ECE 413/513 - Fall 2018

Exam 3 Friday, November 30, 2018

Name: ______

No booklets, additional paper, textbooks, or other materials may be referenced during this examination with the exception of one 8.5"x11" sheet of paper (front and back). Your only other resources are a pen/pencil, eraser, and this exam.

Submit answers only in space indicated on each page.

1. Multiple Choice Questions (2 points each)

- (1.1) Responsive design _____.
 - (a) uses two different servers for two different websites, one for desktop and one for mobile
 - (b) uses the same web server that sends back either a desktop version to desktop browsers or a mobile version to mobile browsers
 - (c) sends back the same HTML to both desktop and mobile browsers, but the browsers alter the appearance of the web page to match the device size
 - (d) None of the above
- (1.2) An image that is 100 x 100 logical pixels will use how many total device pixels on a 3 DPR display?
 - (a) 100
 - (b) 10000
 - (c) 30000
 - (d) 90000
 - (e) None of the above

(1.3) Which of the following correctly sets the viewport width to the device width with an initial zoom of 100%?

- (a) <meta name="viewport" content="width=device-width">
- (b) <meta name="viewport" content="width=device-width, initial-scale=1">
- (c) <viewport width="device-width" zoom="100%">
- (d) <viewport width="device-width" initial-scale="1">
- (e) None of the above

(1.4) Given a device width of 800 pixels, how large will a 200x200 pixel render with the following CSS?

```
img {
    width: 20vw;
}
```

- (a) Width: 20 pixels, Height: 20 pixels
- (b) Width: 20 pixels, Height: 200 pixels
- (c) Width: 160 pixels, Height: 160 pixels
- (d) Width: 160 pixels, Height: 200 pixels
- (e) None of the above

(1.5) A flex item is _____.

- (a) an element that has the CSS property display set to flex or inline-flex.
- (b) an element that is the immediate child of a flex container
- (d) all descendant elements of a flex container.
- (e) None of the above

(1.6) Which of the following CSS rules defines a flex container?

```
(a) display: flex;
(b) display: flex-container;
(c) flex: true;
(d) flex: 0 1 20%;
```

- (e) None of the above
- (1.7) What is the functionality of the attribute flex-direction?
 - (a) Flex container property that defines the alignment of the flex items.
 - (b) Flex item property that defines the alignment of a specific flex item.
 - (c) Flex item property that indicates flex-grow, flex-shrink, and flex-basis combined.
 - (d) Flex container property that indicates which direction the flex items are placed in the flex container.
 - (e) None of the above

(1.8) Which tag attribute specifies which image should be displayed for specific DPR values?

- (a) dpr
- (b) sizes
- (c) src
- (d) srcset
- (e) None of the above
- (1.9) Boostrap and Materialize are _____ for creating responsive websites.
 - (a) CSS stylesheets
 - (b) JavaScript libraries
 - (c) back-end frameworks
 - (d) front-end frameworks
 - (e) None of the above

(1.10) Which of the following Particle functions is needed to register a response handler for WebHook integration?

- (a) Particle.publish()
- (b) Particle.subscribe()
- (c) Particle.function()
- (d) Particle.handler()
- (e) None of the above

2. Flexbox (15 points)

Part A (10 points): Given the HTML and CSS, draw the rendered webpage assuming a device screen width of 600 pixels.

HTML

Rendered Web Page (Box represents 600-pixel screen width)

```
<div class="wrapper">
  <section id="section1">
    <div class="big-card">Card 1.0</div>
    <div class="big-card">Card 1.1</div>
    <div class="big-card">Card 1.2</div>
  </section>
  <section id="section2">
    <div class="big-card">Card 2.0</div>
    <div class="big-card">Card 2.1</div>
    <div class="big-card">Card 2.2</div>
    <div class="big-card">Card 2.3</div>
  </section>
  <section id="section3">
    <div class="sm-card">Card 3.0</div>
  </section>
</div>
CSS
section {
   border : 2px dotted #000;
   padding: 5px;
   margin: 5px;
}
.wrapper {
   display: flex;
   flex-direction: column;
}
#section1 {
   display: flex;
   flex-flow: row;
}
#section2 {
   flex-flow: row wrap;
   align-items: center;
   display: flex;
}
#section3 {
   justify-content: space-around;
   display: flex;
   align-items: center;
}
.big-card {
  flex: 1 1 40%;
   border : 2px solid #000;
   padding: 5px;
   margin: 5px;
   text-align: center;
   box-sizing: border-box;
}
.sm-card {
   flex: 0 0 25%;
   border : 2px solid #000;
   padding: 5px;
   margin: 5px;
   text-align: center;
}
```

Part B (5 points): Write a media query for a 400px breakpoint that changes the layout by <u>only changing flexbox</u> <u>properties</u> such that sections 2 and 3 use a column layout where each card grows to full width of the section.

3. State-based Software (15 points)

Draw a state diagram for a state machine that:

- 1. The state machine is executed every 100ms
- 2. The state machine starts in a wait state that waits until enabled, indicated by the function startMeasurement() returning true
- 3. Once enabled, the state machine will:
 - a. Sample the ambient temperature once per second for 60 seconds using the function getAmbientTemp()
 - b. Determine the maximum and minimum temperature within the 60 seconds, assigning variable maxTemp and minTemp, respectively
 - c. After determining the maximum and minimum temperatures, the state machine should report those temperatures by using the function, reportTempBounds (maxTemp, minTemp)
 - d. Then, the state machine will return to the wait state, where it will again wait to be enabled