

CS 4331 and CS 5331 Virtual Reality - Fall 2020

Final Exam (12/04/2020)

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Instructor office hours: 3-4pm, MWF, or by appointment

Student Name: _____(Last, First)

Final Score: _____(Total: 20 points)

General Instructions:

- The maximum is 20 points, equivalent to 20% of your final score.
- There are **15** questions over 2 pages.
- This is a 60-minute closed-book and closed-note exam.
- Please explain your answer clearly and be concise. **Please show the steps on how you obtain your result and make sure your handwriting is readable.**
- Submit a copy (images) of your answers via email to tommy.dang@ttu.edu
- Good luck.

Question 1: (2 points)

What are Virtual Reality, Augmented Reality, and Mixed reality?
What are the basic differences between them?

Question 2: (2 points)

What are bad (problems) and good things (advantages) about VR?

Question 3: (1 points)

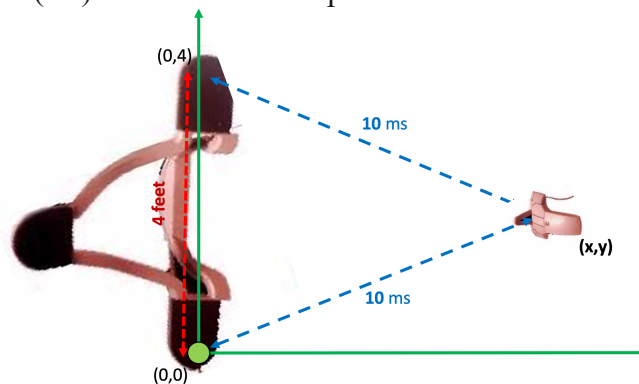
Why can Virtual Reality be viewed as a field which can draw upon the principles of direct manipulation for Human-Computer Interaction (HCI)?

Question 4: (2 points)

Please describe Mechanical position tracking in VR.
What are the advantages and disadvantages of this tracking method?

Question 5: (3 point)

Given the following setting in Acoustic Tracking, the green dot is our coordinate origin (0,0). Microphones *mic1* and *mic2* are 4-feet apart. The speed of ultrasonic pulses in this environment is 2 feet per millisecond (ms). You need to compute the coordinates of the *transmitter* (x,y).



Question 6: (1 point)

What are bad (or limitations) and good things (advantages) of voice commands in VR?

Question 7: (1 point)

What is the difference between collocated collaboration and non-collocated collaboration?

Question 8: (1 point)

Please discuss our comfortable range of motion zones.

Question 9: (1 point)

“Text neck” syndrome is the soreness felt from looking down at our smartphones for extended periods. A poor posture can create pressure on your spine. This can lead to permanent nerve damage in your spine and neck. What is the approximate weight that you create on your spine when your lean over 60 degree?



Question 10: (1 point)

Hand tracking can be roughly classified into discriminative vs. generative. What are the strengths and weaknesses of each technique?

Question 11: (1 point)

What are the main applications of AR/VR in the military?

Question 12: (1 point)

Why do we need FLAIM - VR Firefighting Training instead of real training?

What is the biggest weakness of FLAIM - VR Firefighting Training?

Question 13: (1 point)

Feelreal VR sensory masks simulate hundreds of smells. Please list at least 3 more tactile sensations that Feelreal VR also provides.

Question 14: (1 point)

What is the basic difference between Valve Index vs. HaptX gloves?

Question 15: (1 point)

What is Neuralink? What are Neuralink usages?

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