

Haptic Technologies Worksheet **Answers**

1. Haptic feedback is which of the following? Please circle one answer:

- a) hearing
- b) taste
- c) touch
- d) sight

2. Susan decides to play a 3D game that has enemies trying to sneak up on her. The controller vibrates with footsteps and other similar realistic effects such as doors closing. The more intense the vibration, the closer, the enemy is. Does this help Susan's response time to being able to avoid the enemy?

Please circle your answer:

yes **no**

3. Please explain and justify your answer to question 2:

Example answer: The ability to feel the enemy's presence helps Susan detect things that would otherwise be impossible without the aid of sound or haptics. Being able to receive input from an extra sense adds a realism to the game that would otherwise not be there, which contributes to better, more informed decision making when playing.

4. Sally is blind, but still likes to interact with technology. Haptic feedback would help her do which of the following on her tablet? Please circle one answer:

- a) Know which icon she pressed by an audio reading of the application's name.
- b) Identify which application by an odor that is released from the tablet specific to each application.
- c) Identify an icon by the texture she felt from the screen.
- d) Know which application was selected by the display flashing a specific number of times.

5. Which of the following sensors most accurately simulates haptic feedback? Please circle one answer:

- a) rotary encoder
- b) touch sensor
- c) light sensor
- d) color sensor

6. In what kind of jobs might haptic feedback be useful?

Why would it be needed and how would it be used?

Example answer: In the medical field, such as for the education of surgical residents and students, haptics is highly important because it can educate them accurately about how tissues within the body feel and help them to be able to differentiate between the tissues in simulation before ever having to cut open a real person to learn in the field. Being educated in this manner helps to create better surgeons without risking patient health. Specific devices in industry that are used for surgery include the DaVinci robot, which relies on cameras to operate for the user. Newer research in the area promotes robots that could be used to even do tele-surgery, as was done with the DaVinci robot through the use of haptics for more precise decisions from the surgeon who benefits from more knowledge by using both vision and haptic senses. So consequently, haptics is useful in the job fields of medical education and surgery.

7. Does haptic feedback give users a greater ability to make precise movements and interactions with their devices? Please circle your answer:

yes **no**

8. What are differences between capacitive touchscreens and resistive touchscreens?

Capacitive	Resistive
<ul style="list-style-type: none">• Uses the innate charge in your fingers to charge the capacitors• Highly responsive (quick reaction)• Allows for multi-touch• Does not work with gloves	<ul style="list-style-type: none">• Relies on resistance; when the screen is pressed, a layer comes in contact with another, which causes a voltage to be passed• Generally slower in response time• Works with gloves

9. When would it be better to use a capacitive touchscreen instead of a resistive touchscreen, and vice versa?

Example answer: A good use for a capacitive touchscreen is with elderly people who have arthritis in their hands, since minimal movement is needed get the desired responsiveness. Alternatively, a resistive touchscreen would be ideal for rehabilitation because it requires that a specific amount of pressure be placed on the screen in order for it to pass the voltage necessary to respond.

10. The force existing between two statically charged particles at a distance is electrostatic force. Please circle one answer:

true **false**