

Human Computer Interaction Tutorial

Example Exam Questions 1

The following questions are from a combination of several past exams with some modifications to match them to the current instructor's exam-writing style. Solutions to the questions will be posted after the last tutorial.

1 Twitter (new example question)

By default the Android Twitter app shows users notifications about all sorts of things like if they were mentioned in a tweet, if someone likes their tweet, if they get a new follower, ect. Some users like these notifications but others find them annoying. Figure 1 shows the sequence of screens necessary to disable notifications for "Mentions, replies, and photo tags". Answer the following questions about this sequence of screenshots:

1. Describe a pro and a con of using each of the following methodologies to determine if the Twitter app is usable in terms of this task.

Answer: *Correct answers to this question will describe both a pro and a con and the provided pros and cons will be something that makes sense in this task. Some answers will need to be framed. Such as an interview where there are very few pros for this particular task, but one pro is that you can use it for reflection on past instances where they had used the feature and understand how they remember the experience.*

- A/B test using time on task
 - Think Aloud
 - Interview
 - Cognitive Walkthrough using Personas
2. Use Heuristic Evaluation with Nielsen's 10 Heuristics to identify five positive or negative aspects of this interaction sequence.

Answer: *Several answers are possible, the following is an example for each possible heuristic.*

Visibility of system status *Good: for check boxes with more than two options screen e shows the name of the selected item below the setting name. This makes the system status visible.*

Match between system and the real world *Good: Screen e uses checkboxes that are similar to buttons. It is easy for a person to realize that clicking here will change the state.*

User control and freedom *Good: All screens have a back button that allows a user to go forward or back to change settings in whatever order they prefer.*

Consistency and standards *Issue: Screen f shows three options but they are not ordered from most permissive to least permissive. This is confusing for people who may think that moving to “from anyone” will decrease the number of notifications.*

Error prevention *Good: The visibility of system state helps prevent errors from occurring and the clear indication of what can be clicked on and what cannot helps here as well.*

Recognition rather than recall *Good: The system does not force the user to recall anything, they only need to recognize the setting that they need.*

Flexibility and efficiency of use *Issue: there are no real accelerators for this task. As people may want to turn on or off notifications at set times this is potentially a problem.*

Aesthetic and minimalist design *Issue: Screens c-e all have a large number of options. They really are not minimalistic and are instead a bit overwhelming for some users.*

Help users recognize, diagnose, and recover from errors *Issue: If the notification itself is viewed as an “error” or at least as an unwanted system state then it is not obvious from screen a how to go about changing the notifications. The answer is to click on the user’s icon, but that is not clear.*

Help and documentation *Issue: Screen f has no clear description of “Tailored for you” and no clear way to find out what that means.*

3. Analyze this sequence of interactions using GOMS. Assume the following variable names represent the time required to do each action. List out all the necessary actions and use them to construct the formula that would calculate the amount of time necessary to complete the actions in Figure 1. In class we only learned the KVM model thus far, so please treat the person’s finger pressing the screen the same way you would handle a mouse.

- p - point to an area on the screen
- b - press a button (physical or virtual)
- h - home the hand on a position on the screen
- d - draw a straight line on the screen using a finger
- k - open keyboard
- c - type one character
- m - mentally preparing for executing physical actions

Answer:

1. *initiate the setting change (M)*
2. *find the profile icon (M)*
3. *point to the profile icon (P)*
4. *tap icon (B)*
5. *find setting option (M)*
6. *point to the option (P)*
7. *tap option (B)*
8. *find notifications option (M)*
9. *point to the option (P)*

10. *tap option (B)*
11. *find Mobile notifications option (M)*
12. *point to the option (P)*
13. *tap option (B)*
14. *find mentions, replies and photo tag option (M)*
15. *point to the option (P)*
16. *tap option (B)*
17. *find off option (M)*
18. *point to the option (P)*
19. *tap option (B)*
20. *verify change on screen (M)*

The above sequence will result in: $8M + 6B + 6P$

Common correct adjustments to the above would include:

- *adding a homing to the begining where the person has to move their hand to the screen.*
- *ommiting the verify at the end since it does not technically need to be there*
- *add the actions necessary to back out of the screen back to the home screen*

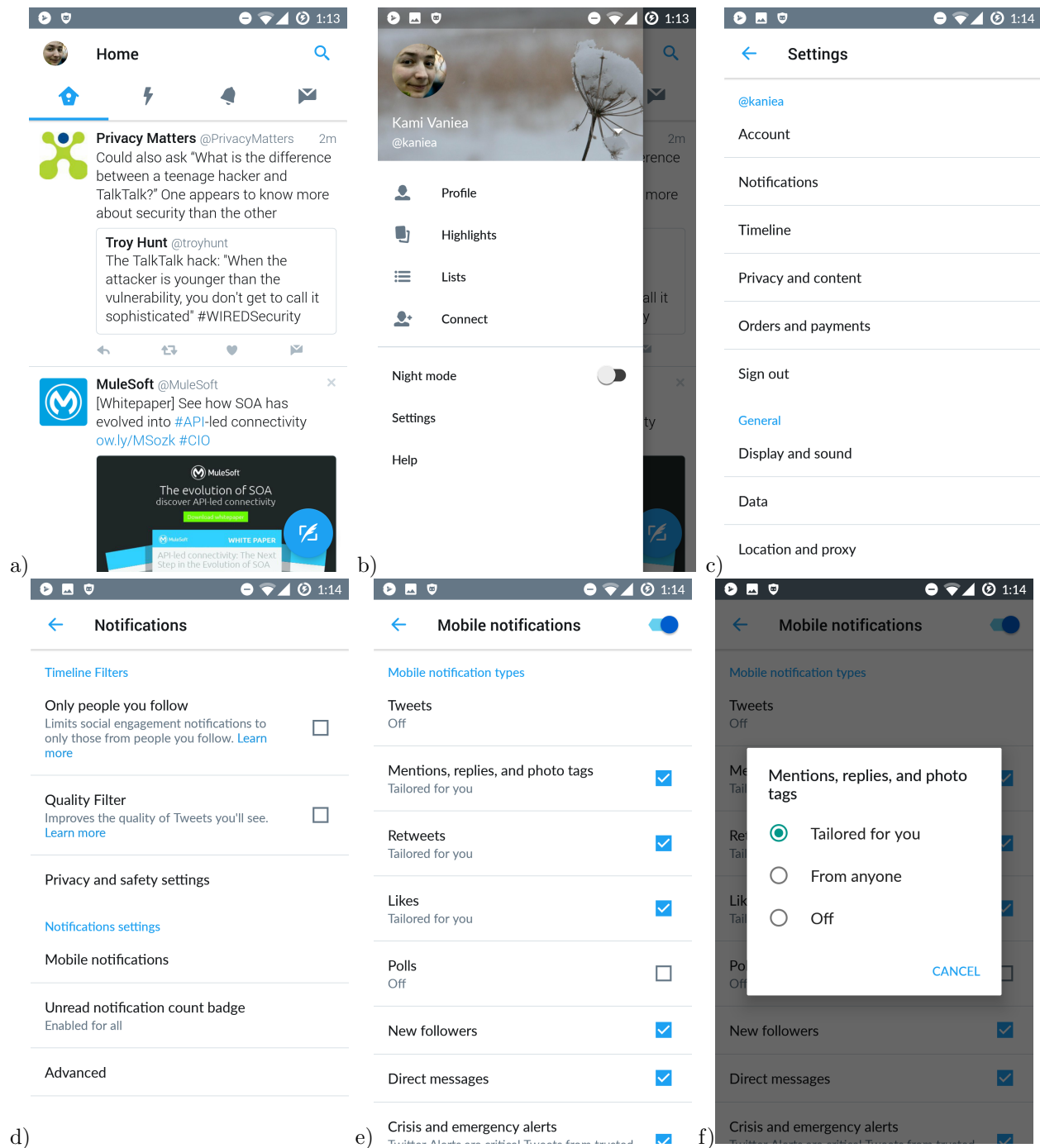


Figure 1: Sequence of screenshots of the twitter app.

2 Modern Hotel (2009 exam)

A modern hotel has installed a sandwich making robot to supply room service sandwiches at any hour of the day. The hotel also has an automated delivery system that will take the completed sandwich to a specified room. You have been asked to program a software agent interface that guests can phone to order sandwiches.

1. Write a short scenario describing how a guest would order a sandwich using your interface.

Answer: *Alice gets into her hotel room late and is hungry. She wants to order room services so she opens up the guest book and sees that she can order one of three sandwiches from the menu at any time of night. So she dials the number in the guest book, a recording answers asking her to type in the number of the sandwich she wants. The guest book has a number code next to each sandwich so Alice type 23 into the phone key pad to order a ham sandwich. She is then told to confirm that she wants a ham sandwich by pressing 1. She does so and is informed that her sandwich will arrive in 10 minutes. After waiting 10 minutes she gets a knock at her door and a robotic trolley has her sandwich.*

2. Provide a hierarchical task description of the sandwich ordering process. Note particularly where there might be choice points or alternative methods. Also explain your criteria for the level of decomposition used.

Answer: *The following is a sample answer, several options are possible. Correct answers will cover the full sequence of events and break them down into tasks and subtasks. The following answer has several choice points which are possible. To begin with the person may choose to find the phone number, and perhaps dial it before trying to select a sandwich.*

(a) *Select a sandwich*

- i. Find the guest book*
- ii. Find the section for menu items*
- iii. Find the section for late-night sandwiches*
- iv. Read about the sandwiches*
- v. Select a sandwich*

(b) *Find the phone number*

- i. Locate the phone number near the top of the section*

(c) *Convey sandwich selection to the system*

- i. Dial the phone number*
- ii. Listen to the recorded message about sandwich delivery*
- iii. Be asked to relay the sandwich number*
- iv. Find the number next to the selected sandwich*
- v. Type in the number code*

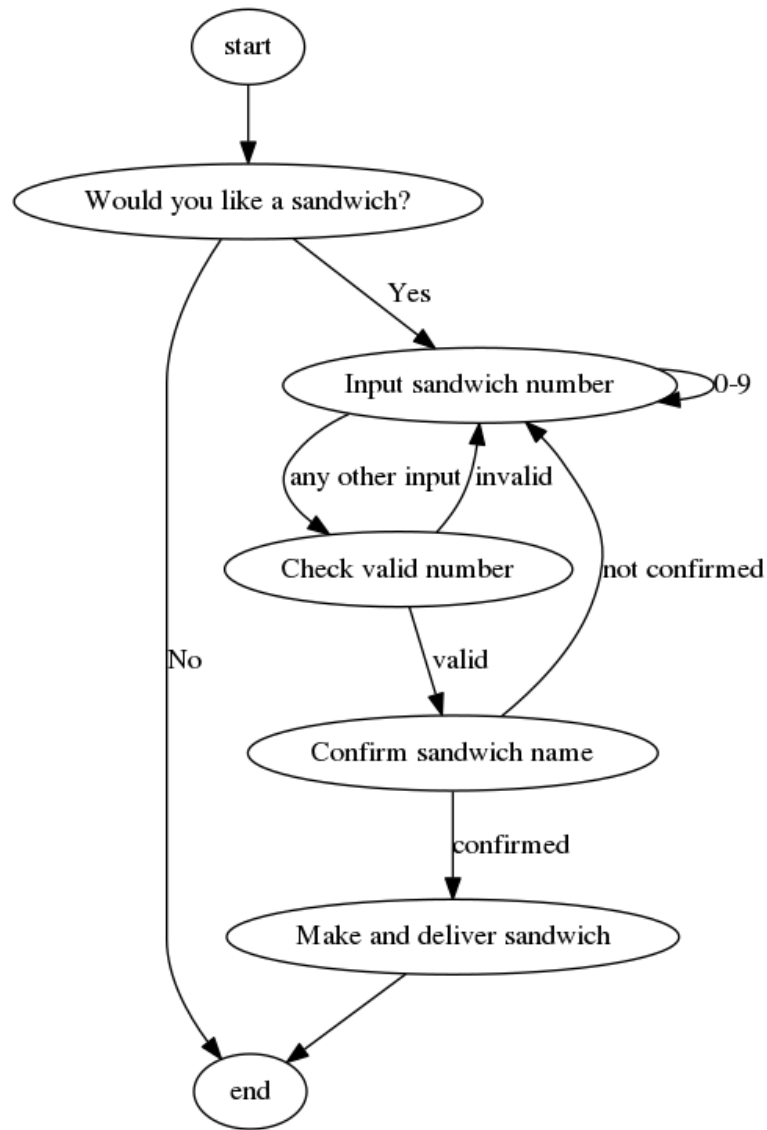
(d) *Confirm selection*

- i. The system reads back the sandwich name and asks for confirmation*
- ii. Confirm by hitting 1*
- iii. Be told about the wait time*

(e) *Receive sandwich*

- i. Wait 10 minutes*
- ii. Listen for knock on door*
- iii. Receive sandwich*

3. Use a state diagram to describe the dialogue between the system and the user. Note any additional issues this raises about the system that need to be resolved in the design.



Answer:

4. Would you use a voice recognition system or ask the user to push phone buttons to enter responses? Explain the relative advantages and disadvantages of each for this particular situation.

Answer: Both answers are reasonable. Voice would be better if it has high accuracy and there are a small number of options. With the voice option the user may need a fall-back for cases where they cannot get the voice recognition system to work. Pushing phone buttons is also reasonable provided that there are a small number of sandwich options. If the number of options becomes too large it will be hard for the user to find the sandwich they want and be sure to input it properly.

5. Do you think the agent should be programmed with a distinct personality? Explain why or why not.

Answer: Again both options are possible. The answer should include a discussion of how different types of people are likely to react to the personality.

3 New web page (2010 exam, heavily modified)

Figure 2 shows the front page of the Scottish government website. You have been asked to design a version of the page that can be viewed on small screens such as a mobile phone or PDA.

1. How would you identify the needs of mobile users accessing the page? Keep in mind that the page needs to provide the same functionality and content as the current page. So you need to focus on identifying layout-related needs.

Answer: *There are multiple answers to this question. The following is a sketch of one of them: I would setup a survey asking people how they use the page now to identify the most commonly used elements. I would then follow up with a think-aloud type study with a mock-up of the phone page (possibly on paper) so I could understand how people might go about accomplishing those tasks on new designs of the site.*

2. How would you evaluate your new design? Give a full outline of an empirical study of usability. Be specific about what you would measure, under what conditions, and how you would decide if any differences in usability, relative to the full size page, were meaningful?

Answer: *Again, multiple answers are possible, the following is a sketch of one such answer: I would do an A/B style test using the think-aloud protocol. I would setup several information finding tasks based on the types of information people typically want from this page such as information about Brexit. I would then have half the people use the mobile interface and half the normal sized web page. I would need at least 10 people to do this, though more would be better. I would then compare the types of errors people made on the two sites and how successful they were at finding information.*



Figure 2: Scottish government web page.

4 Extra resources

The following are provided as part of the tutorial document, but they would not be provided as part of an exam.

Nielsen's 10 Heuristics

Visibility of system status

Match between system and the real world

User control and freedom

Consistency and standards

Error prevention

Recognition rather than recall

Flexibility and efficiency of use

Aesthetic and minimalist design

Help users recognize, diagnose, and recover from errors

Help and documentation