National University of Computer and Emerging Sciences, Lahore Campus

Course Name:	Human Computer Interaction	Course Code:	CS 422
Program:	CS	Semester:	Spring 2020
Duration:	3 Hr + 30 Minutes for paper submission	Total Marks:	60
Paper Date:	10 July 2020	Weight	45
Section:	ALL	Page(s):	
Exam Type:	FINAL		

Student : Name: Arfa Dar Roll No. 17L-4353 Section: HCI-C

Instruction/Notes: **Do not exceed the line limit for your answers.**
All answers must be handwritten.
Provide handwritten screenshots in the space given below each question.

Question 01 [10+10 Points]

Establish a Goal for "Flex Student" Application and apply the following on that goal

- Norman's Model of Interaction
- Abowd and Beale Framework to that Goal.

Human Computer Interaction

Arfa Dar (17L-4353) HCI-C

Final Exam

Q1)

Goal: View Transcript

a) Norman's Model

Step 1: Establish the Goal

In this step, we have decided that we want to take a look at our grades through the flex student website.

Step 2: Formulate Intention

This can be achieved by viewing our student transcript on the flex student website.

Step 3: Specify actions at interface

To achieve our desired goal, we will have to open our web browser and go to flex student website. Furthermore, we will have to login using our own credentials. Lastly, we will have to click on the transcript tab on the homepage.

T/L-4353

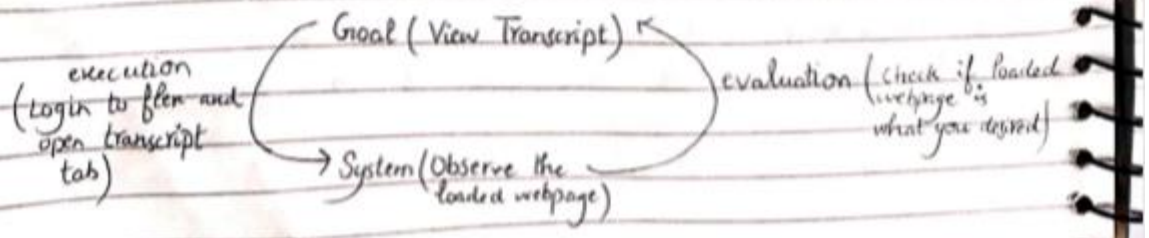
Step 4: Execution of action
Perform the steps mentioned above and wait for the webpage of transcript tab to open.

Step 5: Perceive system's state
After the webpage is loaded, look at the page and observe the information presented on the screen.

Step 6: Interpret system's state
Compare the webpage with what you had in mind while establishing the goal of viewing your grades and looking at your transcript.

Step 7: Evaluate system w.r.t. Goal
If the loaded webpage is what you desired and it shows transcript/ completes the established goal, then your task is complete. Otherwise, formulate further steps to achieve the desired outcome.

Norman's Model Diagram



17L-4353

(b) Abowd & Beale Framework

1- Articulation (Intentions/Specify actions)

I want to view my grades via looking at my transcript on the flex student website. For this purpose, I need to login to the flex website and go to the transcript page.

2- Performance (Execution of actions)

I enter my credentials on the login page after visiting the flex student website and click on the login button. After this, a homepage is loaded and I need to click on the transcript tab on that page.

3- Presentation (System Feedback)

System will load a homepage after login and some progress is shown on the web browser, indicating that a new page has been loaded. After clicking on the transcript tab, the same process will be repeated and the flex student website will show a new page which was not already being presented on the screen.

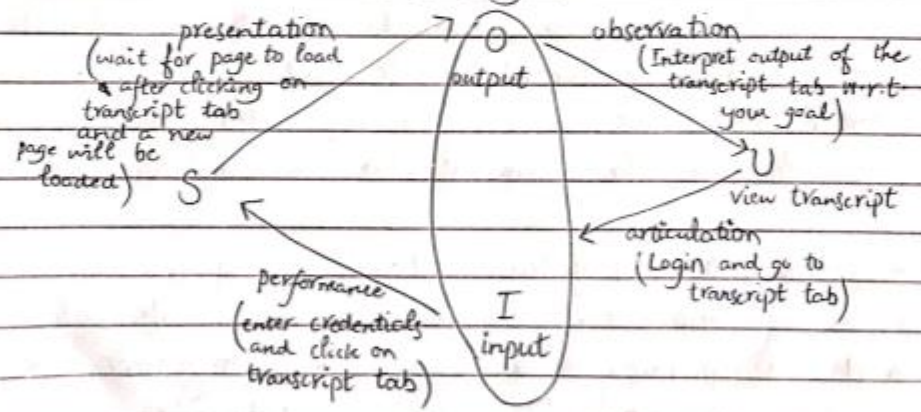
17L-4353

4- Observation (Interpretation of feedback)

The feedback provided by the flex student website is observed and we'll try to interpret that output to see if our goal is achieved. The newly loaded page of transcript on the web browser and the grades shown on it will indicate that our goal has been achieved.

25

Abowd & Beale Framework Diagram:



Q2) a)

Gulf of execution:

Gulf of execution is the difference between user's formulation of the action to reach the goal

a) Elaborate Gulf of Execution and Gulf of evaluation with 2 examples.
b) Give one example each for direct and indirect manipulation Interaction of HCI
(Line limit : 3 lines per example.)

(4)

17L-4353

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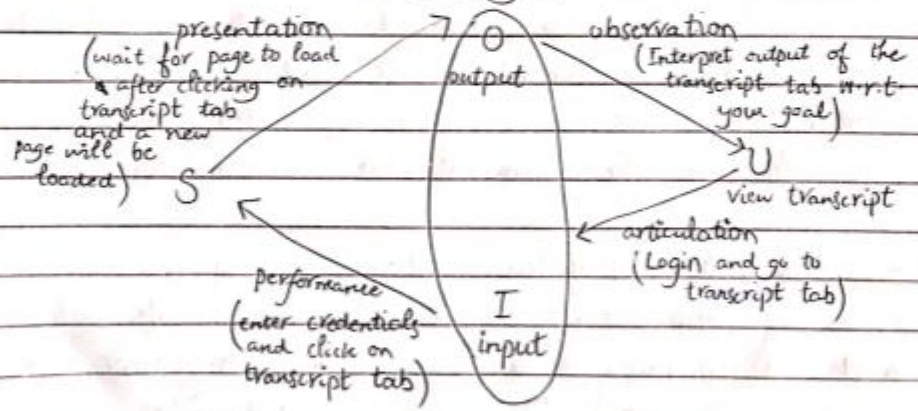
Abowd & Beale Framework Diagram:



Q2) a)

Gulf of execution:

Gulf of execution is the difference between user's formulation of the action to reach the goal

17L-4353

and the actions allowed by the system.

For example:

If in our application/system, a person wants to record his/her screen, he/she will assume that the way to do it will be selecting the record option. But if the record option requires some pre-processing in the settings option, we can say that there is a relatively large gulf of execution.

Gulf of evaluation:

The difference between the physical presentation of the system state and the expectation of the user is called gulf of evaluation.

For example:

If a light switch is on, we can easily interpret that by looking at the physical form of the switch (assuming that we have followed natural conventions in our system). So we can say that gulf of evaluation is very low/null

IIL-4353

b)

Direct Manipulation:

Editing a document in a word processor or preparing a sheet in MS Excel can be referred to as direct manipulation as user is interacting with the artificial world in the computer.

Indirect Manipulation:

Controlling some heavy machinery / equipment through a computer interface in the real world can be refessed to as indirect manipulation.

Q3)

Ben Shneiderman's design rules

1 - Consistency

It refers to similarities and symmetry in the user interface such that the terminologies used in prompts / major displays are similar. Moreover, consistent colours and layouts are used.

For example:

The homepage of flex student website is symmetric and the same interface convention have been followed throughout the homepage i.e. student info in the form of horizontal cards, all menu items in

Ben Shneiderman’s design rules and give one example from each rule for Flex Student Application. (Screenshots can be used for elaboration)

(Line limit : 3 lines per example. One screenshot per example.)

17L-4353

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For example:

The homepage of flcu student website is symmetric and the same interface convention have been followed throughout the homepage i.e. student info in the form of horizontal cards, all menu items in

17L-4353

The sidepar with similar fonts & icons etc.

2- Seek universal usability:

It means that making our interface usable for all kinds of users i.e. casuals, experts etc. should be top priority. Explanation should be there for novice users and there should also be shortcuts for faster pacing for expert users.

For example:

Flex provides exact attendance for the students in the attendance tab but also provides a graphical representation which gives you a relatively rough idea of the attendance. Moreover, visual representation is provided in the tabs for clearer objective identification.

3- Informative Feedback:

Feedback should be given as a result of different operations to make the user aware of what they are doing and what did they do wrong/right.

For example:

Entering wrong login info at flex shows an error message as a feedback. But it doesn't provide options such as forgot password etc. in the message box.

17L-4353

4- Design dialogs to yield closure:

It refers to providing a sequence of operations to the user in case of performing a specific task.

For example:

Opening the fee challaan tab provides you clear options of either viewing the challaan or printing it. Although it is not a sequence of operations but it is more or less an indirect guideline.

5- Prevent errors:

This refers to minimizing the number of errors that a user can make while using the application.

For example:

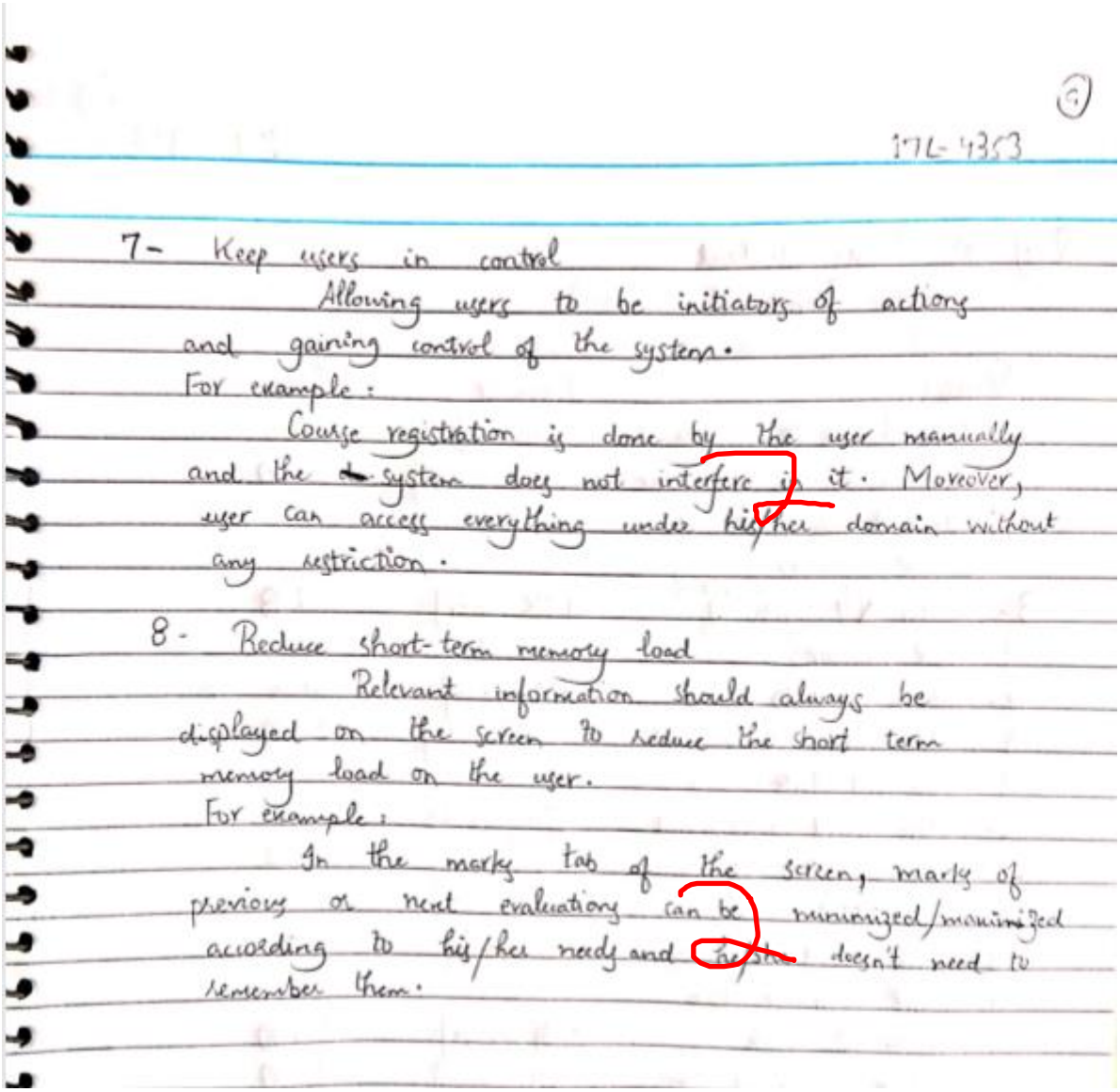
The drop and register button on the course registration screen disappears once the semester has started. This prevents misclicks on these buttons.

6- Easy Reversal of actions

Actions should be easy to reverse in order to provide correction to the errors already made by the user.

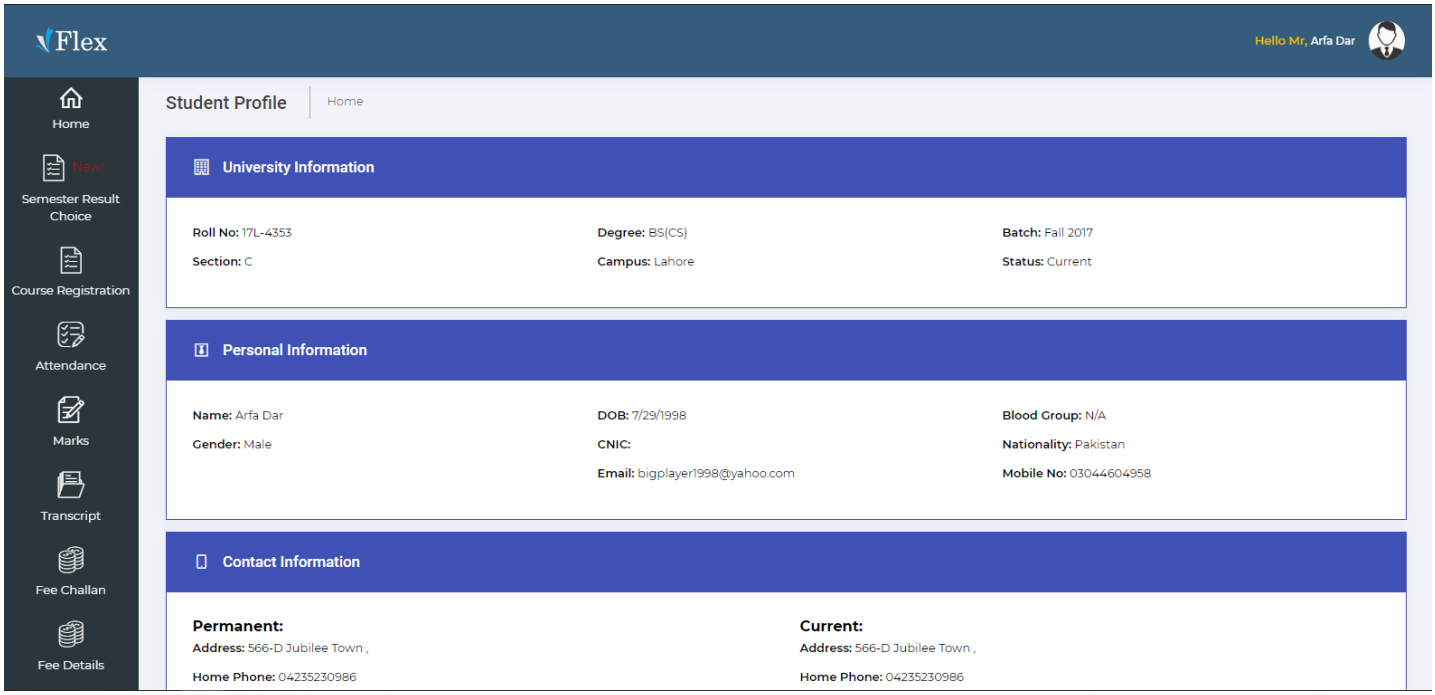
For example:

In the case of semester result choices, a misclick on the letter grade could be easily reversed by clicking on the S/U radio button.

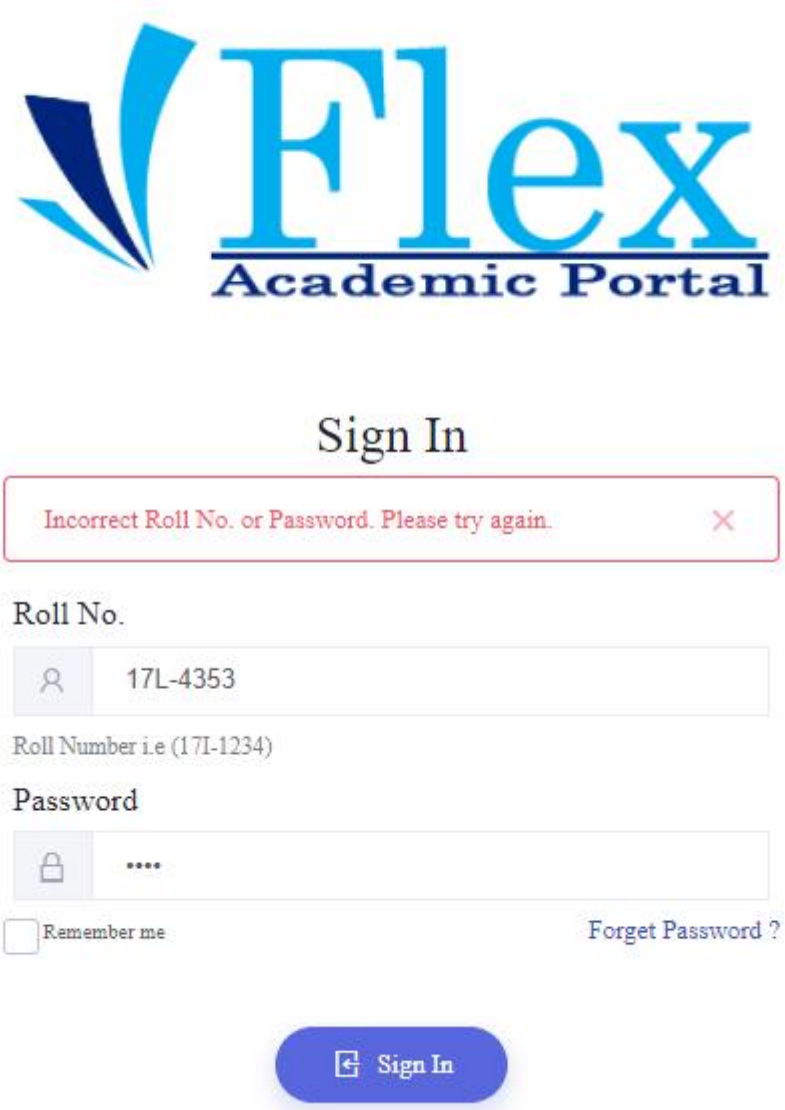


Screenshots:

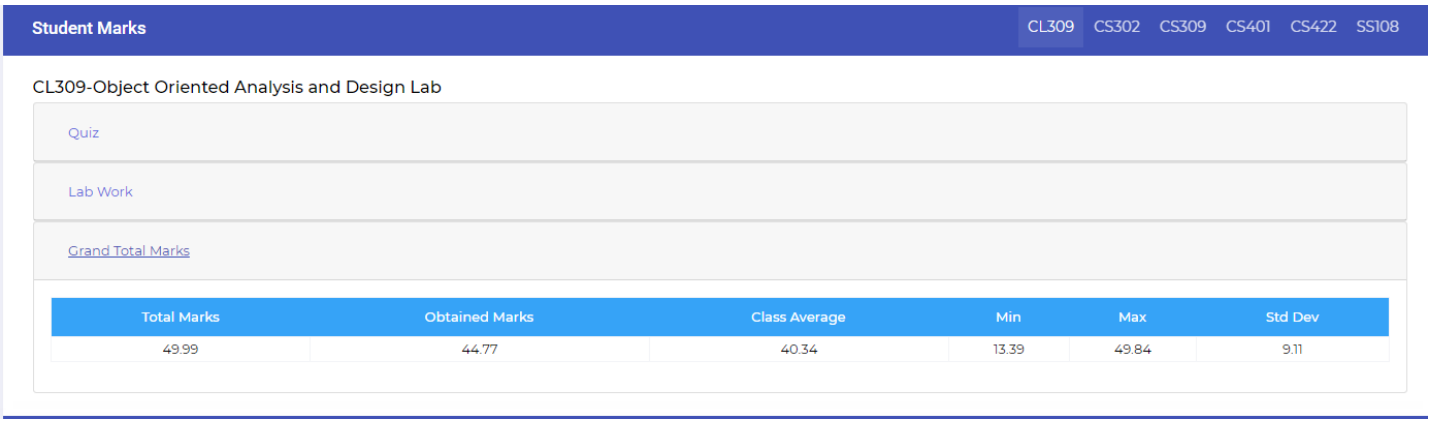
Consistency:



Feedback:



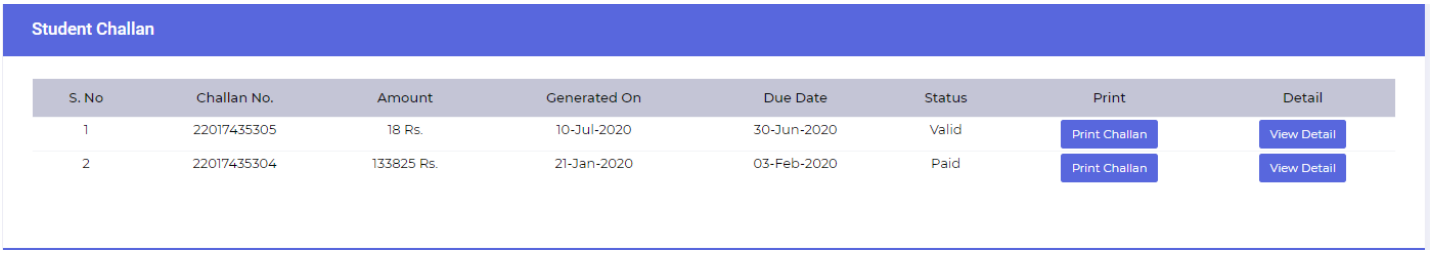
Short term memory:



Prevent Errors:

Sr.#	Course Name	Cr.Hrs	Relation	Comments	Status
1	CS401-Artificial Intelligence	3	Core	Register! 5-New Offered Course <New> (Recommended)	Registered
2	CS302-Design and Analysis of Algorithms	3	Core	Register! 5-New Offered Course <New> (Recommended)	Registered
3	CS422-Human Computer Interaction	3	Core	Register! 5-New Offered Course <New> (Recommended)	Registered
4	CS309-Object Oriented Analysis and Design	3	Core	Register! 5-New Offered Course <New> (Recommended)	Registered
5	CL309-Object Oriented Analysis and Design Lab	1	Core	Register! 5-New Offered Course <New> (Recommended)	Registered
6	SS108-Technical and Business Writing	3	Core	Register! 5-New Offered Course <New> (Recommended)	Registered

Dialog Sequence:



Question 04 [14 Points]

Flex student and Slate application, take one goal from each application and apply KLM GOMS model to calculate time or performance (apply heuristics if applicable).

a. p=1.1 sec point to an area on the screen
b. b=0.2 sec press a button
c. h=0.4 sec home the hand to and from keyboard
d. k=0.2 sec key press
e. m =1.3 sec mentallypreparing

17L-4353

Q2) a) Flex Student View Transcript (Goal)

Steps:	Operator	Time
1- Move hand to mouse	H[mouse]	0.400
2- Move cursor to the login credential area and click on roll number	MPB [mouse]	2.600
3- Move hand to keyboard & Enter 7 digits of roll number	H7K [char]	1.8
4- Move hand to mouse	H[mouse]	0.4
5- Move cursor to password area and click	MPB[mouse]	2.600
6- Move hand to keyboard	H[keyboard]	0.4
7- Type 6 digits of password	6K[char]	1.2
8- Move hand to mouse	H[mouse]	0.4
9- Move cursor to login button & click	MPB[mouse]	2.600
10- Move cursor to the transcript tab & click	MPB[mouse]	2.600

17L-4353 (11)

Operations:

H M P B H K K K K K K K M P
B H K K K K K K H M P B M
P B

One M is added behind a full string, so instead of adding M behind each keystroke, we will add one M for a complete string [I have already added Ms for Ps in steps]

H M P B H M K K K K K K K M P
B H M K K K K K K H M P B M P B

Time:

0.4 + 2.6 + 1.8 + 0.4 + 2.600 + 0.4 + 1.2 + 0.4 + 2.6 + 2.6
+ (1.3 x 2) [For the 2 Ms we added] 6.5

17.6 Seconds.

b) Slate Student
View Resources

Steps	Operator	Time
1- Move hand to mouse	H[mouse]	0.4
2- Move cursor to login area and click on roll no. field	MPB[mouse]	2.6

(17L-4353)

Steps	Operator	Time
3- Move hand to the keyboard	H[keyboard]	0.4
4- Enter 7 digits of roll number	7K[char]	1.4
5- Move hand to mouse	H[mouse]	0.4
6- Move the cursor to the password field and click	MPB[mouse]	2.6
7- Move hand to keyboard	H[keyboard]	0.4
8- Type 5 digits of password	5K[char]	1
9- Move hand to mouse	H[mouse]	0.4
10- Click on the login after moving the cursor upon it.	MPB[mouse]	2.6
11- Move cursor to the desired subject and click	MPB[mouse]	2.6
12- Move cursor to the resources tab and click	MPB[mouse]	2.6

(176-4353)

Operations:

H M P B H K K K K K K K H
M P B H K K K K K H M P B
M P B M P B

Adding M behind strings [shown via arrows]
[One M for whole string as explained before, other Ms already added in the steps]

Time:

0.4+2.6+0.4+1.4+0.4+2.6+0.4+1+0.4+2.6+2.6+2.6
+(2×1.3)
= 20 seconds

7

Q5)

Natural Language:

This interface can be used to give swift commands through typing or speech recognition. It may be appropriate for an application which is being used by a disabled person. He/she can give out commands without looking at the screen or without moving it. Moreover, it can also be used for systems which require minimum direct interaction with the interface.

2

For example:

Natural language can be used as voice recognition in a music player to skip & play songs/ Can be used with Siri/Google Assistant

State how each of the interaction styles is appropriate for applications/interactions. Give one application example for each

- Natural Language
- Three–dimensional interfaces
- Touch

Operations:

H M P B H K K K K K K K H
M P B H K K K K K H M P B
M P B M P B

Adding M behind strings [Shown via arrows]
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(176-4353)

Three dimensional interfaces:

These interfaces can be used to study complex structures or tasks in a better manner to have a greater understanding of hierarachies.

For example:

Can be used to study structure of a complex program via displaying in three dimensions and interacting with it.

Touch:

Provides minimal efforts to perform a task on the screen. Instead of using multiple ~~output~~ input devices to perform different inputs, touch provides a singular input interface.

For example:

Image editor app on a touch phone requires touch to perform various tasks.

Q6)

If we do not perform contextual task analysis then we might miss out on information about how the task which is being automated is being performed in real life. Some task scenarios may require different interfaces depending upon how they are being done in real life which may differ from conventional method.

Example: Airline seat reservation may consist of different tasks being ~~performed~~ performed and each task may have different methods of doing it.

What is the importance of Contextual task analysis and what could be missed if we do not perform Contextual Task Analysis for any application design. Explain with one example that is not already discussed in class or book.
(Line limit : 5 lines)

(17L-4353)

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