Question 1

1. **CH3-ASSIGNMENT**

The aim of this assignment is for you to elicit mental models from people. In particular, the goal is for you to understand the nature of people’s knowledge about an interactive product in terms of how to use it and how it works.

(a) First, elicit your own mental model. Write down how you think a bank machine (ATM) works. Then answer the following questions:

- How much money are you all allowed to take out?
- If you took this amount out and then went to another machine and tried to withdraw the same amount, what would happen?
- What is on your card?
- How is the information used?
- What happens if you enter the wrong number?
- Why are there pauses between the steps of a transaction?
- How long are they?
- What happens if you type ahead during the pauses?
- What happens to the card in the machine?
- Why does it stay inside the machine? Or why not?
- Do you count the money? Why?

Next, ask two other people the same set of questions.

(b) Now analyze your answers. Do you get the same or different explanations? What do the findings indicate? How accurate are people’s mental models of the way ATM’s work? How transparent are the ATM systems they are talking about?

(c) Next, try to interpret your findings with respect to the design of the system. Are any interface features revealed as being particularly problematic? What design recommendations do these suggest?

(d) Finally, how might you design a better conceptual model that would allow users to develop a better mental model of ATMs (assuming this is a desirable goal).

Note: This exercise is based on an extensive study carried out by Payne (1991) on people’s Mental models of ATM’s. He found that people have mental models of ATM’s, frequently resorting to analogies to explain how they work. Moreover, he found that people’s explanations were highly variable and based on ad hoc reasoning.
GUIDELINES:
When doing this assignment you will probably be surprised at just how little people know about how ATMs work (unless they have worked in a bank). A main reason being that, as far as they are concerned, an ATM is there to provide them primarily with cash. They just need to know how to operate it. It is only when unexpected things happen (e.g. it does not provide any money, it says they are overdrawn when they are not, it gives more money than requested) that they may start to wonder how an ATM system works.

Some of the questions we ask in the assignment are difficult to answer. For example, what information is on your card? All you can see is a magnetic strip on the back of the card. You have never been told what is written on it. You have to infer from your knowledge of banking what might be on it. This is likely to include your password, your account number and your limit. But what else?

Most of us are unlikely to have thought much about many of the questions asked in the assignment. So we make inferences on the spot from our limited knowledge about such systems. This is what we mean by ‘ad hoc’ reasoning. We also will commonly use analogies, e.g. ‘well it is like a debit card’, in an attempt to explain. Some of these inferences maybe appropriate and others not.

What did you find when you asked other people? You may have discovered that their explanations were quite different. It is quite common for there to be variability between people's explanations of the same system. Also did you find that people used incorrect analogies, superstition or even bizarre models to explain their understanding? People can be quite creative when forced to provide explanations when they have no idea!

Another issue that is important to think about is whether you really are eliciting a person’s mental model, when asking such questions. How do you know what they say reflects the knowledge they use when interacting with a device? This question has taxed researchers for many years and there is a whole literature on how to elicit mental models and how to determine whether they are really the knowledge representations people use in their activities.

Different conceptual models underlie the design of ATMs used by different banks throughout the world. A key concern is whether to (i) allow the person take their money first and then give their card back or (ii) give their card back before letting them take their money. Banks that designed their ATMs on the first model found that a surprisingly high number of people forgot to take their card once they had achieved their primary goal of obtaining their cash. Conversely, banks that designed their machines using the second model didn't experience such problems. People rarely left their cash behind once they had removed their card! From an engineering perspective, the order in which they are performed may be regarded as arbitrary (so long as they are both executed). From an interaction design perspective, it is obvious as to why the order in which they are carried out by the user is critical.

When using your credit or debit card abroad, some ATMs may let you go through a series of operations (e.g. password, type of account, amount of cash) - only to then inform you that your
bank has denied the transaction. This is cruel for the user, who goes through all the motions of obtaining cash and associated anticipation.

**Deliverable:**
The completed assignment, covering all the requested material as a .pdf file.