

**CS 522: HW 2****Maximum points: 100****Topics focused: [you may still need to use concepts from previous weeks]**

- Introduction to HCI research
- Research Methods in HCI
- Shneiderman et al., 2017. Designing the User Interface: Strategies for Effective Human-Computer Interaction. Chapters 7 and 8.

**General instructions:**

- You must submit your **own** work and not results of a group discussion.
- Soliciting homework solutions from previous terms' students will result in an **automatic F** on the assignment.
- This is an **individual** assignment, not a group assignment. Your answers should not significantly resemble your classmates' work. Use proper quotations, citations, and references, where applicable.
- Stick to the word limits, where given. Any number of figures are allowed.
- Write a coherent, concise, and convincing answer. If I cannot understand your logic, I cannot award you points.
- If referring to a class reading in your answer, provide the page number(s) in your citation.
- Submit your answers in Blackboard in a single word/txt/pdf file and name it Lastname\_CS\_522\_HW\_2.

**Grading Rubric:** Appropriateness: 70% | Clarity: 15% | Insightfulness: 10% | Accurate references: 5%

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**Question 1: 10 points**

List an example of teleoperation or virtual reality. Consider what a future application (that does not presently exist) might do—be creative! [300 words]

**Question 2: 10 points**

Give four advantages and four disadvantages of direct manipulation.

**Question 3: 15 points**

Design a touch screen music jukebox, which allows the user to select from a menu of the five most popular songs of the week. Draw a sketch of this interface for each of the following menu types: Binary menu, Multiple-Item menu, Check boxes, Pull-down menus. Argue which design serves the user best.

**Question 4: 15 points**

You are in charge of designing a menu tree for navigating 1,250 books in a digital library. Present an argument of whether the menu should have larger depth (number of levels) or breadth (number of items per level). [300 words]

**Question 5: 25 points**

What are the 10 usability heuristics for user interface design according to Jakob Nielsen? Find one interaction example (from your daily-life interactions) that complies with and one example that violates each of the 10 heuristics (10 x 2 examples). Your example may be a website, game UI, mobile app, voice UI, wearable, cross-device UI, or the walk-sign controller—any artifact that includes human-computer interaction. Provide a UI screenshot or a picture of the application to better illustrate your point.

**Question 6: 25 points**

"Norberg cites [Paper](#), the popular iPad sketching app, as inspiration. One of its great innovations was the

'Expressive Ink Engine,' which interprets, scrawls, and smooths them into beautiful lines on screen. 'Autopilot is our Ink Engine,' Norberg says. On mobile devices, where input is limited, algorithms and AI can serve as powerful mediators, smoothing rough edges both literally and figuratively. But as our devices shrink and input becomes ever tougher, this mediation becomes increasingly important. On the iPad's large screen, you can let users do, say, 90 percent of the driving and let algorithms fill in the rest. As the new [Pacemaker app](#) suggests, the opposite ratio might be best. It's an approach we'll almost certainly continue to see developers experiment with. The smaller our devices become, the more chances there are for apps that act all on their own."

- Kyle Vanhemert, [On the Apple Watch, the Best DJ is an AI](#), WIRED

Recommend a research plan to design an HCI experiment and investigate this trend. What is the observation here? What would be a reasonable theory to test based on that observation? Generate relevant research question(s), hypothesis, and discuss the intended population, independent and dependent variables, and design of the experiment.

[You do not need to consider every possible IVs and DVs for your research plan. Choose the most important ones according to you, briefly argue why they are important, and consistently lay out the research design.]

Note that your response will be evaluated based on the rigor of your design, not effort. Your answer will be either correct or not.

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