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T. Y. B. TECH. (Information Technology) (SEMESTER -V)

COURSE NAME: Human Computer Interaction

COURSE CODE: IE31175IT

(PATTERN 2017)

Q.1)	a)	List and explain the Norman's Principle of "Design of Everyday Things".	**[6]**
Ans		▸ Visibility of system status ▸ Match between system and 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	
Q.1)	b)	Explain "Design Thinking".	**[6]**
Ans		Design Thinking is an iterative process in which we seek to understand the user, challenge assumptions, and redefine problems in an attempt to identify alternative strategies and solutions that might not be instantly apparent with our initial level of understanding. At the same time, Design Thinking provides a solution-based approach to solving problems. It is a way of thinking and working as well as a collection of hands-on methods. Design Thinking revolves around a deep interest in developing an understanding of the people for whom we're designing the products or services. It helps us observe and develop empathy with the target user. Design Thinking helps us in the process of questioning: questioning the problem, questioning the assumptions, and questioning the implications. Design Thinking is extremely useful in tackling problems that are ill-defined or unknown, by re-framing the problem in human-centric ways, creating many ideas in brainstorming sessions, and adopting a hands-on approach in prototyping and testing. Design Thinking also involves ongoing experimentation: sketching, prototyping, testing, and trying out concepts and ideas.	

There are many variants of the Design Thinking process in use today, and they have from three to seven phases, stages, or modes. However, all variants of Design Thinking are very similar. All variants of Design Thinking embody the same principles, which were first described by Nobel Prize laureate Herbert Simon in The Sciences of the Artificial in 1969. Here, we will focus on the five-phase model proposed by the Hasso-Plattner Institute of Design at Stanford, which is also known as d.school. We've chosen d.school's approach because they're at the forefront of applying and teaching Design Thinking. The five phases of Design Thinking, according to d.school, are as follows:

- Empathise – with your users
- Define – your users' needs, their problem, and your insights
- Ideate – by challenging assumptions and creating ideas for innovative solutions
- Prototype – to start creating solutions
- Test – solutions

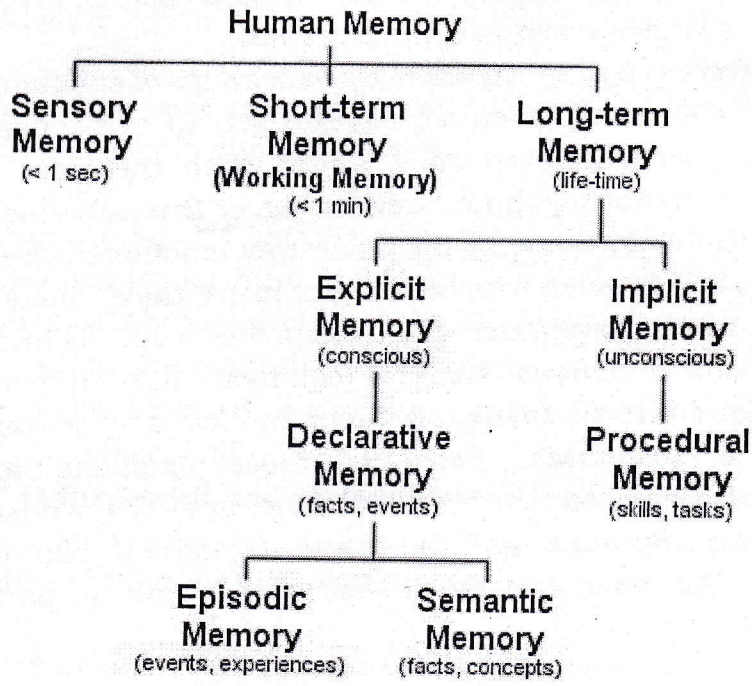
It is important to note that the five phases, stages, or modes are not always sequential. They do not have to follow any specific order and can often occur in parallel and repeat iteratively. Given that, you should not understand the phases as a hierarchal or step-by-step process. Instead, you should look at it as an overview of the modes or phases that contribute to an innovative project, rather than sequential steps.

Q.1) c)	What is HCI? Why HCI study is important?	**[4]**
Ans	'Human Computer Interaction' is a discipline concerned with the design, evaluation and implementation of interactive computing systems for human use and with the study of major phenomena surrounding them. HCI is the study of how people interact with computers and to what extent computers are or are not developed for successful interaction with human beings. One important HCI factor is that different users form different conceptions or mental models about their interactions and have different ways of learning and keeping knowledge and skills (different "cognitive styles" as in, for example, "left-brained" and "right-brained" people). In addition, cultural and national differences play a part. Another consideration in studying or designing HCI is that user interface technology changes rapidly, offering new interaction possibilities to which previous research findings may not apply. Finally, user preferences change as they gradually master new interfaces.	

Q.2)	a)	How people do things? List the SEVEN stages of action?	**[6]**
Ans		▸ Forming a goal: What do I want? ▸ Forming the intention: What would satisfy this goal? ▸ Specifying an action: What do I have to do to achieve the intention? ▸ Executing the action: Do the steps I have specified. ▸ Perceiving the state of the world: Use my senses to gather information about the world and/or system I am working with. ▸ Interpreting the state of the world: Figure out what, if anything, has changed. ▸ Evaluating the outcome: Did I achieve my goal?	
Q.2)	b)	Define "Wicked Problem". List 10 characteristics of wicked problem.	**[6]**
Ans		1. There is no definitive formula for a wicked problem. 2. Wicked problems have no stopping rule, as in there's no way to know your solution is final. 3. Solutions to wicked problems are not true-or-false, they can only be good-or-bad. 4. There is no immediate test of a solution to a wicked problem. 5. Every solution to a wicked problem is a "one-shot operation"; because there is no opportunity to learn by trial-and-error, every attempt counts significantly. 6. Wicked problems do not have a set number of potential solutions. 7. Every wicked problem is essentially unique. 8. Every wicked problem can be considered to be a symptom of another problem. 9. There is always more than one explanation for a wicked problem because the explanations vary greatly depending on the individual perspective. 10. The planner/designer has no right to be wrong and must be fully responsible for their actions. A wicked problem means that the nature of the problem is highly ambiguous. Think of it as a highly complex problem where there are many knowns and unknowns. Wicked problems do not have clear yes or no solution. There are only better or worse solutions to wicked problems.	
Q.2)	c)	Write a short on: Evolution of the web and digital interfaces.	**[4]**
Ans		Evolution of the web and digital interfaces: examples of google interface, yahoo, since their inception.	

Q.3)	a)	Suggest ideas for an interface which uses the properties of sound effectively.	**[6]**
Ans		Any interface example and explanation about the use of properties of sound effectively.	
	b)	Explain the concept of Ergonomics with example.	**[4]**
Ans		Ergonomics (or human factors) is traditionally the study of the physical characteristics of the interaction: • how the controls are designed, • the physical environment in which the interaction takes place, and • the layout and physical qualities of the screen. A primary focus is on user performance and how the interface enhances or detracts from this. ▸ arrangement of controls and displays ▸ e.g. controls grouped according to function or frequency of use, or sequentially ▸ surrounding environment ▸ e.g. seating arrangements adaptable to cope with all sizes of user ▸ health issues ▸ e.g. physical position, environmental conditions (temperature, humidity), lighting, noise, ▸ use of color ▸ e.g. use of red for warning, green for okay, awareness of color-blindness etc.	
	c)	List Universal Design Principles and explain any FOUR of them.	**[4]**
Ans		1. Equitable Use 2. Flexibility in Use 3. Simple and Intuitive to Use 4. Perceptible Information 5. Tolerance of errors 6. Low physical efforts 7. Size and space for approach and use	
Q.4)	a)	"Human emotions play an important role in designing a GUI for any application" Elaborate your answer with example.	**[6]**
Ans		Factors specific to the things we use in our everyday lives influence how we feel when we are using them. It is, therefore, the role of designers to both understand how we are affected by the products they design, and how they can be developed to (on	

		a small scale) improve the associated user experience, and (on a much grander scale) improve our lives. On an average day we experience a wide range of emotions, such as disappointment when we have to get up early, happiness when we see our loved ones, anger when the train we are travelling on stops without forewarning, or frustration when we struggle to open a jar. In the same way emotions arise as we navigate and interact with our environment, these emotions are evoked when navigating and interacting with technologies. While some emotions are less common, like sadness and empathic concern, many products induce a wide range of emotional responses. Some of these emotions are an unintended by-product of certain design qualities, whilst other emotional responses are the result of careful planning to improve the user experience associated with a particular product.	
	b)	Explain a model of Structure of Human Memory.	[4]
Ans		There are three types of memory. Sensory memory, which acts as a buffer for stimuli received through all the senses. Sensory memory exists for each sense we have - haptic for touch, echoic for sound and iconic for sight. Short-term memory is where all information is held briefly upon entering our system. Upon entering short-term memory, the information does not have long to live - 200 milliseconds is about the maximum time. Short-term memory is also very limited. If not committed to long-term memory, we will lose the information. Long-term memory is much longer and holds the information over a long period of time. There is very little decay but if held for too long, it becomes difficult to recall the information.	



	c)	What can a system designer do to minimize the memory load of the user? Explain with example.	**[4]**
Ans		To "minimize user memory load", computers should take over the burden of memory from the user as much as possible. They are very good at remembering things very precisely whereas humans are not. This can be accomplished by promoting recognition over recall. In general, people have a much easier time at recognizing something that is shown to them rather than having to recall the same information from memory without help. Displaying dialogue elements allows users to select items through recognition. Graphical user interfaces (GUIs) such as menus and icons achieve this goal, as opposed to command lines. It is also easier for the user to modify information displayed by the computer than to have to generate all of the desired results from scratch. For example, when users want to rename a file, the text field should be prepopulated with the old name allowing users to make modifications instead of typing a new name. Visibility of the objects of interest to the user also helps to promote recognition. Unfortunately, displaying too many objects will result in contradiction with the 'less is more' rule. Therefore, a compromise must be made to match object visibility as much as possible with the user's needs.	

		Whenever users are asked to provide input, the system should describe the required format and, if possible, provide an example of legal input, such as default value. For example, a system asking the user to enter a date should do it as follows: 'Enter date (DD-Mmm-YY, e.g., 2-Aug-93)'. To minimize the user's memory load, the system should be based on a small number of rules that apply universally throughout the user interface. The use of generic commands is one way to let a few rules govern a complex system. Generic commands make similar things happen in different circumstances; therefore, users only need to learn a few commands in order to work with many different types of data. They support transfer of learning from one application to the next, since users do not need to relearn those commands they already know.	