118,
4 please.
5 Q. Uh-huh.
6 MR. WALLIS: Dr. Rosenberg, please
7 finish answering the question.
8 While there is a lull, David maybe,
9 it has been, I think two hours. If you are
10 anywhere close to having a break spot, I
11 think that might be nice for everyone.
12 MR. HOLT: Understood. I apologize,
13 I lost track of time. Thank you.
14 MR. WALLIS: Happens when you are
15 having fun, right.
16 MR. HOLT: Exactly.
17 THE WITNESS: Hmm. Well, after
18 re-reading it several times, there is, there
19 is some nuance here that I haven't discussed
20 yet.
21 BY MR. HOLT:
22 Q. Okay.

1 A. And I have forgotten your question,
2 too, so if you want to re-ask that.
3 But, there is, there is some things
4 I want to describe about 118 that I didn't
5 describe earlier.
6 MR. HOLT: Okay. Do you want to
7 describe those now or would you like to take
8 a five-minute break to use the restroom?
9 THE WITNESS: I am happy to take a
10 break and then come back to it.
11 MR. HOLT: Okay. Sounds good. Can
12 we go off the record?
13 (Recess taken -- 10:02 a.m.)
14 (After recess -- 10:10 a.m.)
15 BY MR. HOLT:
16 Q. So, before the break, Dr. Rosenberg,
17 I think you said that there was some nuance, if I
18 am remembering the word correctly, with respect
19 to Paragraphs 118 and 119 that you wanted to
20 discuss.
21 So, what is the nuance you were
22 referring to?

1 A. Yeah, maybe it is even more than
2 nuance.
3 Just in re-reading it multiple
4 times, I think that I just -- I don't think that
5 this is describing a tap or a press.
6 I think the interaction with the
7 graphical shadow is just via swipes. And I can
8 explain that.
9 And I also think that the graphical
10 shadow needs to be invoked. It is not just
11 always present. So, I didn't describe that
12 earlier, too.
13 In 118, it says, "For example,"
14 referring to Figure 18A, "if the user drags in a
15 right direction after touching the screen, a
16 graphical shadow 1800 is displayed in the
17 display 40."
18 So, that tells the user that -- that
19 tells the POSITA when reading this that the
20 graphical shadow isn't always there, but you
21 invoke it by right swiping on the screen to get
22 the graphical shadow 1800 to be displayed on the

1 display 40.
2 And then the menu list 1500 that is
3 shown in 15B can be displayed in 40.
4 So, reading on, I will just read and
5 explain. "In this case as the user drags the
6 graphic shadow 1800, the menu list 1500 can be
7 displayed along the dragged graphic 1800."
8 And then, so, I guess that was
9 Point 1, is that the user needs to get that
10 graphic shadow to show, as opposed to it being
11 always present.
12 And then the second is, I believe
13 that the interaction with the graphic shadow is
14 always via swipes, as opposed to I mentioned the
15 press, you know, implies that it could be a tap
16 or a different way for interacting it.
17 In reading it more carefully, I
18 don't believe that is the case and I will tell
19 you why.
20 So, in 119, it says "Further, for
21 example," referring to Figure 18B, "if the user
22 touch drags to the left -- " so, that is a swipe

1 operation, " -- the menu list 1500, shown in
2 Figure B, can be displayed in the display 40."
3 So, to get the menu list 15B to
4 display, it is explicitly saying that you touch
5 drag to the left on that graphic shadow.
6 And then the second, the sentence
7 right after it says, "In this case as the user
8 may press the graphic 1800 with a finger," well,
9 you always have to press before you can do a
10 swipe --
11 Q. Uh-huh.
12 A. -- right? So, that is the beginning
13 of your swipe is that press.
14 "In this case as the user may press
15 the graphic 1800 with a finger, the graphic 1800
16 gradually disappears in the display 40, and the
17 menu list 1500 can be displayed."
18 So, here they providing more detail
19 as to how 15B is displayed as a result to a left
20 swipe on that graphic shadow. And that more
21 detail has to do with the animations that are
22 described and how the graphic shadow gradually

1 disappears in the display, and the menu list can
2 be displayed as emerging from the left-hand side.
3 That implies that it is also an
4 animation as well.
5 If something is emerging, then it
6 implies that it is -- you have some sense of it
7 emerging over time.
8 Q. Uh-huh.
9 A. So, I believe that this is
10 describing two different animations that happen
11 as a result of a left swipe on the graphic
12 shadow.
13 Q. A left swipe in Figure 18 would have
14 been back towards the left edge; is that correct?
15 A. Yes, if you look at 15B, well I'm
16 sorry, 18, Figure 18B.
17 The fingers on 18A are sort of
18 pointing to the right, so it implies that is the
19 right swipe to get that graphic shadow to show.
20 Q. Uh-huh.
21 A. And then the left swipe on, on --
22 you see the fingers are pointing the other way --

1 Q. Uh-huh.
2 A. -- on 18B, it invokes the animation
3 to hide the graphic shadow and to bring up the
4 menu that you see in 15B.
5 That is what 119 seems to be
6 describing.
7 Q. Okay. So if I am understanding the
8 order of operations correctly here, what Ahn is
9 describing is that initially there is no
10 graphical shadow 1800.
11 Is that correct?
12 A. Yes.
13 Q. Okay. Then, I have to swipe to the
14 right in order to display the graphical
15 shadow 1800.
16 Is that correct?
17 A. Yeah. It says, "If the user drags
18 in a right direction after touching the screen,
19 the graphical shadow 1800 is displayed in the
20 display 40."
21 And the menu list 1500 shown in 15B
22 can be displayed in the display.

1 So, it kind of implies that both
2 those happen on the same swipe. I was reading
3 for a while back and forth. You know, is it
4 broad enough to mean that you do a second swipe,
5 one to get the graphic shadow and then a second
6 swipe to get that menu list?
7 It may be broad enough to encompass
8 both. But it does seem that it is probably a
9 single swipe that first shows the graphic shadow
10 and then ultimately turns into the menu.
11 And then you can essentially --
12 anyway, I will wait for your question.
13 Q. So, once the graphical shadow is
14 there, am I performing the same swipe to open the
15 menu or a different swipe to open the menu?
16 A. It seems to imply it is the same
17 swipe to the right. But, the next paragraph,
18 they talk about the left swipe.
19 I think it gave more credence to the
20 interpretation that it is two swipes. One is to
21 display the graphic shadow.
22 Q. Uh-huh.

1 A. And then -- the first swipe is to
2 show the graphic shadow.
3 Q. Uh-huh.
4 A. The second swipe -- I think a very
5 plausible read of this is that the second swipes
6 to show the menu are all to the left. They are
7 all to the left on the graphic shadow.
8 Q. Okay. So I'm a user. I have to
9 swipe from somewhere around the left edge toward
10 the center of the display in order to show the
11 graphic 1800.
12 And then I touch down inside the
13 graphic shadow and swipe left to show the menu.
14 Is that correct?
15 A. Yeah. Let me just re-read it and
16 answer you. All right. I have read it again.
17 So, I think you were asking it is a
18 right swipe to bring up the graphic shadow and
19 then a left swipe that is starting on the graphic
20 shadow to dismiss the graphic shadow and bring
21 up 15B.
22 Q. Yes.

1 A. Yes.
2 Q. Is that your understanding of how it
3 works?
4 A. Yes, it is.
5 Q. Okay. So, in order to get the
6 graphic shadow 1800, I have to do a first
7 gesture. And then in order to open the menu, I
8 have to do a second gesture; is that correct?
9 A. I think there is a little bit of
10 ambiguity in that. And I will point to, it is
11 the word "can" in the second to the last line of
12 Page 39.
13 Q. Uh-huh.
14 A. "If user drags in a right direction
15 after touching the screen, a graphical
16 shadow 1800 is displayed in the display, and the
17 menu list 1500 shown in 15B can be displayed in
18 the display 40."
19 So, if it said "is displayed," it
20 would be unambiguous. It is displayed right
21 there. It is a single gesture, drag to the right
22 that, that I don't think is, a POSITA would read

1 is the case.
2 Because what you would have to do is
3 you would show that graphic shadow just for a
4 moment. And then it would disappear, because you
5 are not showing 15B, the menu, at the same time
6 as the graphic shadow.
7 It is either the menu or the graphic
8 shadow, right. If you had the graphic shadow, it
9 would be obscuring part of your menu.
10 Q. Uh-huh.
11 A. So, it says the word "can" be
12 displayed. And if you look at the subsequent,
13 the rest of the sentence, and the entirety of
14 119, it describes how that menu, Figure 15B is
15 displayed, what additional things the user needs
16 to do, to get 15B to display.
17 And that would be a left swipe on
18 the graphic shadow itself that will dismiss the
19 graphic shadow with an animation and emerge 15B,
20 likely with an animation as well.
21 Q. Okay.
22 A. So, I believe that given it uses the

1 word "can" and given that it would not be a very
2 usable system to have the graphic shadow appear
3 at the exact same time as the menu, and have
4 those both fighting for the same screen space,
5 that it is a two -- like you said, two swipes, a
6 swipe to open the graphic shadow and then a swipe
7 to use that graphic shadow to open menu 15B.
8 Q. Okay. If a user were to swipe right
9 and keep the swipe going, you know, kind of
10 further along the display, would that open the
11 menu or no?
12 A. I don't believe so. There is no
13 disclosure of that here.
14 Q. Okay. So, the sentence we were
15 looking at before that says, "For example,
16 referring to Figure 18A, if the user drags in a
17 right direction after touching the screen, a
18 graphical shadow 1800 is displayed in the
19 display 40, and the menu list 1500 shown in
20 Figure 15B can be displayed in the display 40."
21 The menu list is not displayed with
22 respect to that right direction swipe. Is that

1 correct?
2 A. Well, I don't believe it is
3 displayed right at that time, but it enables the
4 possibility. It can be displayed in 40.
5 And the next couple of sentences
6 show how it can.
7 Like it certainly -- it doesn't seem
8 to disclose the possibility of showing 15B before
9 that graphic shadow comes out.
10 The graphic shadow is the trigger --
11 specifically, a left swipe on the graphic
12 shadow -- to get menu 15B to display.
13 So, there, there is no way to
14 display 15B, if you don't have a graphic shadow
15 as being your start point target.
16 So, given the two things I said, the
17 fact that it uses the word "can" be displayed, I
18 think that means it enables a system, an
19 affordance has come on to the screen, which is
20 your graphic shadow, that will allow a user to
21 open 15B.
22 And if it was, if it was as you said

1 where a long wipe -- a long swipe to the right
2 would bring up the menu, then they never talk
3 about dismissing the graphic shadow itself,
4 right.
5 So, you wouldn't -- a user wouldn't
6 want a system with the graphic shadow overlaid on
7 the same part of the screen as the menu. They
8 would fight with each other.
9 So -- and there is no description of
10 the long swipe bringing up the menu itself. I
11 mean, the description of how in this -- at that
12 point how the graphic shadow is dismissed.
13 The only way the graphic shadow is
14 dismissed is a sentence or two later where it
15 says when you left swipe on the graphic shadow,
16 it does two things. It animates the dismissal of
17 the graphic shadow and it brings up the graphic
18 itself.
19 It uses the word "emerges." The
20 menu list 1500 can be displayed as emerging from
21 the left side of the menu.
22 Q. Okay.

1 A. So, I believe it is describing two
2 swipes.
3 Q. Okay.
4 A. A right swipe and then a left swipe.
5 Q. I think earlier in our discussion
6 you referred to graphical shadow 1800 as an
7 affordance; is that correct?
8 A. I think it --
9 MR. WALLIS: Objection, form.
10 THE WITNESS: It could be described
11 as an affordance, yes. The patent doesn't
12 use that term. But, a POSITA would
13 understand what an affordance is, and I would
14 describe it as an affordance.
15 BY MR. HOLT:
16 Q. Is it common -- or let me strike
17 that. Ask that differently.
18 At the time of the patent, would a
19 POSITA have found it normal or peculiar that a
20 user would have to input a gesture to gain access
21 to an affordance?
22 MR. WALLIS: Objection, form.

1 THE WITNESS: I think affordances
2 can pop up depending on the mode. This seems
3 to be describing a situation in which the
4 user wants to be in a mode where they can
5 launch, launch menus.
6 I don't think it would -- I think it
7 can happen both ways. Affordances could be
8 always present or affordances could be
9 depending on the mode.
10 There would be disadvantages of
11 having the graphic shadow that you see in
12 Figure 18 always present all of the time.
13 BY MR. HOLT:
14 Q. Okay.
15 A. It uses a lot of pixels.
16 Maybe 5 percent of the pixels of this display
17 would be constantly, you know, out of commission,
18 so to speak, because they would always be this
19 cross hatched graphical shadow.
20 So, there would be advantages of not
21 showing that all of the time.
22 Q. Okay. What is the purpose of the

1 graphical shadow?
2 A. Well, I guess I would want to search
3 through Ahn to see if they specifically say
4 something. In general, it provides a target.
5 But, I'm happy to see if Ahn says
6 something specifically regarding the purpose.
7 Q. I believe in Paragraph 117, it talks
8 about an identifier for notifying the user that
9 an item list matched to the specific direction as
10 displayed in the display 40, can be displayed in
11 the display 40.
12 A. All right. Let me read -- 117, you
13 say?
14 Q. Yes, sir.
15 A. All right, I have read that.
16 Q. Okay. Before a user swipes right
17 from the left edge of the display and the
18 graphical shadow 1800 is displayed, as you
19 described it --
20 A. Uh-huh.
21 Q. -- is there any indication to the
22 user that that gesture, an outcome is available

1 to him or her?
2 A. I don't believe so.
3 Q. Okay. So, in order to get access to
4 an indication of where a menu emerges, the user
5 has to do a gesture for which there is no
6 notification; is that correct?
7 A. In order to get access to where a
8 menu -- what were the next words?
9 Q. Let me restate.
10 The graphical shadow 1800 is a
11 notification to the user that a menu is
12 associated with the left-hand side of the
13 display, correct?
14 A. Yes.
15 Q. In order to get access to that
16 notification, a user would have to input a
17 gesture that has no notification itself; is that
18 correct?
19 A. When you say no notification, you
20 mean there is not an affordance?
21 Q. Correct.
22 A. Okay. Yes. And I believe I

1 answered that just previously.
2 Q. Okay.
3 A. If that was the same question as
4 before.
5 Yes, I don't believe that there is
6 an affordance showing that the -- I mean much
7 like in the same way with, you know, Apple and
8 iOS devices, there is plenty of swipe directions
9 that both those operating systems recognize
10 without any affordance.
11 The user just needs to know from
12 training or experience.
13 Q. Okay. But if a user would know a
14 gesture from training or experience, why include
15 the graphical shadow 1800 at all?
16 A. I was thinking just a minute or two
17 earlier, this isn't necessarily how I would
18 design it. But, I think it is a good question.
19 It is a valid question.
20 I can just go by what is disclosed
21 in Ahn itself. Ahn does disclose a graphical
22 shadow in Paragraphs 118 and 119. They disclose

1 how to get the graphical shadow to display.
2 Q. Uh-huh.
3 A. If you look at Figure 15, there is
4 no graphical shadow.
5 Q. Uh-huh.
6 A. And they are bringing up a menu.
7 That is why I talked about there's different
8 embodiments for how to bring up a menu.
9 Q. Uh-huh.
10 A. Some use graphical shadows, some
11 don't.
12 Here this, what is described in 15
13 seems to be somewhat simple, right. There is no
14 affordance, but you have the advantage of not
15 taking up pixels from the display, all of the
16 time.
17 And, the user does need to know it,
18 how to get that menu to display, but it is a
19 simple right swipe.
20 There is, in Paragraphs 118 and 119,
21 they discuss a different way to get Figure 15B to
22 display as well, and that is using the graphical

1 shadow technique.
2 You know, there seems to be multiple
3 ways to get Figure 15B to display --
4 Q. Uh-huh.
5 A. -- those different embodiments.
6 And, it -- I mean, if you are asking me to defend
7 why do 18 -- why do what was described in 18 --
8 Paragraphs 118 and 119, I haven't really analyzed
9 that.
10 You know, if there are advantages
11 over what is already described for Figure 15.
12 But it does seem to be described as yet another
13 possibility to bring up 15B.
14 Q. Right. Okay. Would it have been
15 obvious to a POSITA after reading Paragraphs 117
16 through 119 to have displayed graphic 1800 from
17 the start without the gesture?
18 MR. WALLIS: Objection -- sorry.
19 Objection, form, scope.
20 THE WITNESS: You are asking would
21 have been obvious to always have the graphic
22 shadow displayed?

1 BY MR. HOLT:
2 Q. Yes.
3 A. I don't think it, I don't think it
4 would be advantageous to do so, for the reasons I
5 mentioned earlier, of using the display space all
6 of the time.
7 Q. Okay.
8 A. So, I think a POSITA could realize
9 they could do 100 different things with the user
10 interface, but I don't think they would be
11 motivated to do so, to have that always
12 displayed.
13 Q. Okay. We got on this topic way back
14 with the idea of a press, potentially opening the
15 menus.
16 And I think now we are at a place,
17 am I correct, that a press alone will not open a
18 menu; is that right?
19 A. Yes. Not as described in 118
20 and 119.
21 That press essentially was the first
22 touch associated with the left side, a leftward

1 swipe.
2 Q. Okay.
3 A. A left swipe.
4 Q. If after the rightward swipe opens
5 or displays the graphic 1800, under your
6 understanding of this description, what would
7 happen if a user tapped inside of the graphic
8 1800?
9 A. I don't think anything would happen.
10 Q. Okay.
11 A. Nothing would happen. That, that
12 graphic shadow is responsive to swipes.
13 Q. Okay. A POSITA who read on in these
14 paragraphs, would that POSITA have found it
15 obvious for a tap on the graphical shadow to
16 perform any functionality whatsoever?
17 MR. WALLIS: Objection, form.
18 THE WITNESS: I will answer it with
19 motive. I don't think they would be
20 motivated to provide a different interaction
21 technique.
22 BY MR. HOLT:

1 Q. Okay.
2 A. I think they would, they would
3 design it such that the graphic shadow is meant
4 to be something that is responsive to a swipe and
5 not a tap.
6 Q. Okay. So, a POSITA reading on
7 would, in using a graphical shadow 1800, only
8 understand it as being able to respond to swipes?
9 MR. WALLIS: Objection, form.
10 THE WITNESS: I believe that is how
11 Ahn describes the use of the graphic shadow
12 and in no other way, yes.
13 BY MR. HOLT:
14 Q. Okay. And a POSITA would never
15 think to deviate from that teaching; is that
16 correct?
17 A. I don't think a POSITA would be
18 motivated to deviate from that teaching.
19 Q. Okay.
20 A. A POSITA, being one of ordinary
21 skill in user interface design, would realize
22 that there is many, many options that could be

1 done with that graphic shadow, but to accomplish
2 the goal, I don't think they would be motivated
3 to do anything else but to be responsive to the
4 swipe.
5 Q. Okay. So, there is -- the POSITA is
6 aware of other options, but there would be no
7 motivation for utilizing any of those options; is
8 that correct?
9 MR. WALLIS: Objection, form.
10 THE WITNESS: I think that I -- the
11 short answer is yes. A POSITA is aware of
12 many different user actions and styles.
13 I mean, the graphic shadow could
14 turn into a text entry box and you could, you
15 could name it.
16 You know, would a POSITA be
17 motivated to allow the user to put a custom
18 name in the graphic shadow? No, they
19 wouldn't.
20 Would it be possible, or are they
21 aware that it could be programmed that way to
22 make it a text entry box and to name your

1 graphic shadow?
2 Yeah, they would be aware that it
3 was possible. But that doesn't mean they
4 would be -- you know, it would provide
5 benefit to the user for the task at hand.
6 BY MR. HOLT:
7 Q. If they were aware of a benefit,
8 would it have been obvious for them to make that
9 change?
10 MR. WALLIS: Objection, form.
11 Scope.
12 THE WITNESS: They would -- if they
13 were aware -- if they thought that there was
14 a benefit, then a POSITA could have
15 implemented the benefit.
16 But, again, I think what is
17 important here is, it is not what creative
18 ideas a POSITA could have above and beyond
19 what Ahn is describing when the POSITA is
20 reading Ahn.
21 A POSITA might read Ahn and think
22 of, oh, I can think of ten additional things

1 that I could do to this that aren't described
2 in Ahn at all.
3 I mean, that is what we are talking
4 about here.
5 BY MR. HOLT:
6 Q. Uh-huh.
7 A. My understanding is what is
8 important is, what would a POSITA at the time of
9 the invention understand as Ahn having -- you
10 know, what is Ahn disclosing. Not all of the,
11 the 100 extra things a POSITA could do that Ahn
12 isn't disclosing.
13 So, Ahn isn't disclosing taps on the
14 on the graphic shadow. Ahn isn't disclosing the
15 ability to name a graphic shadow with a custom
16 name.
17 All of the things that a POSITA
18 would understand are possible, but just aren't
19 part of the disclosure of Ahn.
20 Q. Okay.
21 MR. HOLT: I don't think I have any
22 other questions.

1 THE WITNESS: Okay. Thank you.
2 MR. HOLT: Chad?
3 MR. WALLIS: No redirect at this
4 time. We are good.
5 MR. HOLT: Okay. Thank you.
6 (Whereupon, signature not having been waived,
7 the deposition suspended at 10:44 a.m.)
8 * * *
9
10
11
12
13
14
15
16
17
18
19
20
21
22

1 DECLARATION UNDER PENALTY OF PERJURY

2

3 I, CRAIG ROSENBERG, PH.D., do hereby certify

4 under penalty of perjury that I have read the

5 foregoing transcript of my deposition taken on

6 July 10, 2025; that I have made such corrections

7 as appear noted herein in ink, initialed by me;

8 that my testimony as contained herein, as

9 corrected, is true and correct.

10

11 Dated this ____ day of _____, 2025.

12

13

14

15 CRAIG ROSENBERG, PH.D.

16

17

18

19

20

21

22

1 CERTIFICATE OF NOTARY

I, LORI J. GOODIN, RPR, CRR,

2 CA CSR # 13959 the Notary for this deposition, do hereby certify that the witness whose testimony

3 appears in the foregoing deposition was sworn by me; that I am neither counsel for, related to,

4 nor employed by any of the parties to the action in which this deposition was taken; and, further,

5 that I am not a relative or employee of any attorney or counsel employed by the parties

6 hereto, or financially or otherwise interested in the outcome of this action.

7

8 Lori J. Goodin

LORI J. GOODIN, RPR, CLR, CRR
Notary Public in and for:

9

STATE OF FLORIDA, COUNTY OF SARASOTA

10 Notary Commission Number: GG987804

11 My Commission expires: May 12, 2028

12 STATE OF CALIFORNIA, CA CSR# 13959

13 My Commission expires: February 22, 2027

14

15 STATE OF MARYLAND, COUNTY OF ANNE ARUNDEL

16 My Commission expires: August 2, 2025

17 DISTRICT OF COLUMBIA, WASHINGTON DC

18 My Commission expires: June 1, 2026

19

20 STATE OF DELAWARE, COUNTY OF KENT

21 My Commission expires: September 9, 2025

22

1 Craig Rosenberg, Ph.D., c/o
2 NORTON ROSE FULBRIGHT US, LLP
3 98 San Jacinto Boulevard, Suite 1100
4 Austin, Texas 78701
5
Case: Apple Inc. v. Smith Interface Technologies, LLC
6 Date of deposition: July 10, 2025
7 Deponent: Craig Rosenberg, Ph.D.
8
9 Please be advised that the transcript in the above
referenced matter is now complete and ready for signature.
10 The deponent may come to this office to sign the transcript,
a copy may be purchased for the witness to review and sign,
11 or the deponent and/or counsel may waive the option of
12 signing. Please advise us of the option selected.
13 Please forward the errata sheet and the original signed
14 signature page to counsel noticing the deposition, noting the
15 applicable time period allowed for such by the governing
16 Rules of Procedure. If you have any questions, please do
17 not hesitate to call our office at (202)-232-0646.
18
19 Sincerely,
20 Digital Evidence Group
21 Copyright 2025 Digital Evidence Group
Copying is forbidden, including electronically, absent
22 express written consent.

1 Digital Evidence Group, L.L.C.
1730 M Street, NW, Suite 812
2 Washington, D.C. 20036
(202) 232-0646
3
4 SIGNATURE PAGE
Case: Apple Inc. v. Smith Interface Technologies, LLC
5 Witness Name: Craig Rosenberg, Ph.D.
Deposition Date: July 10, 2025
6
I do hereby acknowledge that I have read
7 and examined the foregoing pages
of the transcript of my deposition and that:
8
9 (Check appropriate box):
( ) The same is a true, correct and
10 complete transcription of the answers given by
me to the questions therein recorded.
11 ( ) Except for the changes noted in the
attached Errata Sheet, the same is a true,
12 correct and complete transcription of the
13 answers given by me to the questions therein
14 recorded.
15
16 _____ _____
17 DATE WITNESS SIGNATURE
18
19
20
21 _____ _____
22 DATE NOTARY

1 Digital Evidence Group, LLC
2 1730 M Street, NW, Suite 812
3 Washington, D.C. 20036
4 (202)232-0646
5
6 ERRATA SHEET
7
8 Case: Apple Inc. v. Smith Interface Technologies, LLC
9 Witness Name: Craig Rosenberg, Ph.D.
10 Deposition Date: July 10, 2025
11 Page No. Line No. Change
12
13
14
15
16
17
18
19
20
21 _____ _____
22 Signature Date

A

**a.m** 1:13 2:5 6:1 99:13,14 125:7
**ability** 67:17 124:15
**able** 12:8 20:21 62:3 82:8 121:8
**above-titled** 2:3
**absent** 128:21
**absolute** 46:18 60:19 63:16
**absolutely** 60:13 62:1
**acceleration** 14:11,16
**access** 112:20 115:3,7,15
**accomplish** 24:6 122:1
**accounting** 60:22
**accurate** 43:10
**acknowledge** 59:16 129:6
**action** 2:3 95:18 127:4,6
**actions** 122:12
**active** 25:17
**actual** 12:14 38:17
**add** 65:16
**addition** 14:8
**additional** 9:1 83:22 108:15 123:22
**Administrator** 2:8
**advantage** 54:12 55:13,22 117:14
**advantageous** 119:4
**advantages** 51:7 54:7 57:3 113:20 118:10
**advise** 128:12
**advised** 128:9
**affordance** 48:1 48:4 62:21 63:1,3 85:1,2 110:19 112:7 112:11,13,14 112:21 115:20 116:6,10 117:14
**affordances** 85:1 113:1,7,8
**ago** 54:3 63:19 81:21
**agree** 8:3 9:4,11 33:15 35:15 41:10 64:12 87:9
**agreed** 6:13
**ahead** 17:6
**Ahn** 5:11 10:10 28:1,3,6 29:9 31:18,21 32:12 32:15,19,20,21 33:2,5,8 34:4,6 35:7,12,17,22 37:4 38:7 40:1 40:15,16 41:3 41:12,17 42:18 48:12,14 49:10 49:11 50:1,6 50:13 52:1 57:6,18,19,22 59:15,20 60:2 60:4 61:19 62:7 65:12 67:7,16 68:1 69:2,5,9,9,16 70:5,7,8,21 71:13,21 74:4 74:12 76:10 77:7 78:10,15 78:16 79:11,14 79:18,19,20 84:5,19 86:16 86:16,22 87:17 88:4,5,14 92:5 92:14 104:8 114:3,5 116:21 116:21 121:11 123:19,20,21 124:2,9,10,11 124:13,14,19
**algorithm** 29:17
**algorithms** 32:1
**allow** 110:20 122:17
**allowed** 77:8 88:18 128:15
**aloud** 52:5 90:9
**altering** 47:6
**ambiguity** 107:10
**analyze** 85:14
**analyzed** 71:6 85:13 118:8
**anchored** 96:12
**and/or** 128:11
**android** 40:6
**animates** 111:16
**animating** 96:2
**animation** 96:7 96:9 97:1 103:4 104:2 108:19,20
**animations** 95:22 96:14 97:9 102:21 103:10
**ANNE** 127:15
**answer** 8:5 10:4 11:22 54:2 66:9 69:20 76:17 79:1 82:9 84:3 97:10 106:16 120:18 122:11
**answered** 87:2 116:1
**answering** 8:6 21:4 76:18 96:13 98:7
**answers** 12:9 20:9 25:20 129:10,13
**anticipation** 69:15,21
**anybody** 9:7,12
**anyway** 105:12
**apologize** 98:12
**apparent** 72:14
**APPEAL** 1:1
**appear** 96:11 97:20 109:2 126:7
**APPEARANC...** 3:1
**appearing** 6:12
**appears** 93:4,4 127:3
**Apple** 1:3 5:3 7:13 28:20 64:16 116:7 128:5 129:4 130:8
**applicable** 79:6 128:15
**application** 8:20 40:9
**applications** 40:10
**applies** 25:10 26:15
**apply** 70:1
**appreciate** 11:15
**approach** 81:12
**approached** 40:15
**appropriate** 20:19 129:9
**approximately** 2:4 7:11 22:19
**arbitrary** 30:15 30:20
**area** 25:11 29:8 30:10 45:19,21 47:20 52:11,20 53:22 61:17 65:5
**argued** 80:8
**argument** 25:22
**arguments** 82:3
**art** 20:16 74:13 75:18 76:10 77:12 79:10,15 81:11,12
**ARUNDEL** 127:15
**asked** 76:18 85:14
**asking** 8:4 11:21 17:18 29:2 93:22 106:17 118:6,20
**aspect** 29:6
**associated** 115:12 119:22
**assume** 11:22 25:21 62:15 84:20
**assumed** 56:8
**attached** 129:11
**attorney** 81:1 127:5
**attributes** 13:1 82:1
**atypical** 75:10
**August** 127:16
**Austin** 3:14 128:4
**available** 114:22
**Avenue** 3:6
**aware** 122:6,11 122:21 123:2,7 123:13
**Awesome** 7:6

B

**B** 18:12 29:4,19 33:2,13 44:13 52:12 80:6 102:2
**back** 11:19 12:15 17:10 35:4,5 38:12 41:9 42:15 48:9 49:15 63:18 66:16 78:3 89:3 90:5

91:3 99:10 103:14 105:3 119:13
**background** 64:3,3 66:19 85:6
**base** 15:8
**basic** 40:7
**basically** 10:15
**bearing** 11:17
**beginning** 14:17 102:12
**BEHALF** 3:3,11
**believe** 13:9 20:11 28:18 29:9 32:21 42:17 47:16 48:20 52:18 53:19 62:7 63:11,20 66:2 67:22 76:5 81:4,19 86:14 86:17 87:4 101:12,18 103:9 108:22 109:12 110:2 112:1 114:7 115:2,22 116:5 121:10
**benefit** 59:22 80:12 123:5,7 123:14,15
**best** 44:18 71:11 84:2 86:19
**better** 56:6 57:16 65:16 73:22 78:8
**beyond** 123:18
**bezel** 15:6
**bezels** 15:5
**bit** 11:15 17:5 23:13 32:14 33:7 40:1 42:4 55:12 69:13 70:18 107:9
**Board** 1:1 9:2
**border** 56:3 59:21 65:16 69:6
**Boulevard** 3:13 128:3
**boundaries** 44:11
**bounding** 29:21 44:12 45:1
**box** 29:21 44:12 45:1 122:14,22 129:9
**bracketed** 48:18
**break** 9:14,18 10:1,5 98:10 99:8,10,16
**breaks** 9:21
**bring** 34:21 53:13 76:11,20 104:3 106:18 106:20 111:2 117:8 118:13
**bringing** 53:10 77:6 111:10 117:6
**brings** 111:17
**broad** 93:21 94:13 105:4,7
**broader** 14:2 46:8
**browser** 8:12,19
**buffer** 55:10 56:1,2
**build** 18:3 35:13 36:19 39:20 41:20,22 42:5 55:10 79:5
**built** 18:8 39:5

**C**

**C** 29:19 34:8 44:14
**c/o** 128:1
**CA** 127:2,12
**California** 1:16 2:6,10 5:6 127:12
**call** 7:3 36:11 74:22 84:11 128:17
**called** 6:7 26:2 48:1 55:22 62:20 80:22
**carefully** 101:17
**cares** 26:21
**case** 17:20 20:16 47:5 54:19 56:12 66:5 81:20 89:7 91:15 92:17 101:5,18 102:7 102:14 108:1 128:5 129:4 130:8
**cases** 7:12 62:7
**center** 106:10
**centroid** 25:16
**certain** 30:9,10 44:16 48:18 80:12
**certainly** 14:17 23:4 83:19 84:11 85:15 110:7
**CERTIFICATE** 127:1
**Certified** 2:7,8
**certify** 126:3 127:2
**Chad** 3:12 10:12 125:2
**chad.wallis@...** 3:15
**change** 17:14 123:9 130:11
**changes** 18:4,9 18:10 129:11
**characterize** 74:18
**characterizing** 40:21
**chat** 9:9
**Chaudri** 8:15 10:10 41:13,17
**Check** 129:9
**choice** 51:11,22
**choices** 56:10
**choose** 50:16
**claim** 39:11 81:6 92:11
**claiming** 16:4
**clarification** 12:3
**clarify** 16:16 21:7 28:7
**clear** 8:2 35:17 52:1 72:22 78:17
**clicked** 49:13
**clipped** 30:17
**clones** 63:21
**close** 53:14 54:16 59:7 98:10
**coarser** 23:9
**code** 31:12 32:5 32:8
**color** 30:9
**Columbia** 2:11 127:17
**column** 20:6 51:1
**combination** 13:15 16:7 80:9
**combine** 80:7,10
**combined** 37:5 40:10
**come** 9:12 14:12 15:14 36:4 48:6 62:9 78:14 94:9 99:10 110:19 128:10
**comes** 64:19 86:20 94:3,4,5 110:9
**coming** 96:10
**commencing** 2:4
**comment** 96:17
**commission** 113:17 127:10 127:11,13,16 127:18,21
**common** 22:16 23:12 63:12,14 112:16
**compared** 47:7
**compiling** 32:6
**complete** 128:9 129:10,12
**completely** 35:13
**complicated** 66:14
**compute** 14:9,10
**computer** 8:9 9:9 22:12 64:5 64:15 86:20
**concept** 15:5 80:1,21 81:5 81:15 83:1
**conceptually** 24:15
**concerns** 49:17
**conclusion** 36:4 69:19
**condition** 26:16
**conditions** 12:9
**consent** 128:22
**consider** 71:21 83:7,7
**considered** 44:2 93:19
**considering** 82:19 90:2
**constantly** 113:17
**constrain** 70:17
**constrained** 63:6 72:1 77:14
**constrains** 67:16 68:20
**constraints** 38:8
**contact** 14:6 94:18
**contained** 126:8
**contemplate** 50:2

**contemplating** 48:14
**context** 70:21
**continuing** 75:21
**conversation** 95:6
**coordinate** 21:20 22:11 23:17,18 24:16 24:17 25:1 26:2,3
**coordinates** 21:15
**copies** 8:22 17:4
**copy** 8:12 17:7 28:14,19 128:10
**Copying** 128:21
**Copyright** 128:21
**corners** 30:16
**correct** 9:2,3 16:19 28:8 29:3,11 30:13 38:18 39:8 46:13 48:21 50:14 54:11 58:15 59:19 60:11 63:1 65:8 74:16 80:2 81:17 93:9 97:10 103:14 104:11 104:16 106:14 107:8 110:1 112:7 115:6,13 115:18,21 119:17 121:16 122:8 126:9 129:9,12
**corrected** 126:9
**corrections** 126:6
**correctly** 50:5 99:18 104:8
**couched** 58:10
**counsel** 5:13 9:8 22:22 127:3,5 128:11,14
**COUNTY** 127:9 127:15,20
**couple** 7:21 54:21,22 57:4 110:5
**course** 8:1 10:6 10:16
**court** 8:3
**Craig** 1:10 2:2 4:3 5:2 6:6 7:2 60:2 126:3,15 128:1,7 129:5 130:9
**create** 14:2 32:16 61:19
**creating** 55:22 76:14
**creative** 57:12 86:8 123:17
**credence** 105:19
**criteria** 65:1
**critical** 15:19
**cross** 29:8 45:19 45:21 47:20 52:11,19 53:22 61:16 65:4 113:19
**cross-examina...** 9:6
**CRR** 1:15 2:5 5:5 127:1,8
**CSR** 1:16 2:6 5:6 127:2,12
**curious** 42:3
**custom** 122:17 124:15
**cycle** 36:17

**D**

**D** 29:20 44:14
**D.C** 1:21 3:8 129:2 130:3
**date** 15:19 16:2 128:6 129:5,17 129:22 130:10 130:22
**Dated** 126:11
**David** 3:5 98:8
**day** 126:11
**days** 10:14 11:8 11:10,11
**DC** 127:17
**decides** 62:18
**declaration** 8:11 8:13,16 10:16 10:20 11:2 17:6,8 126:1
**defend** 118:6
**define** 21:16 29:12 30:2 34:2,7 82:6
**defined** 19:14 29:15,16,20,21 30:5,8 85:7
**defines** 30:21 62:7
**defining** 30:11 32:13
**definitely** 46:10 46:18 48:10 58:1
**degree** 18:7 56:4 64:5,15 68:21
**Delaware** 2:11 127:20
**Delta** 27:6
**depending** 25:13 47:21 113:2,9
**depends** 18:19 27:16
**deployed** 42:10
**deponent** 128:7 128:10,11
**deposed** 7:7
**deposition** 1:10 2:1 6:12 7:17 7:18,20 9:7 10:8 11:6,8 44:11 125:7 126:5 127:2,3 127:4 128:6,14 129:5,7 130:10
**derivative** 14:11
**describe** 25:8 34:15 37:17,18 39:19 40:4 41:12 44:18 88:15 99:4,5,7 100:11 112:14
**described** 35:12 35:17 40:7,16 50:12 56:18 57:18,18 66:18 71:9,11 72:16 73:1 80:14 81:21 84:12,19 85:16 86:7,13 86:21 88:3 97:21 102:22 112:10 114:19 117:12 118:7 118:11,12 119:19 124:1
**describes** 35:9 37:4 108:14 121:11
**describing** 35:19 37:13 78:10,12 78:16,17 86:10 89:16,21 92:12 100:5 103:10 104:6,9 112:1 113:3 123:19
**description** 37:3 38:18 39:5 42:7,15,17 49:11 50:8 64:2 72:8 94:10 111:9,11 120:6
**descriptions** 34:6 41:11 49:20
**descriptive** 41:16
**design** 12:16,17 20:21 31:22,22 32:20,22 33:3 33:9,12 36:6 51:11,22 56:10 59:17 64:7,19 67:17 73:22 76:12 116:18 121:3,21
**designed** 27:17 42:9 55:2
**designer** 36:2 49:2 59:17 65:13
**designers** 24:11 31:3,7,8 48:7 57:14
**designing** 63:7 64:6,17
**detail** 31:18 34:20 102:18 102:21
**detailed** 36:19
**detect** 15:6,11 18:1,9
**detected** 18:12 22:18
**detecting** 23:5
**detection** 18:14
**determine** 44:20
**determining** 51:12
**deviate** 121:15 121:18
**devices** 116:8
**devoid** 17:19
**dictates** 74:14
**dictating** 60:6
**difference** 18:18 59:10,14,16 97:16,18
**differences** 37:6 37:7
**different** 10:13 11:7 17:15 18:12 19:20 23:3,18,22,22 25:15 26:9,14 26:17 29:16 31:5,6,14 35:3

35:12,14 39:8 39:10 41:4 50:18 51:21 56:7 57:15 71:8 78:4,15 79:19 80:5 85:16 92:10 93:2,5 95:7 101:16 103:10 105:15 117:7 117:21 118:5 119:9 120:20 122:12
**differently** 60:11 65:8 112:17
**difficult** 9:16
**dig** 16:1
**digital** 1:20 8:12 8:21 28:14 128:20,21 129:1 130:1
**dimensions** 12:20 13:9,12 17:13,14 19:1 19:7 95:7,9
**direction** 14:4 26:21 27:2 43:6,18,21 44:7,16 45:3 56:21,22 60:17 61:2 90:13 100:15 104:18 107:14 109:17 109:22 114:9
**directions** 116:8
**disadvantages** 113:10
**disappear** 92:1 108:4
**disappears** 89:9 89:12,19 91:17 91:20 92:18,21 96:1,22 102:16 103:1
**disclose** 79:15 79:16 110:8 116:21,22
**disclosed** 71:13 75:16 77:19 92:3 116:20
**discloses** 79:10 80:6,6
**disclosing** 124:10,12,13 124:14
**disclosure** 50:6 63:6 87:3 109:13 124:19
**disclosures** 79:20
**discuss** 49:7,8 50:1 99:20 117:21
**discussed** 17:11 58:9 98:19
**discussing** 49:21
**discussion** 74:20 75:2 112:5
**discussions** 73:18
**dismiss** 106:20 108:18
**dismissal** 111:16
**dismissed** 111:12,14
**dismissing** 111:3
**display** 19:11 20:1,2,7 22:9 22:12,14,20,20 23:6,12,18 25:12 30:4,17 43:7,9 45:4,15 47:1 48:17 52:7,16 61:15 72:10 89:6,9 89:11,19 90:15 90:17,22 91:14 91:18,19,20 92:1,19,21,22 94:4 96:6,8,21 97:2,4,8 100:17 101:1 102:2,4,16 103:1 104:14 104:20,22 105:21 106:10 107:16,18 108:16 109:10 109:19,20 110:12,14 113:16 114:10 114:11,17 115:13 117:1 117:15,18,22 118:3 119:5
**displayed** 16:10 33:13 43:7,9 43:19 44:21 49:3,6 50:10 58:3,9 73:4 89:5,10,20 90:1,14,16,19 90:21 91:2,8 91:11,14,18 92:20 96:4 97:3 100:16,22 101:3,7 102:2 102:17,19 103:2 104:19 104:22 107:16 107:17,19,20 108:12,15 109:18,20,21 110:3,4,17 111:20 114:10 114:10,18 118:16,22 119:12
**displaying** 45:15 52:7,16 58:17 62:11 72:10
**displays** 120:5
**distance** 14:9
**distinct** 52:11
**distinguishes** 81:6
**District** 2:11 127:17
**dive** 12:13 41:6
**divided** 14:10
**document** 35:21 38:17
**documents** 10:17 12:14
**doing** 6:20,21 30:6 55:15
**domain** 79:4
**dozen** 17:12 35:3,6
**Dr** 7:4,8 8:16 10:20 98:6 99:16
**drag** 44:4 45:16 45:21 52:8,18 56:21 58:19 61:2,10 72:13 72:21 93:3 98:1 102:5 107:21
**dragged** 43:17 43:20 101:7
**dragging** 83:13
**drags** 43:5 45:4 60:16 67:11 88:22 89:4 90:12 91:7,12 100:14 101:5 101:22 104:17 107:14 109:16
**draw** 30:6,6
**drawn** 59:9 72:18
**dth@fr.com** 3:9
**duly** 6:8
**duration** 14:3,7 14:14
**durations** 92:10

**E**

**earlier** 32:15 44:11 47:8 48:21 49:20 50:13 52:4 65:10 95:5 99:5 100:12 112:5 116:17 119:5
**east** 27:2
**edge** 19:11,15,16 20:1,2,6 49:5 50:12 53:9 54:10 103:14 106:9 114:17
**education** 77:3
**educational** 64:2 66:18
**ego** 65:13
**either** 9:8 19:4 27:8 50:8 54:7 96:6,9 108:7
**electronically** 128:21
**element** 28:4 54:1 72:16 92:1
**embodiment** 46:1 47:13 57:1 58:5 61:14 62:5 67:21 72:4,5
**embodiments** 46:6 48:12 49:19 50:19 69:10 117:8 118:5
**emerge** 108:19
**emerges** 47:2 68:15 111:19 115:4
**emerging** 68:10 89:10,13,20 91:19 92:20 96:5,7 97:3 103:2,5,7 111:20
**employed** 127:4 127:5
**employee** 127:5
**enables** 110:3,18
**encompass** 105:7
**engineer** 17:22 20:5,13 21:3 31:14 35:20

37:15 50:16 67:3
**engineering** 36:16 37:16 38:21 39:20 41:19 75:4
**engineers** 35:4 35:13
**enlarging** 86:4
**entire** 14:5
**entirety** 15:8 69:9 108:13
**entry** 122:14,22
**envisioned** 24:12
**equals** 19:17 50:22 51:1
**equated** 39:22
**errata** 128:13 129:11 130:6
**especially** 53:17 53:20
**ESQUIRE** 3:5 3:12
**essentially** 25:16 29:21 105:11 119:21
**evaluating** 74:11 77:10 81:9
**Evidence** 1:20 128:20,21 129:1 130:1
**exact** 56:8,9,9 64:7,18 109:3
**exactly** 30:18 36:7 54:4 98:16
**examination** 4:1 4:5 6:7,16
**examined** 6:8 129:7
**example** 21:14 27:9 32:13 38:5 42:14 43:1,4 45:14 52:6 59:3 60:15 62:10 72:9 90:11 91:6 100:13 101:21 109:15
**examples** 88:2
**Excellent** 29:1
**exception** 33:8
**excuse** 16:18
**executable** 32:6
**exhibit** 28:8,10 28:13
**exhibits** 5:1,9,10 5:13 11:1
**exists** 81:15
**expand** 42:4
**expect** 41:20
**experience** 24:2 53:16 56:9 57:5 64:3,6 66:19 77:4 116:12,14
**expert** 81:6
**expires** 127:11 127:13,16,18 127:21
**explain** 100:8 101:5
**explicitly** 69:3 87:6 102:4
**express** 128:22
**extent** 35:10 93:22
**extra** 56:4 124:11

**F**

**face** 13:6 15:7
**fact** 110:17
**fair** 19:13 20:17 21:17 23:20 24:19 32:10,17 34:2 35:1 70:18
**familiar** 7:19 48:2
**far** 16:10 35:18 64:21
**fast** 89:2
**February** 127:13
**feel** 67:18 73:21
**felt** 71:10
**fidelity** 22:18,19
**fight** 111:8
**fighting** 109:4
**figure** 29:3,4,7 33:2,20 36:6,8 36:10 37:20 38:2,4 42:16 43:5,8 45:9,14 45:18 47:12 48:22 49:10,14 50:7,7 51:12 52:6,12 59:9 60:16 61:22 62:19 65:3 67:6 72:7,9 89:1 90:10,12 90:16,20 91:8 91:13 92:6 93:8 100:14 101:21 102:2 103:13,16 108:14 109:16 109:20 113:12 117:3,21 118:3 118:11
**figures** 34:1 37:1 37:5,8 47:8 90:6
**file** 39:10
**filed** 9:1 17:7 28:19
**financially** 127:6
**find** 69:4
**finer** 23:7,8
**finger** 13:16 14:5,15,20 15:2 19:5 24:4 25:9,11 43:17 43:20 44:5,15 45:4 56:21 72:15,18 86:11 89:8,18 91:16 92:18 93:15,18 94:3,6,7,8,8,11 94:18 95:13,16 95:16,18,19,20 96:19,21 97:6 97:8 102:8,15
**fingers** 15:1,2 86:3,3 103:17 103:22
**finish** 8:4,6 98:7
**first** 5:10 6:8 11:11 28:11,20 36:15 44:5,9 45:13 46:3 51:15 52:5,10 53:21 58:16 71:16 83:17 93:3 105:9 106:1 107:6 119:21
**FISH** 3:4
**five-minute** 99:8
**flat** 21:19
**flexibility** 46:21 62:13
**Florida** 2:10 127:9
**fly** 60:3
**focus** 16:11
**focused** 31:21
**follows** 6:9
**forbidden** 128:21
**foregoing** 126:5 127:3 129:7
**forgotten** 81:22 99:1
**form** 21:18 22:21 24:20 26:12 31:1 32:18 34:3 36:9 40:18 46:14 51:14 65:9 66:12 69:17 70:10 71:3 74:17 76:15 77:16 78:21 81:18 82:21 84:8 85:11 88:7 94:22 112:9,22 118:19 120:17 121:9 122:9 123:10
**forth** 90:6 91:3 105:3
**forward** 20:14 128:13
**found** 70:8,13,22 84:4 112:19 120:14
**four** 10:13 11:7
**frames** 32:4
**frequently** 23:2
**FULBRIGHT** 3:12 128:2
**full** 6:22 10:13 12:9 68:11,11 68:16
**fun** 98:15
**functionality** 120:16
**functions** 36:19
**further** 88:19 91:5 101:20 109:10 127:4

**G**

**gain** 112:20
**general** 7:20 17:19,21 71:7 77:2 80:4 114:4
**generalized** 48:16
**generally** 11:20 12:15 32:16 76:10
**gesture** 12:20 13:10,18 14:19 15:9 17:15 18:3,8,18 19:12 24:5,6 24:11 26:14,20 44:2,19 45:2

52:22 53:1 58:2 72:2 94:20 97:15 107:7,8,21 112:20 114:22 115:5,17 116:14 118:17
**gestures** 17:13 95:6
**getting** 38:13 54:4 57:12 71:20 81:13 97:20
**GG987804** 127:10
**give** 10:4 11:22 12:9 23:1 70:22 82:8
**given** 31:13 35:3 39:3 41:18 52:10 53:17,21 58:16 71:16 72:15 108:22 109:1 110:16 129:10,13
**go** 17:6 28:3 32:4 49:15 63:18 64:21 65:20 66:16 69:12 74:2 75:21,21 89:3 99:12 116:20
**goal** 122:2
**goals** 38:8
**goes** 22:5,5 25:9 38:12 41:12 42:18
**going** 9:16 20:14 26:7 33:19 46:11 59:15 69:4,12 71:10 87:7 90:5 91:3 95:22 109:9
**good** 6:19,22 40:3 65:15 82:8 99:11 116:18 125:4
**Goodin** 1:15 2:5 5:5 127:1,8
**governing** 128:15
**grabs** 61:19
**gradually** 89:9 89:19 91:17 92:18 96:1,22 102:16,22
**grained** 23:7,8,9
**graphic** 30:3 37:22 51:20 52:2 63:4 89:8 89:8,11,18,18 91:16,16,17,20 91:22 92:9,17 92:18,21 93:19 96:1,2,22 101:6,7,10,13 102:5,8,15,15 102:20,22 103:11,19 104:3 105:5,9 105:21 106:2,7 106:11,13,18 106:19,20 107:6 108:3,6 108:7,8,18,19 109:2,6,7 110:9,10,11,14 110:20 111:3,6 111:12,13,15 111:17,17 113:11 118:16 118:21 120:5,7 120:12 121:3 121:11 122:1 122:13,18 123:1 124:14 124:15
**graphical** 16:9 29:10,13 33:3 33:9,12 36:7 37:1,2,9,19 43:6 45:15 46:2,7,10,12 46:22 47:6,14 48:13 49:1,3,5 49:17,22 50:10 50:20 51:5,9 52:7,16 53:18 53:19 54:14,15 54:20 55:14 56:19 57:10,20 58:8,12,13,17 58:22 59:9,12 59:18 60:7,20 61:11,15 62:2 62:6,8,11,12 62:16,19 63:9 65:4 66:4 67:1 67:10,19,22 68:2,4,18,20 68:22 69:5 70:9 71:2,16 72:2,5,6,6,8,10 72:17,18 73:2 73:4,8 74:5,9 76:6,8 77:20 83:10,17 84:6 84:16,21,22 85:2,10,20 86:12 87:1,5,6 87:7,11,13,20 88:6,15 90:14 90:19 93:11,16 100:7,9,16,20 100:22 104:10 104:14,19 105:13 107:15 109:18 112:6 113:19 114:1 114:18 115:10 116:15,21 117:1,4,10,22 120:15 121:7
**graphically** 30:3
**graphics** 22:12 30:5 86:20
**great** 9:4 10:7 12:7,12 17:3 22:13
**greater** 68:9,21
**grid** 23:5
**Group** 1:20 128:20,21 129:1 130:1
**guess** 11:5,12,19 20:14 33:7 37:11 40:14 48:9 50:4 64:11,21 70:3 73:21 77:8 81:8 82:17 96:13 101:8 114:2
**guidance** 42:8

**H**

**half** 17:12
**hand** 24:6 123:5
**happen** 9:12,17 27:11,13 32:3 37:8 62:14 88:17,18 103:10 105:2 113:7 120:7,9 120:11
**happened** 54:20
**happens** 26:1 88:9,15 98:14
**happy** 99:9 114:5
**hard** 64:11
**hardware** 13:14 17:22 18:5 25:13,14
**hatch** 52:11
**hatched** 29:8 45:19,21 47:20 52:20 53:22 61:17 65:4 113:19
**heard** 6:11 21:12 49:7,8
**height** 68:12
**held** 2:3
**Hello** 6:18
**help** 8:3
**helpful** 27:19 63:2
**helping** 57:5
**hereto** 127:6
**hesitate** 128:17
**hidden** 48:5
**hide** 104:3
**high** 17:18 22:8 22:8 24:3 54:22 83:1
**higher** 23:13 55:12
**Hinckley** 8:15 10:11 41:13,17
**hits** 96:21
**Hmm** 98:17
**HOLT** 3:5 4:6 6:17 18:21 21:21 23:15 25:3 27:18 28:15 31:16 33:14 34:13 36:13 41:14 46:19 51:17 65:22 67:2 70:2,16 71:18 75:5 76:22 78:6 79:12 82:13 83:4 84:13 85:22 88:10 95:4 98:12,16,21 99:6,11,15 112:15 113:13 119:1 120:22 121:13 123:6 124:5,21 125:2 125:5
**hopefully** 20:9 39:12
**hour** 9:22
**hours** 11:12,13 98:9
**hovering** 15:12
**hypothesize** 59:21
**hypothetical** 37:14 75:1

I
**idea** 62:18 119:14
**ideas** 64:7 78:15 78:19 79:18 123:18
**identical** 63:21 64:13 73:19
**identically** 64:8
**identifier** 114:8
**ignore** 66:9 78:20 87:10
**illustrates** 45:14 52:6 72:9
**immediately** 95:20 96:15
**implement** 20:21 31:10,11 31:15 33:6 34:10,11 38:9 43:14,16 45:10 49:4 50:8,16 51:13 52:18 53:20 55:18 56:18 57:8,15 58:1 63:7,14 65:2 66:22 67:9 73:13 74:15 75:12 78:5,9
**implementation** 18:20 31:18 47:22 61:13 74:21 97:14
**implementatio...** 41:5 49:9
**implemented** 47:19 57:14 60:10 63:15 71:8 123:15
**implementing** 20:5 31:3 32:5 32:8 35:20 46:9 50:17 55:9 57:22 62:1 71:10
**implications** 95:21
**implies** 35:11 44:4 94:2,7 101:15 103:3,6 103:18 105:1
**imply** 41:1 46:2 48:14 94:5,6 105:16
**implying** 83:21
**important** 95:9 123:17 124:8
**importantly** 16:9
**impossible** 63:17
**inclined** 50:21
**include** 93:21 94:14 116:14
**includes** 47:13
**including** 9:8 128:21
**INDEX** 4:1 5:1
**indicate** 62:8
**indication** 48:1 114:21 115:4
**individual** 56:12
**individuals** 65:2
**initial** 9:5 94:18
**initialed** 126:7
**initially** 104:9
**ink** 126:7
**input** 12:19 13:12,13 16:8 22:15,18 26:9 26:18 30:13 32:17 112:20 115:16
**inputs** 24:17
**insensitive** 18:17
**inside** 58:3 63:8 67:10 72:2 106:12 120:7
**instance** 19:4
**instantaneous** 96:10
**intended** 55:15 57:14 86:22
**interacting** 16:6 101:16
**interaction** 31:22 34:16 37:7 100:6 101:13 120:20
**interested** 92:13 127:6
**interface** 1:6 5:3 12:16,17 29:14 31:8,21 33:12 34:17 51:4 64:19 76:12 119:10 121:21 128:5 129:4 130:8
**interfaces** 31:19 64:6,17
**interpret** 77:5
**interpretation** 105:20
**interpreting** 76:21
**inventing** 60:2
**invention** 16:1,4 16:12 39:12,13 60:1 124:9
**invisible** 55:10 56:1
**invoke** 100:21
**invoked** 95:16 100:10
**invokes** 104:2
**involves** 14:19
**involving** 7:13
**iOS** 40:5 116:8
**IPR2024-01083** 1:5
**irrelevant** 79:19
**issues** 17:20
**item** 114:9

J
**J** 1:15 2:5 5:5 127:1,8
**Jacinto** 3:13 128:3
**Java** 34:8
**July** 1:12 2:4 5:4 6:1 126:6 128:6 129:5 130:10
**June** 127:18

K
**keep** 109:9
**KENT** 127:20
**kind** 9:16 12:13 12:15 13:3 39:22 63:18 82:2 86:4 105:1 109:9
**kinds** 13:1 24:10 34:11 41:4 86:5,9
**knew** 37:17 57:13
**know** 9:13,15,17 10:2,13 11:8 13:12 14:11 15:4,22 17:3 17:12 18:11 20:18 22:7 24:5 25:10,17 27:2,15 29:17 30:1,9 31:9 32:2,3 35:18 37:5,18 39:11 39:15 40:6 41:8 44:13,17 48:5 50:1,19 50:22 53:9 56:3,6,11 57:14 60:1 63:20 64:14 65:1,11,13,17 68:15 69:21 71:13 74:12,22 74:22 75:2,11 75:16,16 77:4 78:4,8 80:9,13 81:11,17 82:1 82:6 84:10 86:2,4 92:11 94:11 96:3,11 97:21 101:15 105:3 109:9 113:17 116:7 116:11,13 117:17 118:2 118:10 122:16 123:4 124:10
**knowledge** 31:17 76:12,20 77:4,6
**known** 15:18 32:9,16 33:5 77:11
**knows** 65:12

L
**L.L.C** 129:1
**lack** 18:17
**language** 34:8,8 34:9
**languages** 34:12
**largely** 74:21
**launch** 28:5 113:5,5
**launching** 49:20
**law** 64:13
**leeway** 68:5,8,9 69:7 70:22
**left** 19:16,18,22 20:2,6 22:1,4,9 41:3 44:21 47:1 53:10,13 68:11 88:22 89:4,11,13 91:7,12,19 92:20 96:3,11 101:22 102:5 102:19 103:11 103:13,14,21 105:18 106:6,7 106:9,13,19 108:17 110:11 111:15,21 112:4 114:17 119:22 120:3
**left-hand** 48:6

48:17,18 59:5 59:8 68:12 96:7,12 97:3 103:2 115:12
**left-side** 59:6
**leftward** 119:22
**legal** 69:13,19 79:6 82:10,10
**legally** 56:6
**lens** 75:19
**let's** 14:13 18:22 19:16,17 25:21 26:10,22 42:14 53:7,12 54:13 62:15 77:12 84:20
**level** 17:19 31:18 83:1
**life** 36:17
**light** 63:6 77:11 82:19 93:6
**limit** 46:11 48:8
**limiting** 68:19
**limits** 49:2
**line** 40:20 107:11 130:11
**list** 43:8 89:1,5 89:10,20 90:15 90:21 91:7,18 92:2,19 96:4 97:2 101:2,6 102:1,3,17 103:1 104:21 105:6 107:17 109:19,21 111:20 114:9
**little** 23:13 32:14 33:7 40:1 42:4 55:12 65:16 69:13 70:17 107:9
**LLC** 1:7 5:3 128:5 129:4 130:1,8
**LLP** 3:12 128:2
**loaded** 38:15
**location** 14:17 14:18 19:6 46:11
**logically** 29:17
**long** 11:4 15:1 24:3,10 73:17 81:20 94:11 111:1,1,10
**look** 19:1 36:17 37:2 42:15 50:6 60:14 89:2,14 91:9 103:15 108:12 117:3
**looked** 36:5,5 61:22
**looking** 21:9 27:1,5 33:1 38:6 40:16 42:20 45:8,9,9 45:18 51:12 57:6 69:16 70:4,7,8 79:11 109:15
**looks** 30:15
**Lori** 1:15 2:5 5:5 127:1,8
**lost** 98:13
**lot** 35:11 41:3 62:20 65:17 95:7 113:15
**love** 63:1
**loves** 85:1
**low** 54:22
**lower** 22:10 28:19 55:12
**lull** 98:8

**M**

**M** 1:21 129:1 130:2
**magic** 32:3
**Maine** 3:6
**majority** 39:16 64:21,22
**manner** 15:17
**map** 23:6 80:13
**mapping** 92:10
**marked** 5:9,10 5:13 28:9
**Maryland** 2:10 127:15
**match** 24:9 64:8
**matched** 114:9
**matter** 26:22 27:3 69:11,14 128:9
**MAX** 51:2
**mean** 17:18 20:4 31:20 34:4 42:5,12 44:4 46:18 50:15 56:5 64:1,6,18 69:21 71:5 73:17 82:8,11 82:12 85:18 86:5 87:5 88:17 94:8 95:12 105:4 111:11 115:20 116:6 118:6 122:13 123:3 124:3
**meaning** 26:16 37:12
**means** 81:17 110:18
**meant** 121:3
**medications** 12:10
**meet** 65:1
**memorized** 28:12
**mention** 10:19 21:2
**mentioned** 14:7 14:13,13,14,16 15:17,22 16:13 16:14 18:1,6,7 19:2 44:22 81:20 84:1 87:18,19,20 96:14 101:14 119:5
**menu** 28:5 43:8 43:18 44:21 45:12,22 47:1 47:7 53:10,13 58:4,14 59:3,6 60:8 61:3 62:4 63:10 67:11,13 68:1,10,15 84:7,17 85:10 85:21 86:12 88:2 89:1,5,9 89:19,22 90:4 90:15,20 91:2 91:7,10,11,13 91:18 92:1,6 92:19 93:2,8 94:17,20 95:12 96:4 97:2,20 101:2,6 102:1 102:3,17 103:1 104:4,21 105:6 105:10,15,15 106:6,13 107:7 107:17 108:5,7 108:9,14 109:3 109:7,11,19,21 110:12 111:2,7 111:10,20,21 115:4,8,11 117:6,8,18 119:18
**menus** 11:3 49:20 62:9 113:5 119:15
**message** 9:10
**met** 10:12 11:4
**method** 93:2,5
**metric** 75:20
**Microsoft** 64:16
**middle** 53:8
**mind** 14:12 15:15 20:20 57:16 78:3
**minority** 65:7 66:6
**minute** 116:16
**minutes** 63:19
**mistaken** 13:7
**mock-ups** 31:9
**mode** 113:2,4,9
**modifications** 66:8 78:15,19
**modify** 65:18
**module** 18:3,8 18:15,16
**moment** 15:15 23:1 25:18 49:13 54:3 61:5 89:14 90:7 91:4 108:4
**morning** 6:19
**motivated** 53:20 119:11 120:20 121:18 122:2 122:17
**motivation** 80:7 122:7
**motive** 120:19
**move** 37:19 52:2
**movement** 14:4
**moves** 44:6 51:20 52:2
**moving** 37:9,22
**multi-part** 14:19
**multi-touch** 13:18 14:13
**multiple** 19:20 25:5,6,15 41:19 50:18 66:15 100:3 118:2

**N**

**name** 6:22 122:15,18,22 124:15,16 129:5 130:9
**nature** 12:4 13:3
**near** 15:12 49:5
**necessarily** 36:6 41:10 47:6,10 116:17
**necessary** 9:14 9:18

**need** 10:1 23:8 41:6 44:3 46:3 46:4 52:19 56:19,20 57:9 61:16 65:20 66:16 87:12 117:17
**needed** 24:12 27:17 35:18 39:5 42:9
**needs** 20:6 36:19 37:19 40:11 42:9 44:10 47:20 48:16 57:19 61:10 66:4 69:6 71:15 73:1,7 74:5 76:7 77:20 100:10 101:9 108:15 116:11
**neither** 92:9 127:3
**Neonode** 7:14
**never** 73:11,13 111:2 121:14
**nice** 98:11
**normal** 112:19
**north** 27:2
**NORTON** 3:12 128:2
**Notary** 2:9 127:1,2,8,10 129:22
**noted** 126:7 129:11
**notes** 8:8
**noticing** 128:14
**notification** 115:6,11,16,17 115:19
**notifying** 45:15 52:7,17 58:18 72:12,20 114:8
**noting** 128:14
**nuance** 98:19 99:17,21 100:2
**number** 16:18 22:20 28:13 29:16 127:10
**numbers** 26:7
**NW** 1:21 129:1 130:2

**O**

**object** 23:1
**objection** 6:10 17:16 21:18 22:21 24:20 26:12 31:1 32:18 34:3 36:9 40:18 46:14 51:14 65:9 66:12 69:17 70:10 71:3 74:17 76:15 77:16 78:21 81:18 82:21 84:8 85:11 88:7 94:22 95:14 112:9,22 118:18,19 120:17 121:9 122:9 123:10
**obscuring** 108:9
**obvious** 70:8,13 70:22 80:10 82:19 83:7,20 83:22 84:5,11 85:4,8,19 86:6 87:4,13 118:15 118:21 120:15 123:8
**obviousness** 69:15,22 80:1 80:2,4,16,20 80:22 81:2,5 81:16 82:7
**office** 1:1 39:11 128:10,17
**Oftentimes** 13:22 36:15
**oh** 78:4 123:22
**okay** 7:3,4,12,22 8:18,21 9:4 10:5,22 11:14 11:19 12:7,12 15:16 16:13,21 16:22 17:3 18:22 19:10 21:6,12 22:13 23:16 24:13 25:4,19 26:6 27:19 28:2,16 29:6,9,12 30:11,21 31:17 32:12 33:15,17 34:18 36:1 37:21 38:2,3,6 38:22 39:7 41:22 42:14,21 43:13,20 44:8 44:22 45:8,20 46:9 47:3 48:20 49:10 51:10 54:2 55:17 56:15 57:2,11,21 58:11 59:10 61:7,18 62:15 63:3 65:6 67:3 67:16 68:7 69:11 70:3 71:19 73:9 74:11 76:9 77:6 78:11,18 79:22 80:11,17 82:17 84:4 86:1 87:18 88:4,11,14 89:3,16 90:2 92:13 93:6,13 93:18 94:15 97:5,7,13 98:22 99:6,11 104:7,13 106:8 107:5 108:21 109:8,14 111:22 112:3 113:14,22 114:16 115:3 115:22 116:2 116:13 118:14 119:7,13 120:2 120:10,13 121:1,6,14,19 122:5 124:20 125:1,5
**once** 25:7 105:13
**one-to-one** 22:17 23:3,11 24:9
**ones** 12:19
**open** 8:9,20 28:19 45:12,22 47:7 58:4,13 59:2,5 60:8 61:3 62:3 63:10 67:11,13 68:1 84:7,17 85:10,20 88:2 90:4 92:6 93:7 94:20 105:14 105:15 107:7 109:6,7,10 110:21 119:17
**open-ended** 70:14
**opened** 17:4
**opening** 86:12 93:2 119:14
**opens** 94:17 95:12 120:4
**operating** 40:9 40:10 116:9
**operation** 34:2 45:16 52:8 58:19 61:10 72:13,21 86:4 89:17 102:1
**operations** 104:8
**opinion** 57:21 73:9 77:17
**opinions** 82:14
**opposed** 31:22 75:21 101:10 101:14
**option** 128:11,12
**options** 49:12 121:22 122:6,7
**order** 34:21 44:20 45:12 58:4 60:8 61:2 62:3 63:9 67:11 104:8,14 106:10 107:5,7 115:3,7,15
**ordinary** 20:16 121:20
**origin** 22:2
**original** 128:13
**outcome** 114:22 127:6
**outlines** 7:20
**output** 16:9
**outside** 45:21 57:4 58:21 59:12 84:6 85:9 87:5
**overall** 70:21
**overlaid** 111:6
**overloaded** 37:12 38:20
**owner** 1:8 3:11 9:8

**P**

**Pacific** 1:13
**pad** 25:11
**page** 4:5 28:20 107:12 128:14 129:4 130:11
**pages** 129:7
**paint** 30:9
**pair** 25:1
**paragraph** 42:18,22 45:8 46:4 49:11,16 49:16 58:7 60:6,10 61:6 61:21 70:20 71:14 72:1 73:6 76:9 77:12 90:10 91:5 92:16

93:7 94:16 95:11 105:17 114:7
**paragraphs** 90:3 92:4 99:19 116:22 117:20 118:8,15 120:14
**part** 10:13 15:7 32:16 36:11 40:3 67:22 69:13 94:19 108:9 111:7 124:19
**partially** 30:16
**particular** 73:12
**parties** 6:11 7:13 127:4,5
**patent** 1:1,1,6,8 3:11 8:14 9:8 10:9 13:5 15:19 16:4,12 16:14,15,17,22 22:17 37:13 39:2,10,11,12 39:14,16 40:1 40:2 41:3 42:13 49:21 55:21 60:5 61:19 63:5 67:6 75:9,11 75:15,22 76:4 76:20 80:14 112:11,18
**patents** 39:19 41:21 42:1,6,8
**path** 14:5,8 18:11,11,12
**pattern** 30:10
**PC** 3:4
**PDF** 8:11
**peculiar** 112:19
**pen-down** 18:10
**pen-up** 18:11
**penalty** 126:1,4
**pending** 10:4
**people** 31:5 64:4 64:14
**percent** 47:11 53:8,12 59:3 59:11 113:16
**Perfect** 21:6
**perform** 120:16
**performing** 105:14
**period** 128:15
**perjury** 126:1,4
**person** 20:15 21:8 31:4 56:12 67:5 85:4,5
**personally** 50:21 51:6
**perspective** 20:15 21:5 71:22 81:9 82:15
**Petitioner** 1:4 3:3
**Ph.D** 1:10 2:2 4:3 5:2 6:6 126:3,15 128:1 128:7 129:5 130:9
**phrase** 33:8 43:1
**phrased** 32:21
**pick** 67:5
**picking** 63:4
**piece** 97:15
**pixel** 22:8,9,10 23:6
**pixels** 20:1,7 22:8,14,20 25:15 27:1 30:9 54:14,15 54:22,22 57:4 59:12 113:15 113:16 117:15
**place** 47:7 119:16
**places** 50:20
**plane** 21:16 26:3
**plausible** 106:5
**please** 7:1 38:11 48:21 95:3 98:4,6 128:9 128:12,13,16
**plenty** 116:8
**plurality** 81:3
**point** 16:10 18:10,11 19:3 24:2 29:18 33:3 34:16,17 37:1 53:16 55:5,8 62:14 79:7 94:9 101:9 107:10 110:15 111:12
**pointed** 52:4
**pointing** 103:18 103:22
**points** 19:21
**pop** 113:2
**portion** 9:6
**POSITA** 20:16 20:20 21:5 31:2 32:2,9,15 34:21 35:17 36:5 38:6 40:15 43:13 45:9 50:5 51:11 52:18 53:19 55:20 56:5 57:5,8,22 58:20 60:4,9 61:8,19,22 62:18 63:4,12 63:13,17,20 64:2,9,13 65:1 65:21 66:3,17 66:20,21 67:4 67:15 69:8,16 70:4,8,20,21 71:7,9,22 73:11 74:2,7 74:14,19 75:8 75:11,15,17 76:3,5,11,19 77:11,13,18 78:2,3,9,14,18 79:2,17,20 81:10,12 82:15 82:18 83:7 84:4,15,22 85:4,7,9 86:15 87:15 88:4,16 90:4 92:15 93:13 94:16 95:10 97:11 100:19 107:22 112:12,19 118:15 119:8 120:13,14 121:6,14,17,20 122:5,11,16 123:14,18,19 123:21 124:8 124:11,17
**POSITA's** 79:4
**POSITAs** 56:7 63:22 64:22 65:7 66:6,10 66:10,15 73:18 86:8
**position** 19:12 21:13 24:4,5 24:14,16,22,22 26:2,14,17 27:4 29:18,19 44:10,15 45:2 45:5,16 47:19 48:8,15,16 49:2 50:9 51:16 52:8,17 52:22 53:10,22 54:8,9 57:9,19 58:19 59:1 61:9,16 62:13 65:3 66:4 67:12 68:6,21 71:1,15,22 72:12,17,21 73:1,7 74:5,10 76:7 77:20 83:11
**positions** 25:5,6 45:1 46:8 68:14,17
**positive** 22:5,6
**possibilities** 50:2
**possibility** 25:9 25:14 110:4,8 118:13
**possible** 18:2,13 18:14 23:17,21 23:22 25:4 49:9 50:15 81:14 86:18,18 86:19 122:20 123:3 124:18
**potentially** 14:4 15:5 19:7,11 40:4 57:16 59:21 119:14
**precisely** 40:17
**predict** 9:16
**preparation** 10:8,18 11:5
**present** 100:11 101:11 113:8 113:12
**press** 89:7,17,17 89:22 91:15,22 92:8,9,17 93:12,12,14,15 93:19,22 94:4 94:7,13 95:9 95:10,11,19 96:18 97:22 100:5 101:15 102:8,9,13,14 119:14,17,21
**pressing** 72:15
**pressure** 13:20 13:20,22 14:14 18:9 25:10
**presumably** 83:16
**pretty** 65:15 72:14,22 78:17 86:20
**previous** 97:10
**previously** 5:9 5:13 18:2 28:9 116:1

**primary** 8:15
**prime** 48:19
**printout** 8:10,11
**prior** 5:10 74:13 75:17 76:10 77:11 79:10,14 81:10
**probable** 61:13 61:13
**probably** 9:22 10:12 11:7,10 17:4 57:12 79:6 105:8
**problem** 10:1
**Procedure** 128:16
**procedures** 30:7
**proceeding** 85:7
**PROCEEDIN...** 6:2
**process** 32:7
**product** 24:12
**Professional** 2:6
**program** 36:22
**programmatic** 30:2
**programmed** 42:10 122:21
**programmer** 65:12,14
**programmers** 31:4
**programming** 18:17
**proper** 74:22
**provide** 17:6 34:5 120:20 123:4
**provides** 114:4
**providing** 102:18
**proximity** 15:11
**Public** 2:9 127:8
**pull** 42:19
**purchased** 128:10
**purpose** 39:14 39:17 58:18 87:12 113:22 114:6
**purposely** 18:16
**pushed** 11:9 41:9
**pushing** 48:9
**put** 60:12 86:3 122:17
**putting** 86:10

**Q**

**qualifications** 66:17
**qualified** 69:20
**question** 8:4,6 10:4 12:1,5 13:4 16:14 17:19 20:10 25:20,22 35:10 38:10 40:14,22 50:4 54:3 60:13 70:1,14 76:17,18 79:1 82:5 83:1 84:2 84:21 85:3 87:2 95:2,15 98:7 99:1 105:12 116:3 116:18,19
**questioning** 40:21 71:20
**questions** 11:21 17:10 20:12 81:13 124:22 128:16 129:10 129:13
**quickly** 11:20 38:3
**quite** 38:13

**R**

**radial** 11:2
**radius** 14:2 25:16
**range** 46:8 68:11 68:16
**re-ask** 99:2
**re-read** 106:15
**re-reading** 98:18 100:3
**read** 34:22 43:10 43:13 52:5 60:4,5,10 61:21 65:7 67:6,7 70:20 73:10 75:8 88:4 90:9 93:13 98:3 101:4 106:5,16 107:22 114:12 114:15 120:13 123:21 126:4 129:6
**reading** 32:15 50:6 57:22 61:8 63:13 67:15 69:8,9 74:3,8,13 75:8 76:4,5,9 77:5,7 77:14,18 84:5 86:15,16 87:16 88:19 100:19 101:4,17 105:2 118:15 121:6 123:20
**reads** 75:11,15 76:19
**ready** 128:9
**real** 89:2
**reality** 54:21 55:4 56:11
**realize** 119:8 121:21
**really** 15:11 18:19 23:10 27:3 35:9 38:2 39:4 71:12 75:7 76:3 86:13 87:11 91:10 92:13 97:16,17 118:8
**Realtime** 2:7,7
**reason** 12:8 23:7 40:19,20 79:11
**reasonable** 47:18
**reasons** 119:4
**recall** 7:16 28:4 31:20 87:22
**received** 16:8
**recess** 99:13,14
**recognition** 18:3 18:8,16 26:15 26:20 44:19 97:15
**recognitions** 24:11
**recognize** 13:20 53:1 116:9
**recognized** 13:2 13:14 55:21 56:13
**recognizer** 53:1
**record** 7:1 8:2 16:17 21:7 28:7 99:12
**recorded** 129:10 129:14
**rectangle** 29:20 30:12,14,16,18 30:19 32:14
**rectify** 61:5
**redirect** 125:3
**refer** 16:21
**reference** 5:11 10:10,11,11 77:7 80:5,6,18 80:20 81:16 82:2
**referenced** 128:9
**references** 8:15 70:6 74:13 76:11 80:5,8,9 81:3
**referral** 5:10 28:11
**referred** 29:5 112:6
**referring** 43:1,4 60:15 88:20 90:11 91:6 99:22 100:14 101:21 109:16
**refers** 13:6 29:9
**regarding** 114:6
**Registered** 2:6
**related** 127:3
**relative** 127:5
**released** 42:10
**remember** 7:15
**remembering** 99:18
**remote** 2:1 3:1 9:15
**remotely** 6:12 6:14
**report** 25:15
**Reported** 1:15
**reporter** 2:7,7,9 6:10 8:3
**represent** 13:10
**representing** 15:8
**represents** 13:15 47:13
**requirement** 24:9 69:1
**requirements** 36:18
**requires** 59:16 69:18
**rescheduling** 11:15
**research** 15:21
**researched** 23:10
**resolution** 23:13 23:14 24:3
**respect** 20:12 22:14 30:12 38:14 48:22 69:16 70:9 71:2 92:6 94:15 99:18 109:22
**respond** 121:8

**response** 16:15 17:1 88:18
**responsive** 88:12 120:12 121:4 122:3
**rest** 108:13
**restate** 115:9
**restrictive** 48:7
**restroom** 99:8
**result** 94:17 102:19 103:11
**resultant** 16:9
**retained** 5:13
**review** 128:10
**reviewed** 10:9 10:10,15,18,19 10:21 11:1
**RICHARDSON** 3:4
**right** 8:8 12:7,12 13:8 19:8,9 22:5,10 28:19 33:1 43:5,17 43:21 44:6 45:6,22 51:16 51:18 53:7,9 53:14 54:5 56:2,20,21 58:4 59:13 60:8,16 61:2 63:9 67:11,20 68:16 72:18 82:15 83:13 90:12,18 92:7 92:8 93:11 98:15 100:15 100:21 102:7 102:12 103:18 103:19 104:14 104:18 105:17 106:16,18 107:14,20,21 108:8 109:8,17 109:22 110:3 111:1,4 112:4 114:12,15,16 117:13,19 118:14 119:18
**right-hand** 59:4 68:17 88:21 96:5
**rightward** 120:4
**room** 9:13 41:4 60:9
**ROSE** 3:12 128:2
**Rosenberg** 1:10 2:2 4:3 5:2 6:6 7:2,4,8 98:6 99:16 126:3,15 128:1,7 129:5 130:9
**rounded** 30:16
**route** 75:22
**routines** 30:6
**row** 20:6
**RPR** 1:15 2:5 5:5 127:1,8
**RSA** 1:15 2:5 5:5
**rules** 7:20 11:20 128:16
**run** 7:21
**running** 32:4 40:5,6

**S**

**sake** 25:21 84:20
**San** 3:13 128:3
**SARASOTA** 127:9
**sat** 7:18
**satisfy** 20:2
**saying** 19:22 40:1,13 47:9 57:7 60:19,21 68:8 73:3,6 76:19 87:6 102:4
**says** 28:20 43:4 45:13 52:14 58:17 60:15 64:13 65:19,20 66:2 69:5 72:9 72:20 74:1 87:12 88:20 91:5,22 92:16 95:11 100:13 101:20 102:7 104:17 108:11 109:15 111:15 114:5
**scheduled** 11:8
**scheduling** 11:11
**science** 64:5,15
**scope** 17:16 70:11 71:4 84:9 85:11 118:19 123:11
**screen** 13:17 14:6 15:2,2,3,7 15:12,13 19:3 19:4 21:13 25:2 29:22 30:10 43:6 44:4,6 45:11 45:14 52:6 53:8 56:22 59:4,11 60:17 60:20,21 62:10 72:9 83:14,16 90:13 93:16 94:19 95:13 96:3 100:15,21 104:18 107:15 109:4,17 110:19 111:7
**search** 114:2
**second** 11:12 27:9 42:21 60:14 61:1 73:21 80:18,20 90:10 91:21 94:16 101:12 102:6 105:4,5 106:4,5 107:8 107:11
**section** 51:4
**sections** 10:21
**see** 14:13 15:1 28:14,21,22 33:19 43:2,3 47:21 51:6 63:18 67:6 89:3 103:22 104:4 113:11 114:3,5
**seen** 64:1
**sees** 30:4 84:22
**selected** 128:12
**sense** 9:19 18:22 24:13 25:19 33:21 34:18 36:1 50:3 53:16 59:5 62:20 82:20 103:6
**sensitive** 18:4 26:15
**sensor** 15:5
**sentence** 42:22 43:3,11,14,15 44:9 45:13 46:4 52:5,11 53:21 58:16 60:15 61:1,6,6 69:4 71:17 83:17 90:10 91:22 93:1,3 94:16 102:6 108:13 109:14 111:14
**sentences** 73:10 110:5
**September** 127:21
**set** 14:18 38:7 40:9
**sets** 31:6
**shadow** 29:10,13 30:3 33:10,12 36:7 37:2,9,19 43:7 46:2,7,10 46:12,22 47:6 47:14 48:13 49:1,3,5,17,22 50:10,20 51:6 51:9 53:18,19 54:8,10,14,15 54:20 55:14 56:20 57:4,10 57:20 58:3,12 58:13,18,22 59:9,13,18 60:7,20 61:11 61:15 62:3,6 62:11,12,16,19 63:9 65:4 66:4 67:1,10 68:2,4 68:7,18,20,22 69:5 70:9 71:2 71:16 72:3,6,7 72:8,17,19 73:2,4,8 74:6,9 76:6,8 77:21 83:10,17 84:6 84:16,21,22 85:2,10,20 86:12 87:1,5,7 87:8,11,13,21 88:6,16 90:14 90:19 93:11,17 96:2 100:7,10 100:16,20,22 101:6,10,13 102:5,20,22 103:12,19 104:3,10,15,19 105:5,9,13,21 106:2,7,13,18 106:20,20 107:6,16 108:3 108:6,8,8,18 108:19 109:2,6 109:7,18 110:9 110:10,12,14 110:20 111:3,6 111:12,13,15 111:17 112:6 113:11,19 114:1,18 115:10 116:15 116:22 117:1,4 118:1,22

120:12,15 121:3,7,11 122:1,13,18 123:1 124:14 124:15
**shadows** 58:8 62:8 67:20,22 117:10
**shape** 30:15,20 30:21
**sheet** 128:13 129:11 130:6
**short** 122:11
**Shorthand** 2:8
**show** 29:4 30:3 32:20 37:1 101:10 103:19 106:2,6,10,13 108:3 110:6
**showing** 46:22 91:10 108:5 110:8 113:21 116:6
**shown** 29:7 36:7 43:8 89:1,5 90:15,21 91:7 91:13 101:3 102:1 104:21 107:17 109:19
**shows** 33:2 37:22 72:7 90:15 105:9
**side** 30:17 47:1 48:6,17,18 59:4,8 68:12 68:17 88:21 89:11,14 91:19 92:20 96:5,7 96:12 97:3 103:2 111:21 115:12 119:22
**sign** 128:10,10
**signature** 125:6 128:9,14 129:4 129:17 130:22
**signed** 17:9 128:13
**signing** 128:12
**similar** 94:1
**simple** 117:13 117:19
**Sincerely** 128:19
**single** 25:6 26:2 81:15 105:9 107:21
**single-reference** 80:22 81:5 82:7
**singular** 66:21
**sir** 6:18 114:14
**situation** 113:3
**situations** 53:18
**skill** 20:16 31:6 121:21
**skills** 31:10
**slightly** 31:6 64:1
**Smith** 1:6 5:3 128:5 129:4 130:8
**snafu** 11:16
**software** 13:2,14 17:21 18:4,14 18:15 20:4,13 21:2 31:7,10 31:14 32:4 33:6 34:9,11 35:4,5,13,19 35:20 36:2,3,5 36:16,16 37:15 37:16 38:20 39:3,6,17,19 39:20 41:18 50:15,19 55:16 67:3 75:3,12 76:1 79:5
**somewhat** 23:18 117:13
**soon** 94:4,5 95:12 97:7
**sorry** 51:1 87:19 103:16 118:18
**sort** 17:18 103:17
**sorts** 79:17
**sought** 38:8
**sounds** 65:6 99:11
**source** 31:12
**south** 27:2
**Southwest** 3:6
**space** 13:6 109:4 119:5
**speak** 17:4 20:15 23:2 32:3 41:2 47:2 113:18
**Speaking** 58:6
**spec** 36:11 90:6
**specific** 16:7 18:20 20:3 48:15 58:6 70:1 81:22 84:2 114:9
**specifically** 12:16 15:21 33:19 41:8 49:12,16 58:7 71:6 77:9,12 85:13 86:16 110:11 114:3,6
**specification** 34:5 35:3,8,21 36:12,20 37:4 37:10,12,15 38:14,16 39:1 39:3,15,18 40:2,17,22 42:8,13 52:1 74:4 75:3,22
**specificity** 18:7 19:15
**specifics** 12:14 27:16 32:1 34:7 41:7
**specified** 51:5,21
**specifying** 52:14 52:15 74:4,9
**speculate** 82:11
**speed** 14:8,9,11 14:16
**splay** 86:3
**spot** 98:10
**standard** 75:11 75:14,20 86:14
**standards** 62:22
**start** 14:22 17:5 24:5,14,16 26:14,16 27:4 27:6 28:5 44:10,14 45:1 45:5,16 46:8 46:11 47:19 48:8,15,16 50:9 51:16 52:8,17,22 53:10,21 54:8 54:9 55:5,7 56:19 57:9,19 58:18 59:1 61:9,16 62:14 62:14 65:3 66:3 68:6,14 68:19,21 71:1 71:15 72:12,17 72:20 73:1,7 74:5,9 76:7 77:19 83:11 87:5,7,12,14 110:15 118:17
**starting** 19:12 27:8,10,12,13 90:18 93:11 106:19
**starts** 26:22 42:22
**state** 2:9,10,10 2:11 6:22 127:9,12,15,20
**STATES** 1:1
**stays** 44:6 94:11
**step** 11:19 12:15
**stepping** 17:10
**steps** 36:16
**Stewart** 7:2
**stick** 56:17 71:12
**stop** 14:22
**stray** 73:11
**Street** 1:21 129:1 130:2
**strike** 112:16
**strongly** 46:16
**studied** 82:5
**study** 82:4
**styles** 122:12
**stylus** 13:16 14:5 14:15,20 19:5
**subject** 80:14
**subsequent** 108:12
**sudden** 53:6
**sufficient** 24:7 80:7
**suggesting** 48:21
**Suite** 1:21 3:7,13 128:3 129:1 130:2
**supported** 18:6 24:10
**suppose** 21:9
**sure** 7:19 9:20 13:11,11 21:7 38:11,13 46:15 67:18 69:19 70:15 78:22 84:1
**surface** 21:16 25:11 97:8
**suspended** 125:7
**swipe** 44:5,15 56:20 58:4 60:8 88:12 90:18 92:7,8 93:10,21 94:14 101:22 102:10 102:13,20 103:11,13,19 103:21 104:13 105:2,4,6,9,14 105:15,17,18 106:1,4,9,13 106:18,19 108:17 109:6,6 109:8,9,22 110:11 111:1

111:10,15 112:4,4 116:8 117:19 120:1,3 120:4 121:4 122:4
**swiped** 54:13,19 63:9
**swipes** 100:7 101:14 105:20 106:5 109:5 112:2 114:16 120:12 121:8
**swiping** 100:21
**sworn** 6:8,13 127:3
**system** 17:22 20:5,22 21:20 22:12 23:17,19 24:17 25:2,9 26:15 27:16 31:3 32:17 33:20 34:2,6 34:15,22 35:9 35:16 36:18 38:8 39:19,21 40:9,10,17 41:17,20 42:6 45:11 50:17 51:7 54:18 55:1 59:17 61:20 62:1 63:7 67:9,17 74:15 75:13 76:14 79:5 88:5 109:2 110:18 111:6
**systems** 2:8 13:20 15:10 21:10 23:16 27:7,22 35:14 116:9

**T**

**table** 34:21
**take** 9:14,17,22 10:5 25:5,6 42:14 90:7 93:15 99:7,9
**taken** 99:13 126:5 127:4
**talk** 9:7 17:5 32:13,21 33:9 49:12 66:14 105:18 111:2
**talked** 15:18 19:1 27:20 30:11 36:2 38:16 44:12 45:3 57:3 73:10 79:22 80:17 93:3 117:7
**talking** 12:22 16:17 17:11 19:16 20:13 21:8 22:13 24:18 28:7 29:2 32:14 33:18 41:7 51:16,19 59:20 66:7,10 67:4 69:12,15 70:5 79:8,9 85:5,6 93:1 95:6 97:9 97:19 124:3
**talks** 44:9 114:7
**tap** 85:20 88:13 88:18 94:1,2,6 100:5 101:15 120:15 121:5
**tapped** 88:6 120:7
**tapping** 87:18 87:20
**taps** 88:15 124:13
**target** 27:9,10 27:12,14,20,21 28:5 29:5,7,13 30:12,22 32:13 110:15 114:4
**task** 24:6 79:1,4 123:5
**tasked** 63:14
**taught** 38:9
**teach** 31:18 38:7
**teaches** 58:1
**teaching** 73:12 80:18 82:19 83:2 121:15,18
**teachings** 71:21 74:15 77:15
**team** 37:16 39:3 39:6,20 41:19 75:4 76:1
**teams** 35:6 36:2 36:3,5 41:19 41:20
**technically** 55:14 56:16
**technique** 118:1 120:21
**Technologies** 1:7 5:3 128:5 129:4 130:8
**tell** 12:18 64:12 101:18
**tells** 100:18,19
**ten** 26:8 36:3 63:19 123:22
**tendencies** 64:18
**term** 38:21 48:2 48:10 82:10 112:12
**terms** 37:6,8 40:8 66:18 68:6 83:9
**testified** 6:8
**testimony** 126:8 127:2
**Texas** 3:14 128:4
**text** 9:9 122:14 122:22
**thank** 11:14,16 27:19 98:13 125:1,5
**thing** 20:11 68:15
**things** 9:15 37:12 39:7 40:7 44:16 45:10 60:2,12 69:13 74:13 83:22 86:6,9 99:3 108:15 110:16 111:16 119:9 123:22 124:11,17
**think** 7:12 10:18 12:19 13:5 14:7 16:13 17:13,17 19:2 21:12 24:2,14 24:15 26:1 27:20 31:20 33:11,18 35:2 35:14,16 36:3 38:12,19 39:2 40:19 41:6,11 42:21 44:22 46:1,6,17 47:10,12 50:3 51:21,22 53:15 54:2,6,12,19 55:1,17,20,22 56:16 57:8,17 57:18 58:8,16 58:20 61:4,8 61:12 62:12,20 64:20 65:20 66:7,8,13,16 66:20 67:14 68:5,19 69:8 69:18,20,22 70:22 71:14,19 73:11 74:1,21 75:7,14,19 78:4,8,16 80:21 81:1 82:10,22 83:19 84:15 86:5,9,9 87:1,15 88:5,8 88:9 93:20 94:1 95:5,17 96:14 97:11 98:9,11 99:17 100:4,4,6,9 105:19 106:4 106:17 107:9 107:22 110:18 112:5,8 113:1 113:6,6 116:18 119:3,3,8,10 119:16 120:9 120:19 121:2 121:15,17 122:2,10 123:16,21,22 124:21
**thinking** 28:1 37:20 57:13 65:11 97:16 116:16
**thought** 55:7 123:13
**three** 8:14 11:11
**throw** 26:7
**throwing** 88:1
**Thursday** 2:3 5:4 6:1
**time** 1:13 6:11 10:14 13:19 14:10,14,18 22:16 38:1,11 55:20 60:5 61:18 63:5 67:5,22 81:20 81:22 95:3 98:13 103:7 108:5 109:3 110:3 112:18 113:12,21 117:16 119:6 124:8 125:4 128:15
**timers** 15:1
**times** 7:10,11 10:13 98:18 100:4
**timing** 94:10
**title** 28:14
**today** 6:20 10:8 12:8
**tolerance** 55:11

56:4
**topic** 9:21 119:13
**touch** 13:1 14:3 14:4 15:6 21:16 23:5,14 23:17 24:3 25:5,6,22 26:6 30:13 44:5 45:11,16,20 49:4 50:11 52:8,17 55:11 55:11 58:2,12 58:19 59:18 60:7 61:1,9 62:2,14 67:12 72:13,21 73:14 84:5 85:9 88:22 89:4 91:7,12,21 92:11 93:18 101:22 102:4 106:12 119:22
**touch-down** 19:2 21:13 29:18
**touchdown** 47:7 49:2
**touched** 19:10 63:8
**touches** 19:4 67:10,19 95:13
**touching** 13:16 15:12 25:12 43:6 44:3 56:22 60:17,19 60:21 83:10,14 90:13 100:15 104:18 107:15 109:17
**touchscreen** 12:17,21 13:15 16:6,8,11 21:20 26:3
**Trabean's** 8:16 10:20
**track** 98:13
**TRADEMARK** 1:1
**training** 56:8 77:3 116:12,14
**transcript** 126:5 128:9,10 129:7
**transcription** 129:10,12
**travel** 26:21 27:1
**treated** 40:2
**TRIAL** 1:1
**trigger** 110:10
**triggered** 25:17
**triggering** 44:17 95:17
**triggers** 96:18
**true** 126:9 129:9 129:11
**truthful** 12:9
**try** 8:5 9:22
**trying** 45:10 53:13 61:5 70:3 81:8 82:18 92:14 95:8
**tune** 44:20
**turn** 122:14
**Turning** 38:2
**turns** 105:10
**two** 11:10,11 21:14 31:5 37:12 39:7,22 45:10 49:12 54:14,14 56:7 61:6 64:4,5,16 80:4,8,8,10 86:3,3 91:10 92:10 93:7 97:19 98:9 103:10 105:20 109:5,5 110:16 111:14,16 112:1 116:16
**type** 21:8
**types** 21:9
**typical** 22:11 23:11 66:17,20 67:4 85:5
**typically** 21:19 22:1,4 31:9 39:10 59:7 81:2

**U**

**U.S** 16:17
**uh-huh** 19:19 21:1,11,22 22:3 34:14,19 36:14,21 41:15 42:2,11,11 46:20 47:15,17 48:3,11 49:18 51:3,3 52:3,13 53:5,11 54:17 55:3,6,17,19 60:22 62:17 64:10 66:1 68:3,13 70:19 72:11 73:5,20 75:6 76:2 77:1 78:7 79:13 83:5,8,12,15 83:18 84:14,18 90:8 96:16,20 98:2,5 102:11 103:8,20 104:1 105:22 106:3 107:13 108:10 114:20 117:2,5 117:9 118:4 124:6
**UI** 62:22
**ultimately** 94:8 105:10
**unambiguous** 78:1 107:20
**uncertainty** 35:11
**under-specified** 41:2
**understand** 26:4 58:21 62:22 65:21 66:3 69:10 74:3,8 74:19 75:9,17 76:4,6,16 77:18 78:2,10 78:13 79:20 80:3 81:9,15 84:15 87:16,16 88:16 90:4 92:14 95:8,10 97:12 112:13 121:8 124:9,18
**understanding** 16:3 50:5 61:14 63:12 75:15 76:13 77:13 79:14 80:15 81:11 104:7 107:2 120:6 124:7
**understood** 12:1 38:7,11 67:15 80:2 86:15,18 92:15 93:14 94:17 98:12
**UNITED** 1:1
**unmarked** 8:22
**unmarked-up** 8:10,17
**unsure** 12:4
**upper** 22:1,4,9
**usable** 109:2
**use** 11:2 34:9 42:7 48:13 49:1 52:15 59:3 66:5 89:22 99:8 109:7 112:12 117:10 121:11
**useful** 76:14
**user** 12:16,17 13:13,13 19:4 24:2,4 26:6 29:13 30:4 31:8,19,21 33:11 34:16,17 43:5 45:4,11 45:17,20 46:9 48:5 49:4 50:9 50:11 52:9 53:16 54:13,19 55:15 57:5 58:2,12 59:18 60:7,16 61:1 62:2 63:8 64:6 64:17,19 67:9 67:19 72:13,21 73:14 76:12 84:5 85:9 88:6 88:15,22 89:4 89:7,17 90:12 91:6,12,15 92:5,17 100:14 100:18 101:5,9 101:21 102:7 102:14 104:17 106:8 107:14 108:15 109:8 109:16 110:20 111:5 112:20 113:4 114:8,16 114:22 115:4 115:11,16 116:11,13 117:17 119:9 120:7 121:21 122:12,17 123:5
**user's** 97:7
**users** 63:2
**uses** 46:2 108:22 110:17 111:19 113:15
**utilizing** 122:7

**V**

**v** 1:5 5:3 128:5 129:4 130:8
**valid** 58:22 68:14 116:19
**value** 24:22 26:16 27:7 48:19,19
**variable** 44:1
**variables** 12:19

15:14,17,21 16:5
**varied** 13:13
**various** 12:22 13:12 14:22 24:10 69:10
**verify** 17:8
**versus** 15:3 18:18 23:3 48:17 69:22 95:16
**VIDEOTAPED** 1:10 2:1
**view** 16:10 24:3 33:4 34:16,17 37:1 53:16 79:7
**visible** 56:3

**W**

**wait** 105:12
**waive** 128:11
**waived** 125:6
**Wallis** 3:12 10:12 11:5 17:16 21:18 22:21 24:20 26:12 31:1 32:18 34:3 36:9 40:18 46:14 51:14 65:9 66:12 69:17 70:10 71:3 74:17 76:15 77:16 78:21 81:18 82:21 84:8 85:11 88:7 94:22 95:14 98:6,14 112:9 112:22 118:18 120:17 121:9 122:9 123:10 125:3
**want** 16:16 23:1 28:3 30:3 48:7 59:7 75:12 76:16 85:2 91:9 99:2,4,6 111:6 114:2
**wanted** 12:15 21:6 99:19
**wanting** 57:15
**wants** 61:19 85:1 113:4
**Washington** 1:21 3:8 127:17 129:2 130:3
**wasn't** 55:2 85:13
**way** 11:21 19:18 24:15 30:2,9 35:16 40:12,14 40:16 44:18 53:14 57:5 58:10 63:14,18 75:8 78:4,8 89:22 95:2 101:16 103:22 110:13 111:13 116:7 117:21 119:13 121:12 122:21
**ways** 16:5 29:16 34:10 51:7 65:18 88:2 91:1 92:5 93:7 97:19 113:7 118:3
**well-defined** 35:2
**well-designed** 35:8
**went** 26:10
**west** 27:3
**whatsoever** 120:16
**wipe** 111:1
**wire** 32:4
**wise** 97:14
**witness** 4:3 6:7 6:13 17:17 21:19 22:22 24:21 26:13 28:12 31:2 32:19 34:4 36:10 40:19 46:15 51:15 65:10 66:13 69:18 70:12 71:5 74:18 76:16 77:17 78:22 81:19 82:22 84:10 85:12 88:8 95:1,15 98:17 99:9 112:10 113:1 118:20 120:18 121:10 122:10 123:12 125:1 127:2 128:10 129:5 129:17 130:9
**word** 37:11,11 38:14,17,19 52:15 56:3 66:8 71:1 93:13 95:9,10 96:15 99:18 107:11 108:11 109:1 110:17 111:19
**words** 54:4 115:8
**work** 32:1 41:17 55:1 86:22 92:15
**working** 33:20 34:22 64:16
**works** 34:6,16 35:9 37:4 40:17 92:14 107:3
**worries** 11:18
**worth** 28:18 33:16
**wouldn't** 12:8 24:8 27:3 51:22 53:15 59:5 82:8 85:19 86:6 111:5,5 122:19
**writing** 76:13,13
**written** 128:22
**wrong** 48:22

**X**

**X** 19:17 21:15 22:5 26:1 29:19 44:13 45:1 50:22 51:1,1 78:12 78:13 80:6 86:6
**X-axis** 26:8,10
**XY** 14:1 24:22 24:22

**Y**

**Y** 19:21 21:15 22:5,8 26:1 29:18 44:14 45:1 46:8 48:8 48:18,19 51:2 51:2 62:13 68:11,16 80:6 86:6
**Y-axis** 26:8,11
**yeah** 11:18 24:21 38:19 39:9 47:4 51:1 56:2 59:20 65:15 70:19 72:7 81:8,19 87:10 92:8 100:1 104:17 106:15 123:2
**years** 64:5,16

**Z**

**Z** 86:7
**zero** 19:17 51:1 51:2
**Zoom** 8:19,20

**0**

**0** 20:6
**00** 22:4,9

**1**

**1** 92:11,11,11 101:9 127:18
**1,000** 22:7,8,10
**10** 1:12 2:4 5:4 6:1 11:13 126:6 128:6 129:5 130:10
**10,4** 16:18
**10,642,413** 1:7 16:20
**10:02** 99:13
**10:10** 99:14
**10:44** 125:7
**100** 47:11 119:9 124:11
**1000** 3:6,7
**1004** 5:11 28:8 28:10,17,20
**1100** 3:13 128:3
**117** 114:7,12 118:15
**118** 42:18,20,22 46:4 49:11,15 49:16 52:5 56:17,18 58:6 58:6,7,17 60:6 60:10 61:6,8 67:6,15 70:20 71:9,14 72:1 74:8 76:5 77:12,14,15,18 77:19 83:3,9 85:16,17 86:7 86:16 87:3,17 88:3 90:3,10 92:4 97:21 98:3 99:4,19 100:13 116:22 117:20 118:8 119:19
**119** 42:18 67:6 88:20 89:4 90:3 91:5,22 92:4,16 93:7 94:16 95:11 97:21 99:19

101:20 104:5 108:14 116:22 117:20 118:8 118:16 119:20
**12** 26:8 127:11
**13959** 1:16 2:6 5:6 127:2,12
**15** 11:12,13 26:10 89:14 117:3,12 118:11
**1500** 43:8 89:5 89:10,14,20 90:4,15,21,22 91:2,7,13,18 92:2,6,19 93:2 93:8 97:2 101:2,6 102:1 102:17 104:21 107:17 109:19 111:20
**15B** 43:8 89:1,2 89:3,5,22 90:16,21 91:8 91:11,13 97:20 101:3 102:3,19 103:15 104:4 104:21 106:21 107:17 108:5 108:14,16,19 109:7,20 110:8 110:12,14,21 117:21 118:3 118:13
**1730** 1:21 129:1 130:2
**18** 29:3,7 33:20 36:6,8,10 42:15,16 45:8 45:9,14,18 49:10 50:7,7 51:12 52:6 59:9 61:21,22 62:19 65:2,3 67:6 72:9 88:21 92:6 93:8 103:13,16 113:12 118:7,7
**1800** 28:1,4 29:8 29:10 36:7 43:7 46:10 54:1 63:4 67:1 72:16 77:21 87:21 88:16 89:8,11,18,18 90:14,19 91:16 91:16,17,21,22 92:1,9,17,18 92:21 93:12,17 93:19 96:1,22 96:22 97:1 100:16,22 101:6,7 102:8 102:15,15 104:10,15,19 106:11 107:6 107:16 109:18 112:6 114:18 115:10 116:15 118:16 120:5,8 121:7
**18A** 29:4 33:2,13 43:5 48:22 52:12 60:16 90:12,20 100:14 103:17 109:16
**18B** 88:20 91:6 101:21 103:16 104:2

**2**

**2** 127:16
**2,000** 22:8,10
**20** 26:10
**20024** 3:8
**20036** 1:21 129:2 130:3
**202** 1:22 129:2
**202-783-5070** 3:8
**202)-232-0646** 128:17
**202)232-0646** 130:4
**2025** 1:12 2:4 5:4 6:1 126:6 126:11 127:16 127:21 128:6 128:21 129:5 130:10
**2026** 127:18
**2027** 127:13
**2028** 127:11
**22** 127:13
**232-0646** 1:22 129:2
**28** 5:11
**2D** 22:12

**3**

**30** 27:1
**39** 107:12

**4**

**40** 20:7 43:7,9 89:6,12 90:15 90:17 91:14,19 91:20 92:19,21 92:22 100:17 101:1,3 102:2 102:16 104:20 107:18 109:19 109:20 110:4 114:10,11
**413** 8:14 10:9 16:4,12,14,22

**5**

**5** 113:16
**512-474-5201** 3:14

**6**

**6** 4:6
**60** 7:11 53:8
**642,413** 16:18
**6A** 37:20 38:2

**7**

**78701** 3:14 128:4

**8**

**8:00** 1:13 2:4 6:1
**812** 1:21 129:1 130:2
**8B** 38:4

**9**

**9** 127:21
**90** 20:7 53:12 59:3,11
**98** 3:13 128:3