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# Human-Computer Interaction
# Exercise sheet 2

24P

## Exercise 1 – Visual Search

**Solution:**

This is correct, because when searching to confirm that a stimulus is present, regardless of how salient it is, one must only search the options until the stimulus is found and can then ignore subsequent stimuli. When searching to confirm a stimulus' absence however, one must search all stimuli to confirm that it is not the target stimulus.

1.5

## Exercise 2 – Recognition vs. recall

3.5

**Solution:**

**Recall**: How to play notes on a trumpet. Various key combinations to memorize, no obvious pattern to which keys correspond to which musical notes.

0.5

**Recognition**: Using a computer keyboard. Letters printed on keys, and sometimes various ways of displaying information (ex. Braille markers)

1. One shouldn't force the user to use overly complicated procedures to carry out tasks. 0.75
2. Design interfaces that allow the user to recognize relevant information from visual elements rather than have to remember it. 0.75
3. Provide users with various ways to remember and encode information. 0.75
4. One should not have the user remember large amounts of information at a time and should remind the user of relevant information. 0.75

## Exercise 3 – Perceptual illusions

7

**Solution:**

**Part 1**: To evoke the "cutaneous rabbit" illusion, experimenter needs to tap two or more separate regions on a participant's body. The participant should not see where he or she is tapped. Under some conditions (like the amount of taps on each region or regularity of the taps) the places of the taps will be misplaced by the participant. He or she will feel that the taps are not only localized in the tapped regions (physical stimulus) but are more distributed between them (perception). The illusion is most successfully evoked on regions with less spatial acuity.

2

**Part 2**: The illusion should be successfully invoked on the humans back (lower part - middle part - upper part) and arm (wrist - elbow - shoulder). The illusion should work on these regions because they have low spatial acuity, and the illusion is more successfully invoked on regions with less spatial acuity.

2

**Part 3**:

**Person 1** - Arm was better, did not work on back.

**Person 2** - Neither worked.

3

**Person 3** - Worked on arm, didn't work on back.

*Based on our results, arm is a region better suited for evoking the illusion then back.*

## Exercise 4 – Fitts' Law 6

**Solution:**

**Part 1**: According to Fitts' Law, the time taken to make a selection depends on the size of the object and the distance between users' starting point to the object. This can be seen by looking at the smartphone screen given below as an example. If you place the apps which users are most likely to access on a regular basis next to each other, rather than distribute them across the interface like Facebook, Snapchat, and Instagram in the example screen shown below, you will speed up interaction by reducing the amount of movement user have to make to reach the icon. Moreover, the apps present in the groups/collections "More" will require comparably more time because of their small size. 2

**Part 2**: The scenarios that adhere to the implications of Fitts' Law are:

2 a) If the number of important elements is considerably high, then making them bigger would avoid some of them being placed at the edge or corner of the screen.

2 b) Grouping important elements does not necessarily allow them to be place on the edge or corner of the screen.

## 6 Exercise 5 - Mental Model

**Solution:**

**Part 1**: A mental model is the users internal understanding of an external systems. This helps making accurate predictions of the system. The development of a mental model is both a conscious and subconscious process done through both learning and system use.

2

A mental model can be both shallow and deep, corresponding to the depth in the user's understanding of the system. For instance, a shallow mental model can be how to use a microwave oven, while a deeper mental model includes the construction of it.

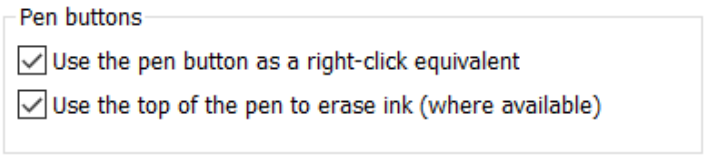
Systems only communicates with the user through a system image, which is how the system is presented to the user. Therefore, the user's mental model will be based on this system image. It is therefore of importance that the designers make a as good system image as possible, so that the user can make a correct mental model out of it.

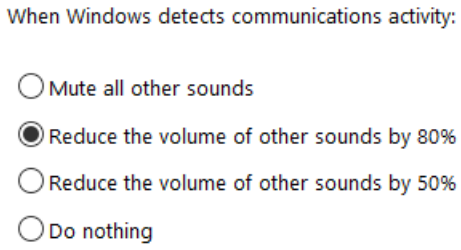
**Part 2**: Gulf of execution

The gulf of execution is the distance between the actions a user thinks are required to perform an action in a system, and what actions the system really requires. For instance, if a user wants to export an image file to another file format in a program, the user might think that the only steps needed are to locate the "export" feature in the menu of the program and then choose a directory to save the new file in. Though, the actually actions required might also include to choose a new file name, file extension and level of image compression. This difference is the gulf of execution.

2

**Part 3**: Gulf of evaluation




The gulf of evaluation is the psychological distance needed to cross in order to understand a user interface. The gap is small when the system gives visual information about its states and behaves as predictably and according to the user's expectations. One example is the convention of using radio buttons (as in the image "When Windows detects communications activity") or checkboxes (as in "Pen buttons"). Radio buttons are usually used to let the user graphically choose only one out of multiple choices, while checkboxes let the user choose multiple, or none. Most experienced users have a sense of what one can do with these graphical elements, so when an interface presents a feature that looks like a checkbox but acts as a radio button, it increases the gulf of evaluation since it does not act like the user expects it to. This is the case at the poll website Straw poll, which has checkboxes that acts like radio buttons.