17L-4202
EIMAN WAHEED
HCI-CS C
QUIZ

Task 1: Bold a word or letter

Scenario 1: assume that the user is pre skilled about using Microsoft Word and has the information about how to bold it using the menu bar. The general procedure is to select a word or letter the user wants to be bolded and the user do so by using the menu bar and select the 'B' from the bar which will bold the word or letter.

Operators sequence:

1. Move hand to the mouse- **H[mouse]**
2. Position mouse after the word or letter-**P[to word/letter]**
3. Press mouse button-**B[left]**
4. Drag mouse to select the word or letter and leave the mouse button after the word/letter got selected-**P[Drag]**
5. Point to the menu bar "**B**" option-**P[to option]**
6. Click the **B** button-**B[Left click]**

Total time= 1H+3P+2B=0.400+3(1.100)+2(0.200)=4.1

Applying heuristics:

There are different rules for applying heuristics as shown below:
H P B P P B
By applying rule 0 we place M before each Ks and Ps by doing so it is shown:
H M P B M P M P B
By applying rule 1 where we delete M before the fully anticipated operator and in this case after pressing the mouse button we must have to select the word. So delete it. And after selecting the word or letter must have to point to the menu bar.
H M P B P P B

Total time= 1H+ 1M+ 3P+2B=1(0.400)+(1.35)+3(1.100)+2(0.200)=5.45

Scenario 2: assume that the user is pre skilled about using Microsoft Word and has the information about how to bold it using the menu bar. The general procedure is to select a word or letter the user wants to be bolded and the user do so by using the keyboard shortcut key i.e. ctrl+B

Operators sequence:

1. Move hand to the mouse- **H[mouse]**
2. Position mouse after the word or letter-**P[to word/letter]**

3. Press mouse button-**B[left]**
4. Drag mouse to select the word or letter and leave the mouse button after the word/letter got selected-**P[Drag]**
5. Move hand to the keyboard-**H[Keyboard]**
6. Press ctrl on keyboard and hold it-**K[keystroke]**
7. Press b on keyboard-**K[keystroke]**

Total time= 2H+2P+1B+2K=0.400+2(1.100)+1(0.200)+2(0.12)=3.04

Applying heuristics:
There are different rules for applying heuristics as shown below:
H P B P H K K
By applying rule 0 we place M before each Ks and Ps by doing so it is shown:
H M P B M P H M K M K
By applying rule 1 where we delete M before the fully anticipated operator and in this case after pressing the mouse button we must have to select the word. So delete it.
H M P B P H M K M K
After applying rule 3 in which there is deletion of M between consecutive terminators:
H M P B P H M K K

Total time= 2H+ 2M+ 2P+1B=2(0.400)+2(1.35)+2(1.100)+1(0.200)=5.9

As you can see in the above scenarios the time was taken less when using keyboard shortcut keys and when applying heuristics it took more time than by bold using the menu bar.

Task 2: Change font size

Scenario 1: assume that the user is pre skilled about using Microsoft Word and has the information about how to change the font size using the menu bar. The general procedure is to select a word or letter whose font size has to be changed and do so by choosing from the menu bar's font size's drop down.

Operators sequence:

1. Move hand to the mouse- **H[mouse]**
2. Position mouse after the word or letter-**P[to word/letter]**
3. Press mouse button-**B[left]**
4. Drag mouse to select the word or letter and leave the mouse button after the word/letter got selected-**P[Drag]**
5. Point to the menu bar "**font size**" option-**P[to option]**
6. Press mouse button to select font from dropdown-**B[right click]**
7. Drag to the font size-**P[drag]**

8. Select font size user wants to enter-**B[Left click]**

Total time= 1H+4P+3B=0.400+4(1.100)+3(0.200)=5.4

Applying heuristics:
There are different rules for applying heuristics as shown below:
H P B P P B P B
By applying rule 0 we place M before each Ks and Ps by doing so it is shown:
H M P B M P M P B M P B
By applying rule 1 where we delete M before the fully anticipated operator and in this case after pressing the mouse button we must have to select the word. So delete it. And after selecting the word or letter must have to point to the menu bar.
H M P B P P B M P B

Total time= 1H+ 2M+4P+3B=0.400+2(1.35)+4(1.100)+3(0.200)=8.1

Scenario 2: assume that the user is pre skilled about using Microsoft Word and has the information about how to change the font size by typing on the bar. The general procedure is to select a word or letter whose font size has to be changed and do so by typing on the bar of the font size that is 14.

Operators sequence:
1. Move hand to the mouse- **H[mouse]**
2. Position mouse after the word or letter-**P[to word/letter]**
3. Press mouse button-**B[left]**
4. Drag mouse to select the word or letter and leave the mouse button after the word/letter got selected-**P[Drag]**
5. Point to the menu bar "**font size**" option-**P[to option]**
6. Press mouse button-**B[left click]**
7. Drag mouse to select the already written font size-**P[drag]**
8. Move hand to keyboard-**H[keyboard]**
9. Enter keystroke for "1" -**K[digit]**
10. Enter keystroke for "4" -**K[digit]**
11. Move hand to mouse-**H[to mouse]**

Total time= 3H+4P+2B+2K=3(0.400)+4(1.100)+2(0.200)+2(0.12)=6.24

Applying heuristics:
There are different rules for applying heuristics as shown below:
H P B P P B P H K K H

By applying rule 0 we place M before each Ks and Ps by doing so it is shown:
H M P B M P M P B M P H M K M K H
By applying rule 1 where we delete M before the fully anticipated operator and in this case after pressing the mouse button we must have to select the word. So delete it. And after selecting the word or letter must have to point to the menu bar.
H M P B P P B P H M K M K H
By applying rule 2: H M P B P P B P H M K K H

Total time= 3H+4P+2B+2K+2M=3(0.400)+4(1.100)+2(0.200)+2(0.12)+2(1.35)=8.94

As from the above analysis we can see that changing the font size from drop down font size is less than changing font by typing on the font size bar.

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.

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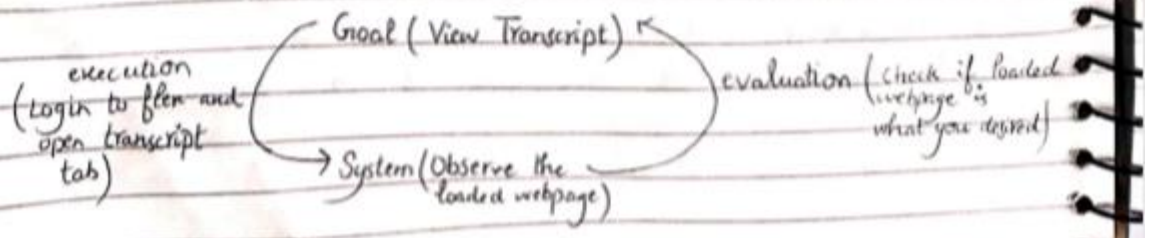
Step 4: Execution of action
Perform the steps mentioned above and wait for the webpage of transcript tab to open.

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



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(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.

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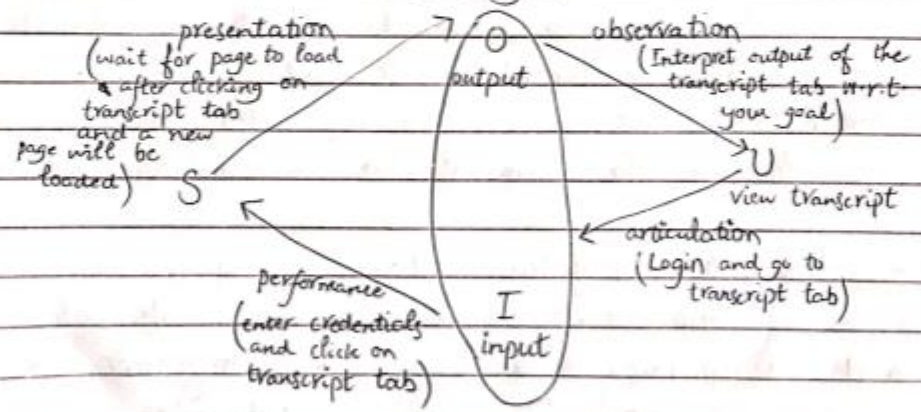
4- Observation (Interpretation of feedback)

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)

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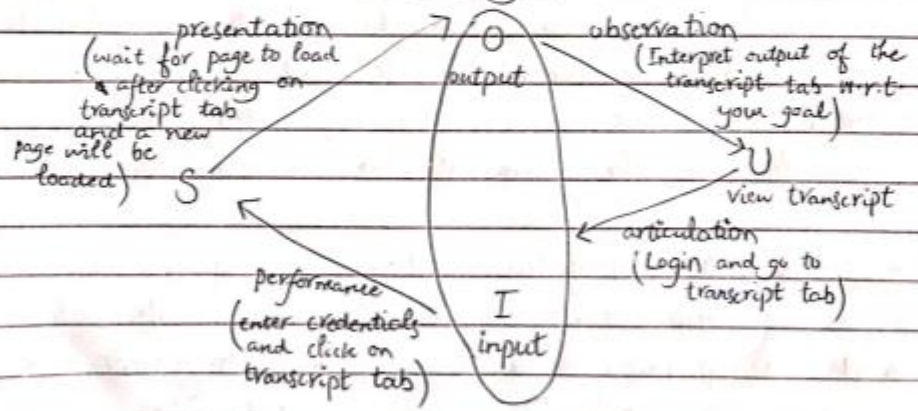
4- Observation (Interpretation of feedback)

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.

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

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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

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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.)

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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:

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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 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

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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.

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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:

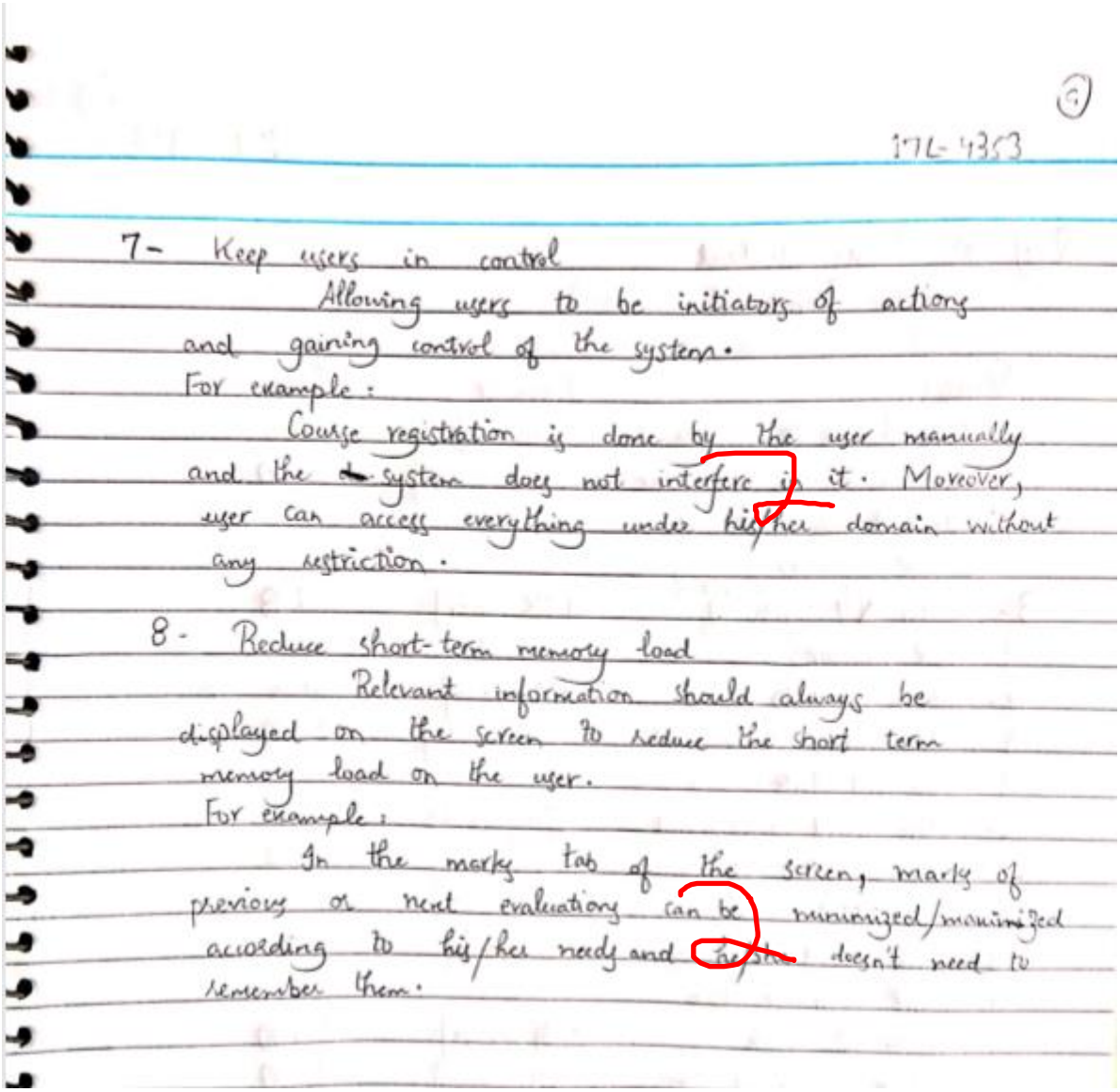
The drop and register button on the course registration screen disappears once the semester has started. This prevents misclicks on these buttons.

6- Easy Reversal of actions

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

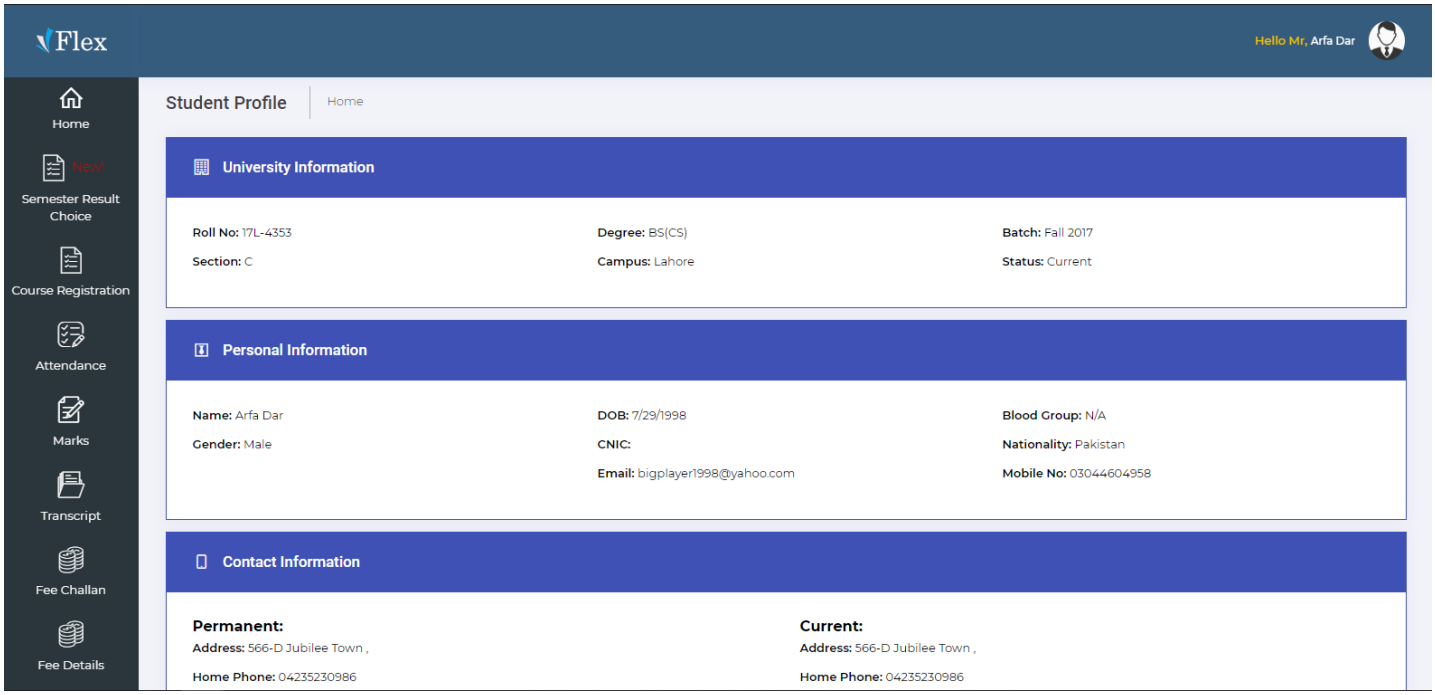
For example:

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.

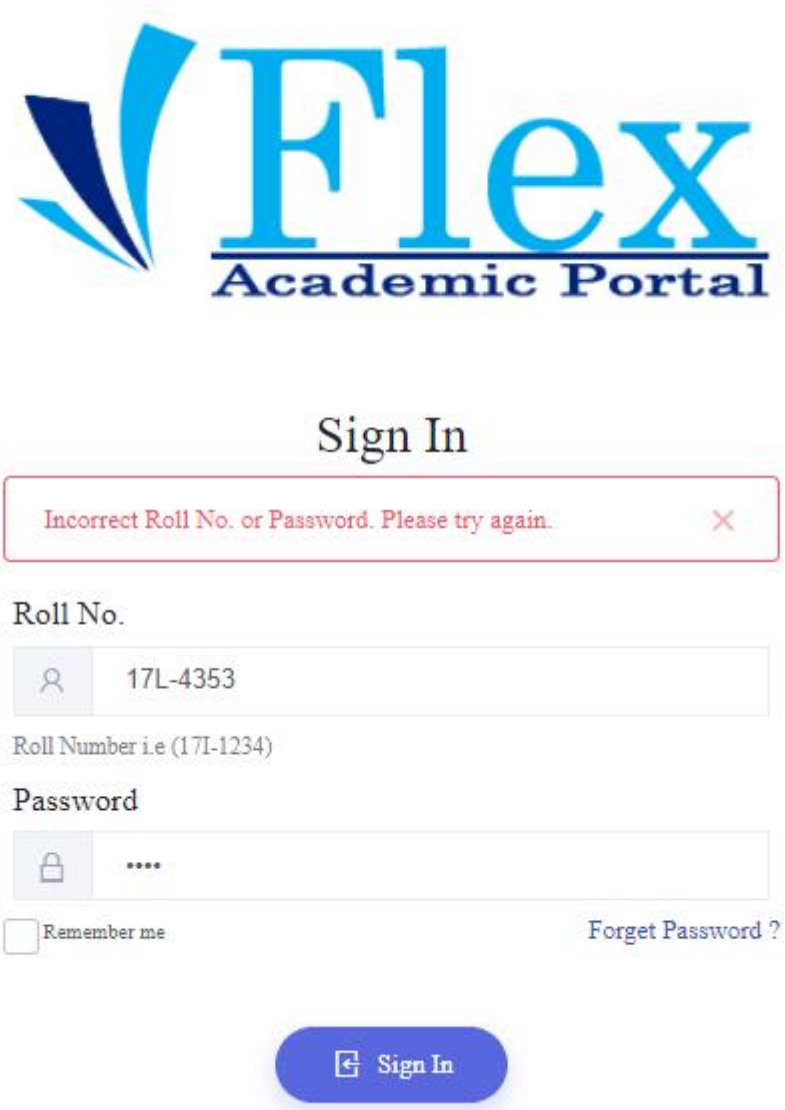


Screenshots:

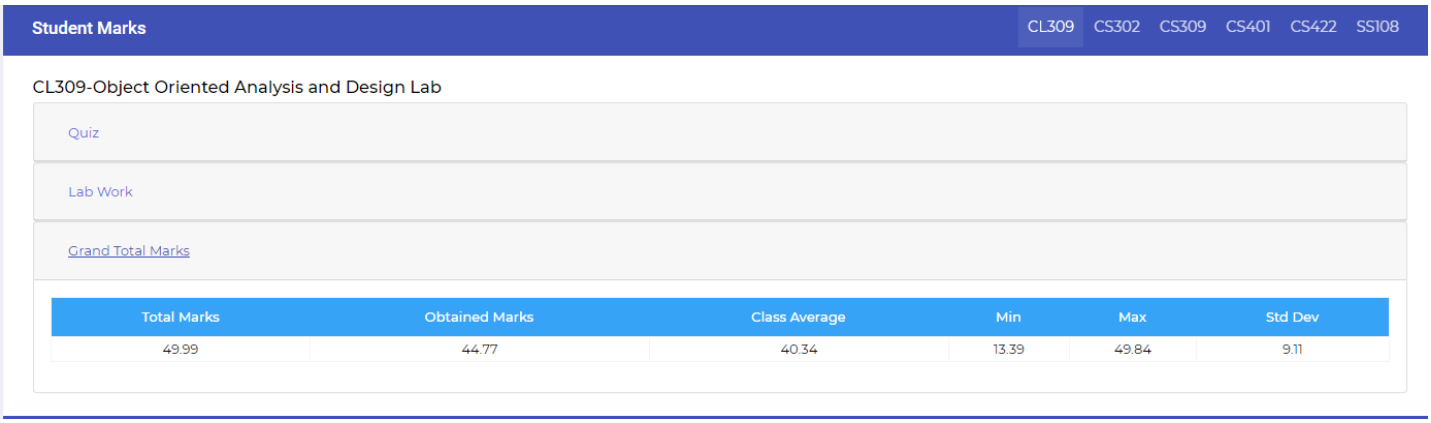
Consistency:



Feedback:



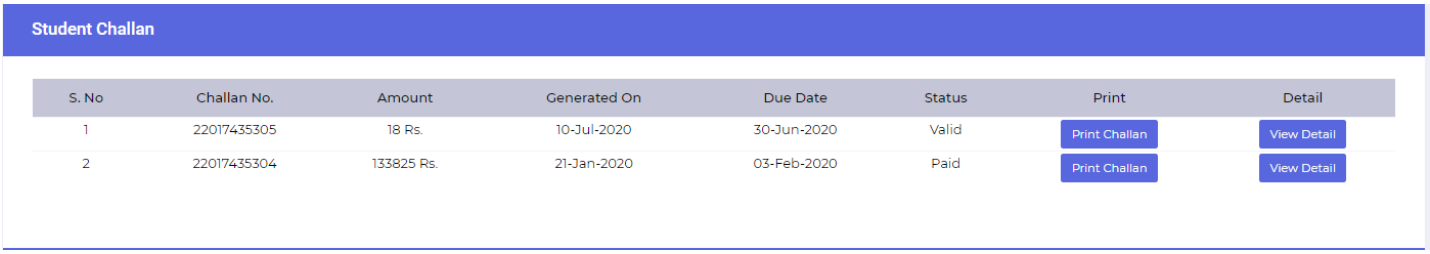
Short term memory:



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

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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

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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

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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

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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]
[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

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.

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

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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)

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Three dimensional interfaces:

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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.

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National University of Computer and Emerging Sciences, Lahore Campus

	Course Name:	**Human Computer Interaction**	**Course Code:**	**CS 422**
	Program:	**CS**	**Semester:**	**Spring 2020**
	Duration:	**24 Hours**	**Total Marks:**	**20**
	Paper Date:	**17 June 2020**	**Weight**	**5**
	Section:	**ALL**	**Page(s):**	**1**
	Exam Type:	**Take Home Quiz**		

Name: AHMED WAHEED

Roll No: L17-4367

Section: A

Question: Apply KLM model (GOMS based model), apply the operators, quantify the performance in terms of time, and also apply heuristics if required of two scenarios on your own of any application of your choice. **(10 x 2 Points)**

ASSUMPTIONS:

- User have complete knowledge of interface
- No error made by user

Before heading onto the scenarios, here is the list of KLM operators with their execution time (s) so we can then apply them onto the following problems.

Operator		Time (s)
K	Press key good typist (90 wpm) poor typist (40 wpm) non-typist	 0.12 0.28 1.20
B	Mouse button press down or up click	 0.10 0.20
P	Point with mouse Fitts' law average movement	 0.1 log2(*D*/*S* + 0.5) 1.10
H	Home hands to and from keyboard	0.40
D	Drawing – domain dependent	-
M	Mentally prepare	1.35
R	Response from system – measure	-

SCENARIOS

SCENARIO NO. 1:

I have taken the scenario of inserting a signature line in an MS Word document.

Operators used:

The operators, which we will use in this scenario, will include H (home hands to and from keyboard), K (press key), P (point with mouse), B (mouse button press), M (mentally prepare).

Operators Sequence:

- Move hand to mouse.
- Point with mouse to "**Insert**" button.
- Click the "**Insert**" button.
- Mentally prepare
- Point with mouse to "**Signature Line**" button.
- Click the "**Signature Line**" button.
- Move hand to keyboard.
- Type the name of the signer.
- Reach for the mouse again.
- Point the mouse to the signer's title field.
- Click the signer's title field.
- Move hand to keyboard
- Type the signer's title.
- Reach for the mouse again.
- Point the mouse to the signer's email address field.
- Click the signer's email address field.
- Move hand to keyboard
- Type the signer's email address.
- Reach for mouse again.
- Point the mouse to the "**OK**" button.
- Click the "**OK**" button.

Steps	Operator	Time(s)
Move hand to mouse.	**H**[mouse]	**0.40**
Point with mouse to "**Insert**" button.	**P**	**1.10**
Click the "**Insert**" button.	**B**[left click]	**0.20**
Mentally prepare	**M**	**1.35**
Point with mouse to "**Signature Line**" button.	**P**	**1.10**
Click the "**Signature Line**" button.	**B**[left click]	**0.20**
Move hand to keyboard.	**H**[keyboard]	**0.40**
Type the name of the signer.	**5K**[name] input: Ahmed	**1.40**(poor typist)
Reach for the mouse again.	**H**[mouse]	**0.40**
Point the mouse to the signer's title field.	**P**	**1.10**

Click the signer's title field	**B**[left click]	**0.20**
Move hand to keyboard	**H**[keyboard]	**0.40**
Type the signer's title.	**7K**[title] Input: Manager	**1.96**(poor typist)
Reach for the mouse again.	**H**[mouse]	**0.40**
Point the mouse to the signer's email address field.	**P**	**1.10**
Click the signer's email address field.	**B**[left click]	**0.20**
Move hand to keyboard	**H**[keyboard]	**0.40**
Type the signer's email address.	**13K**[email address] Input:Ab1@gmail.com	**3.64**(poor typist)
Reach for mouse again.	**H**[mouse]	**0.40**
Point the mouse to the "**OK**" button.	**P**	**1.10**
Click the "**OK**" button.	**B**[left click]	**0.20**

Before applying heuristics:

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

Applying heuristics:

Rule 0: Applying M before P and K but not placing M before a P that is used to place argument.

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

Rule 1: Deletion of anticipated Ms

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

Rule 2: Deletion of Ms with cognitive units.

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

Rule 3,4,5 does not apply on my scenario

$\mathbf{T}_{execute} = \mathbf{T}_K + \mathbf{T}_H + \mathbf{T}_B + \mathbf{T}_P + \mathbf{T}_M + \mathbf{T}_D + \mathbf{T}_R$

$\mathbf{T}_{execute} = 25\mathbf{T}_K + 7\mathbf{T}_H + 4\mathbf{T}_B + 5\mathbf{T}_P + 6\mathbf{T}_M + \mathbf{0} + \mathbf{0}$

$\mathbf{T}_{execute} =$ **24.20 s**

So after applying KLM model on the above scenario, we got total time of **22.85 s**

SCENARIO NO. 2:

I have taken the scenario of our submitted project **Employee management system** interface. The admin will login to the system. And will land to his dashboard. I have assumed that admin is on the main page of the employee management system and has complete knowledge of the system and will not make any errors.

Operators used:

The operators, which we will use in this scenario, will include H (home hands to and from keyboard), K (press key), P (point with mouse), B (mouse button press), M (mentally prepare).

Operators Sequence:

- Move hands to mouse.
- Point the mouse to the "**Admin"** button.
- Click the "**Admin**" button.
- Point the mouse to the "**Username**" field.
- Click the "**Username**" field.
- Move hand to keyboard.
- Type the username of the admin.
- Reach the mouse again.
- Point the mouse to the "**Password**" field.
- Click the "**Password**" field.
- Move hand to keyboard.
- Type the password of the admin.
- Move hand to the mouse.
- Point the "**Submit**" button.
- Click the "**Submit**" button

Steps	Operator	Time(s)
Move hand to mouse.	**H**[mouse]	**0.40**
Point the mouse to the "**Admin"** button.	**P**	**1.10**
Click the "**Admin**" button.	**B**[left click]	**0.20**
Point the mouse to the "**Username**" field.	**P**	**1.10**
Click the "**Username**" field.	**B**[left click]	**0.20**
Move hand to keyboard.	**H**[keyboard]	**0.40**
Type the username of the admin.	**4K**[username] Input: 2020	**0.48**(good typist)
Reach the mouse again.	**H**[mouse]	**0.40**
Point the mouse to the "**Password**" field.	**P**	**1.10**

Click the "**Password**" field.	**B**[left click]	**0.20**
Move hand to keyboard.	**H**[keyboard]	**0.40**
Type the password of the admin.	**6K**[username] Input: aaaaaa	**0.72**(good typist)
Move hand to the mouse.	**H**[mouse]	**0.40**
Point the "**Submit**" button.	**P**	**1.10**
Click the "**Submit**" button	**B**[left click]	**0.20**

Before applying heuristics:

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

Applying heuristics:

Rule 0: Applying M before P and K but not placing M before a P that is used to place argument.

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

Rule 1: Deletion of anticipated Ms.

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

Rule 2: Deletion of Ms with cognitive units.

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

Rule 3,4,5 does not apply on my scenario

$\mathbf{T}_{execute} = \mathbf{T}_K + \mathbf{T}_H + \mathbf{T}_B + \mathbf{T}_P + \mathbf{T}_M + \mathbf{T}_D + \mathbf{T}_R$

$\mathbf{T}_{execute} = 10\mathbf{T}_K + 5\mathbf{T}_H + 4\,\mathbf{T}_B + 4\mathbf{T}_P + 4\,\mathbf{T}_M + \mathbf{0} + \mathbf{0}$

$\mathbf{T}_{execute} =$ **13.8 s**

So after applying KLM model on the above scenario, we got total time of **13.8 s**

Quiz 1

4

Roll number: [redacted]

HCI-Section A

Q1: Explain cocktail party concept (3)

?

Q2: Write an example of retroactive **interference (3)**

?

Q2: Which one of these is a good reason to include sounds in an HCI? (1)

a. Users react more quickly to sounds than to visual signals

b. Users react more slowly to sounds than to visual signals

c. There is no preference. People just like sounds ✓

d. The computer reacts to sounds in the same way as a human

Q4 Mention which type of reasoning is this (1)

- If it is Friday then she will go to work
- It is Friday
- Therefore, she will go to work

deductive ✓

Q5: Write any two **characteristics of human** to be considered when creating interface (2) 2

① ~~Users~~ Humans react & respond to audios/sounds faster than any written text.

② ~~Users~~ Humans ~~are~~ cannot read more than 7 to 9 options at 1 time. (5±2).

17

HCI QUIZ#2 Roll# [redacted] Name [redacted]

How Do You Control Google Glasses? /How do the Google glasses work?(3)

It is an optical head-mounted device fit with laser, and contain features such as 1.2 GHz processor, 8GB storage, 2 GB RAM and input/output features. By simply swiping up or down the right side of glasses, you can tap to select something. 3

What do you know about VR Mind Reading Headset?(3)

- It converts neural signals to actual commands.
- It works in 4 parts: tagging the neural object, sensing electrical signals, decoding neural focus by algorithms and finally activating/executing command. 3
- It can be used in gaming as well as in medical to treat mental illnesses.

List any two Key Features of Google Glass?(2)

1.2 GHz processor
5G technology
GPS 2

Do you think Google Home Voice controller is a useful device? If yes, then, for what purpose you will use it and how Google Home Voice controller has made interaction easier for you? If no, then give reasons to support your argument.(5) 4.5

Yes. It is useful for
- Streaming music wirelessly from the internet,
- Smartly controlling all appliances around the house to dim lights, control appliances, etc.
- Security systems can be linked to it
- It can act as a digital assistant e.g we can command it to search the weather, solve math problem and more.

Interaction is made easy because we can simply use voice command to get tasks completed ↓ which saves time.

We have discussed 10 devices in class i.e Amazon Dash Button, Google Home Voice Controller, Smart doors and Doorbell Cam, Kuri Mobile Robot, Haptic gloves, Smart glasses/google glasses, Smart mirrors, smart irrigation, Eye gaze system, VR Mind Reading and3D Mouse.

Which one you liked the most and why? And how that device would be helpful and meaningful for you in your daily life interactions?(5)

Smart Mirror

It has 2 very useful types

① Multipurpose: which displays temperature, weather, and also comes equipped with anti-Fogging feature in bathrooms.

4.5

② Wardrobe: It saves time in trying multiple clothes to see which looks best. Also, it gives us personalised recommendation based on what will fit us best. Some mirrors also aid us if we have any health issue, it is identified.

Course Name:	Human Computer Interaction	Course Code:	CS 422
Program:	CS	Semester:	Spring 2020
Duration:	24 Hours	Total Marks:	20
Paper Date:	17 June 2020	Weight	5
Section:	ALL	Page(s):	1
Exam Type:	Take Home Quiz		

Student : Name:_____ Roll No._____ Section:_____

Note: You can take help from anywhere of Corse but make sure that I will check plagiarism. Complete the answer in the space given below the question. Submit it on slate.

Note for section B: your project application cannot be used here.

Question: Apply KLM model (GOMS based model), apply the operators, quantify the performance in terms of time, and also apply heuristics if required of two scenarios on your own of any application of your choice. **(10 x 2 Points)**

Depends upon the task and application students chose as in their answer.

Human Computer Interaction – Quiz 1 **Roll Number**
Section C

Q1
Does this menu utilize the concept of Mile High/Infinite Width? Explain?

Q2. An average human being can read 250 words in a minute on average. How can humans read at such a rapid rate?

Q3. How is visual angle calculated? If two objects A and B are of same height, how can A appear to be larger than B? Explain in terms of visual angles.

Q4.

Suggest ideas for an interface which uses the properties of sound effectively.

Human Computer Interaction – Quiz 1 **Roll Number**

Section **F**

Q1
Does this menu utilize the concept of Mile High/Infinite Width? Explain?

Q2. An average human being can read 250 words in a minute on average. How can humans read at such a rapid rate?

Q3. How is visual angle calculated? If two objects A and B are of different height, how can both of them appear to be of same height? Explain in terms of visual angles.

Q4.

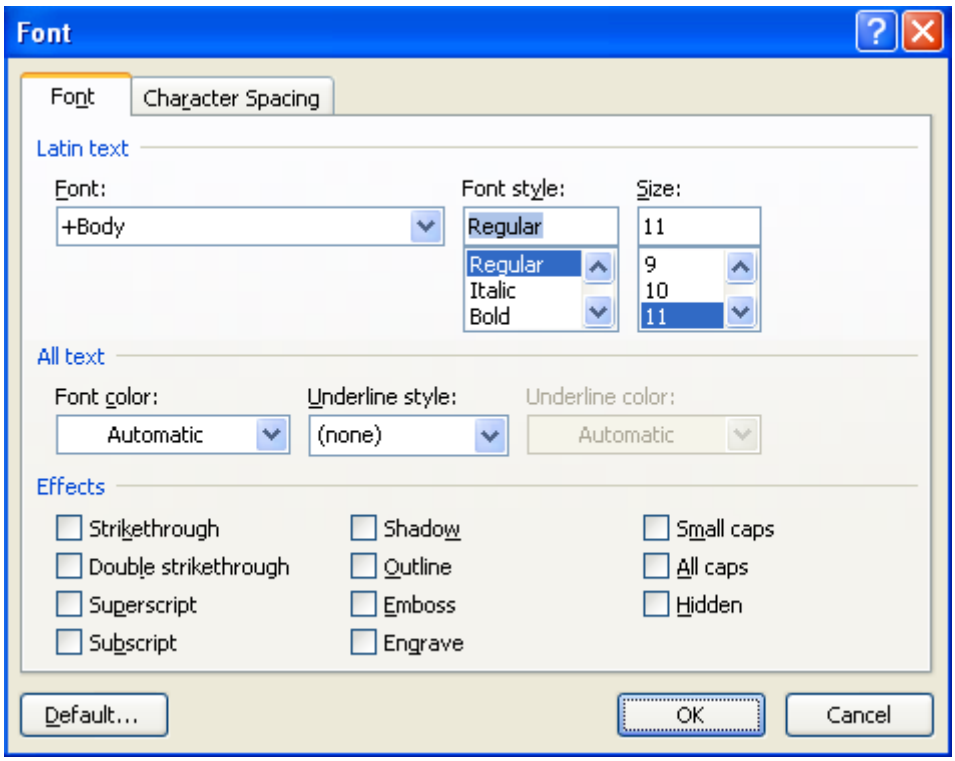
Suggest ideas for an interface which uses the properties of sound effectively.

Human Computer Interaction – Quiz 2 Roll Number

1. [14] What are the seven stages of action? Provide examples of the seven stages of action?
2. [4] Explain the two gulfs with an example for each ?
3. [4] List the types of human errors with examples? What steps can be taken to avoid these errors?
4. [2] What are two goals of ergonomics?
5. [6] List at least two problems using the following as interaction styles?
    a. Natural Language
    b. Command Line Interface
    c. Menus

(Max. Marks = 20)

Consider the MS Word Font Properties Dialog box in the figure below. You want to select the font “arial new” (without double quotes) by typing in the Font drop down (which permits typing as well). The text must be in Bold, Size 9, as a Superscript and Engraved. As a user, you always move from field to field using a mouse. Assume you hand is initially on the mouse and currently “OK” button is selected. Also assume that this dialog box is dismissed by clicking the “OK” button at the end. Using KLM-GOMS, determine the minimum time needed to perform this task in seconds. Note K = 0.2s, P = 1.1s, H = 0.4s and M=1.35s.
There is no partial credit for this question. Show all intermediate steps.



Step 1
PK H KKKKKKKKK H PK PK PK PK PK
Step 2
MPMK H MKMKMKMKMKMKMKMKMK H MPMK MPMK MPMK MPMK MPMK
Step 3
MPK H MKKKKKKKKK H MPK MPK MPK MPK MPK
Step 4
7M + 15K + 2H + 6P = 7(1.35) + 15(0.2) + 2(0.4) + 6(1.1) = 19.85 seconds

Quiz 2 (Section C)

Write down the purpose, techniques and work products of Contextual Task Analysis. (6 marks)

Write down the stages of execution during Norman’s Model of interaction. (3 marks)
Does the user establish the goal before execution or after execution? (1 mark)

Quiz 2 (Section D)

Q1. Draw the Abeale and Bowde ineraction framework. Label the translations. (6 marks)

Q2. Write down the techniques and work products for contextual task analysis. (4 marks)

Quiz 3 – Section D

Total marks: 10

Q. Write down 2 examples for each of the following:

1. Relative goals
2. Ease-of-use goals
3. Satisfaction goals
4. Qualitative goals
5. Performance goals

Quiz 5

Time allowed: 10 minutes
Total marks: 10

Q1. Write down four golden rules of designing (applicable only) for the local structure of the screen. (4 marks)

_____
_____
_____
_____

Q2. Circle ONE correct option from the given choices: (6 marks)

1. Which of the following screen design issues should NOT be standardized:
   a) Use of type fonts and styles
   b) Pointing device interactions and keyboard shortcuts
   c) Use of controls
   d) White spacing
   e) Use of color
   f) None of the above

2. Which of the following technique is most suitable to ensure that alignment of multiple columns is done correctly:
   a) cropping
   b) splitting
   c) blurring
   d) greying
   e) None of the above

3. GOMS stands for:
   a) Goals, operands, methods, selectors
   b) Goals, operators, methods, selection rules
   c) Goals, operators, mentally preparing, selection rules
   d) Grids, operators, methods, selectors
   e) Grids, operational, methods, selection rules

4. Model based evaluation is done on:
   a) the input devices
   b) the user profiles
   c) the contextual task analysis
   d) the interface
   e) None of the above

5. Which of the following is/are aspect(s) of visual design:
   a) Typography
   b) Color
   c) Layout

d) Grouping
e) a, b and d
f) a, b and c

6. Affordances is/are:
   a) the amount of money a customer is willing to pay for the product's designing
   b) clues about how an object should be used
   c) the amount of money a designer demands from the customer for designing
   d) a situation where an object's sensory characteristics intuitively imply its functionality
   e) Both b and d
   f) Both a and c

HCI Quiz 01

Name: Roll No: Section:

1. Explain why visual angle cannot be used to determine the size of an object?

2. What are:
    a. Proactive inhibition:

    b. Retroactive interference:

3. List two types of memory retrieval processes. Which is easier?

4. Which aspect of thinking is related to each of the following?

    a. Ali installed an image processing software developed by Gicrosoft that contained various viruses. Ali never used/installed any other software by Gicrosoft ever again.
    b. Ahmad added a filter to his Gmail account to mark all messages from domain ‘nu.edu.pk’ as spam. A few days later he had over 100 spam emails in his account. He concluded all these emails were sent from domain ‘nu.edu.pk’

HCI Quiz 01

Name: Roll No: Section:

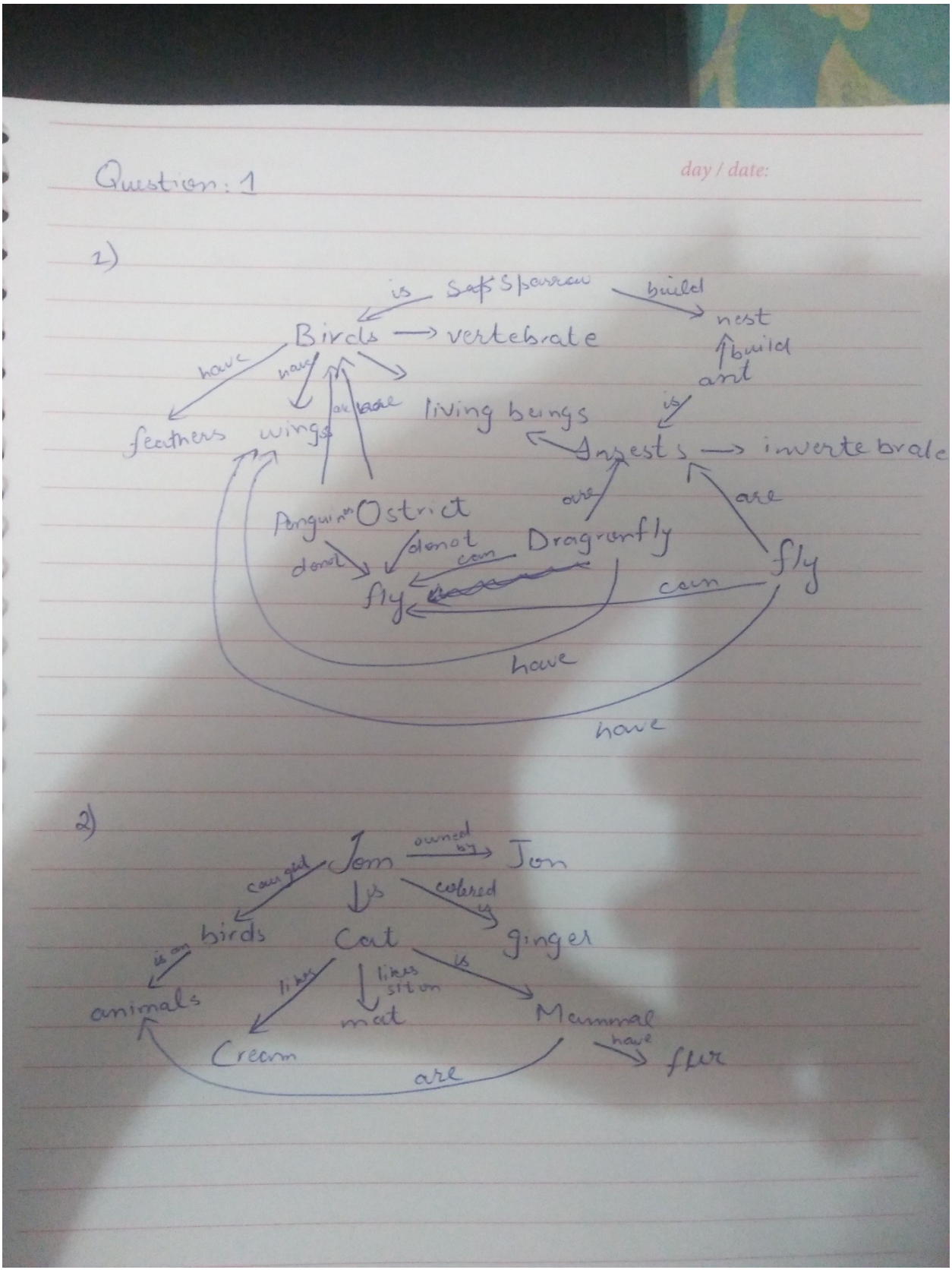
Question 1:

After carefully reading and analyzing, make a semantic network for each of the following paragraphs.

1) Birds and insect both are living beings. Birds are vertebrate whereas insects are invertebrate. Sparrow and ant both build nest. All the birds have wings and feathers. For example, ostriches and penguins have wings but they do not fly. Dragonfly and fly both have wings but they are not birds.
2) Tom is a cat owned by John. Tom caught a bird. Tom is ginger in color. The cat likes to sit on a mat and likes cream. Cat is a mammal whereas bird is an animal. All mammals are animals and have fur.

HCI Quiz 01

Name: Roll No: Section:



HCI Quiz 01

Name: Roll No: Section:

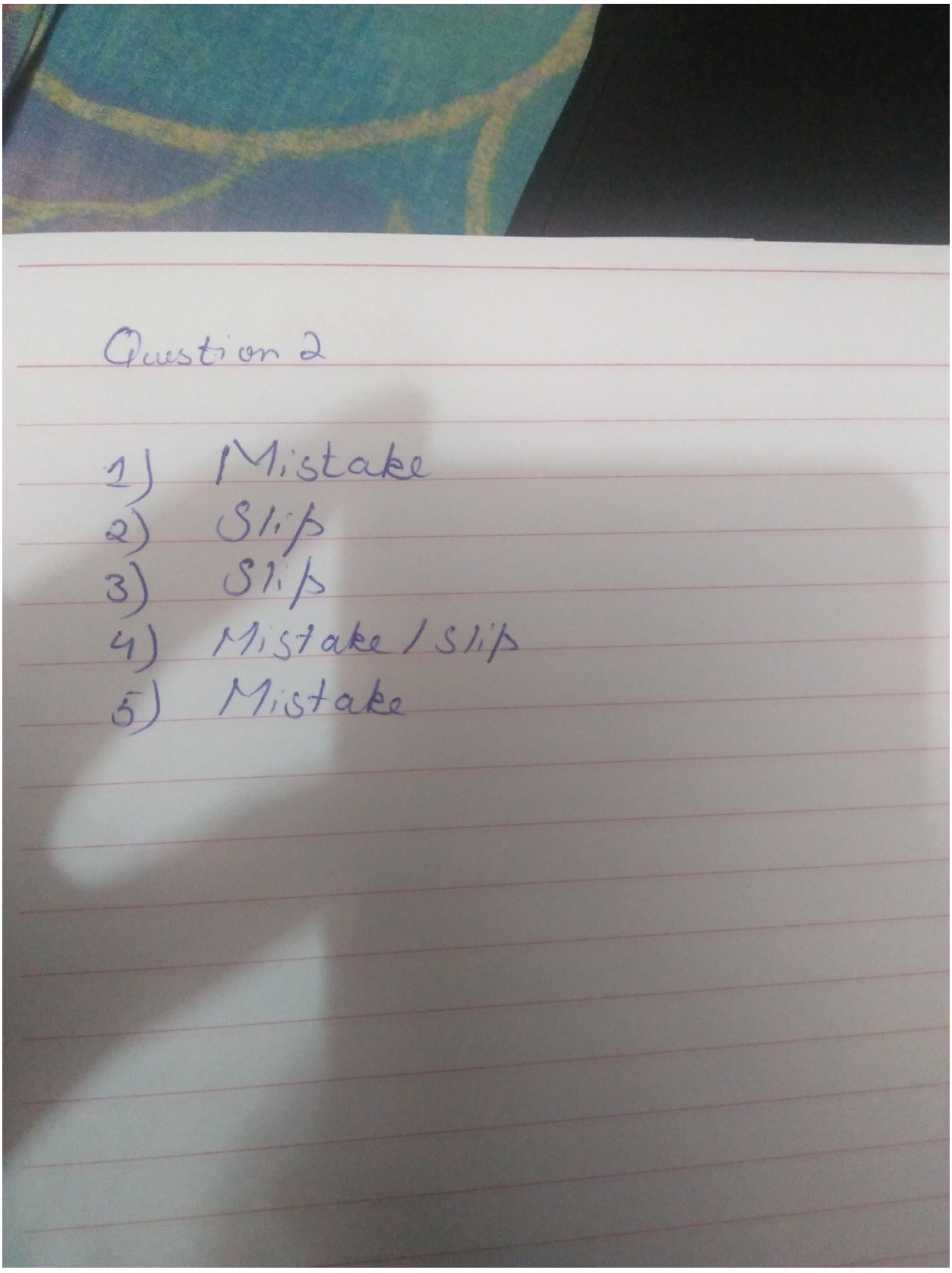
Question 2:

Identify statement as a slip or mistake. Justify your answer.

1) Incorrectly hitting send on incomplete email.
2) A typo caused by improper hand placement on keys.
3) Accidental mouse press.
4) Magnifying glass icon.
5) Sitting and waiting for the table service at a pub.

HCI Quiz 01

Name: Roll No: Section:



Question 2

1) Mistake
2) Slip
3) Slip
4) Mistake / Slip
5) Mistake

HCI Quiz 01

Name: Roll No: Section:

Question 3: Which aspect of thinking is related to each of the following?

a. Ali installed image processing software developed by Gicrosoft that contained various viruses. Ali never used/installed any other software by Gicrosoft ever again.

INDUCTION

b. Ahmad added a filter to his Gmail account to mark all messages from domain ‘nu.edu.pk’ as spam. A few days later he had over 100 spam emails in his account. He concluded all these emails were sent from domain ‘nu.edu.pk’

ABDUCTION

Section C

Q1: Explain cocktail party concept; what are its implications in HCI?(10)

Section C

Q1: Explain cocktail party concept; what are its implications in HCI?(10)

CS-422 Human Computer Interaction Name & Roll No.

Quiz 02

Total Points: 15 Weight: 03 ***Note: You can use both sides of the paper***

Question 01: What are the different layouts of control? Give one example from each. (3 Points)

Question 02: You want to withdraw a course from NEON online system. How you will achieve this goal using **Abowd and Beale framework**? Explain each stage of the framework based on this scenario. (4 points)

Stage 01:	Stage 02:
Stage 03:	Stage 04:

Question 03:

a. Give an example of slip and mistake related to the scenario given in question 02. (2 Points)

b. What are the limitations of Norman's model of interaction? How Abowd and Beale framework incorporate these limitations? *Explain in few lines*. **(Drawing Abowd and Beale framework will get zero marks)** (4 Points)

c. Differentiate gulf of execution and gulf of evaluation? (2 Points)

CS422-A Human Computer Interaction Name & Roll No.

Quiz 03

Total Points: 12 Weight: 02 ***Note: You can use both sides of the paper***

Question 01: Describe the following rules from the Eight Golden rules of interface design and give an example from each. (8 Points)

i. Permit easy reversal of actions

ii. Design dialogues to yield closure

iii. Keep users in control

iv. Seek universal Usability

Question 02:
(4 Points)

i. What is WIMP interface give an example?
ii. How we can interact with system using Command Line Interface? What are the problems with this style of interactions?

CS422-B Human Computer Interaction Name & Roll No.

Quiz 03

Total Points: 12 Weight: 02 ***Note: You can use both sides of the paper***

Question 01: Describe the following rules from the Eight Golden rules of interface design and give an example from each. (8 Points)

i. Offer Informative Feedback

ii. Design dialogues to yield closure

iii. Keep users in control

iv. Prevent Errors

Question 02:
(4 Points)

i. What is WIMP style of interface give an example?
ii. How we can interact with system using Natural Language? What are the problems with this style of interactions?

C2

CS422-A HCI Quiz 04 Name and Roll No.

Q 01: Define and differentiate rationality and cognitive bias.

Q 02: Define the Availability Heuristics and give an example from real life **not from slides**.

Q 03: Fill the blank with the most suitable bias used in the given statements/examples. We have studied *Anchoring bias, Confirmation bias, Availability heuristics, Gambler's Fallacy, Planning Fallacy and Sunk Cost Fallacy*.

(10 pts.)

i. When someone cites a well-known story as an example to support their argument, you can easily and quickly undermine their position by claiming they are showing _____.

ii. If your parents were both very long-lived, you might automatically expect that you will also live a long life. Because of this, you might ignore the fact that your parents lived a healthier, more active lifestyle that probably contributed to their longevity while you eat poorly and are largely sedentary._____.

iii. A class of students were asked to estimate the date at which they will finish their thesis. They actually completed their thesis, on average, in 56 days. However, they predicted they will complete their thesis in 34 days. _____.

iv. Adnan has gone on five job interviews this week and he hasn't had any offers. I think today is the day he will get an offer.
_____.

v. Imagine that Ali holds a belief that left-handed people are more creative than right-handed people. Whenever Ali encounters a person that is both left-handed and creative, he place greater importance on this "evidence" that supports what they already believe.
_____ .

vi. Ali: For my lottery numbers, I chose 6, 14, 22, 35, 38, 40. What did you choose?
Jan: I chose 1, 2, 3, 4, 5, 6.
Ali: You idiot! Those numbers will never come up!
_____.

vii. Imagine that you are trying to negotiate a pay raise with your boss. You might hesitate to make an initial offer, but research suggests that being the first one to lay your cards down on the table might actually be the best way to go. Whoever makes that first offer has the edge.
_____.

viii. People who are scared of flying, recall the crash scenes they've seen on films and the news easily, the idea of crashing becomes a far weightier factor in their decision whether to fly. So, its means they cannot control their _____ .

ix. Sonia Khan is in support of gun control. She seeks out news stories and opinion pieces that reaffirm the need for limitations on gun ownership.

When she hears stories about shootings in the media, she interprets them in a way that supports her existing beliefs.
_____ .

x. The sports team has contended for the National Championship every year for the past five years, and they always lose in the final round. This year is going to be their year!
_____ .

C1 CS422-A HCI Quiz 04 Name and Roll No.

Q 01: Define and differentiate heuristics and cognitive bias.

Q 02: Define the Sunk Cost Fallacy and give an example from real life **not from slides**.

Q 03: Fill the blank with the most suitable bias used in the given statements/examples. We have studied *Anchoring bias, Confirmation bias, Availability bias, Gambler's Fallacy, Planning Fallacy and Sunk Cost Fallacy*.

(10 pts.)

i. Kashif has gone on five job interviews this week and he hasn't had any offers. I think today is the day he will get an offer.
_____.

ii. When someone cites a well-known story as an example to support their argument, you can easily and quickly undermine their position by claiming they are showing _____ bias.

iii. A class of students were asked to estimate the date at which they will finish their thesis. They actually completed their thesis, on average, in 56 days. However, they predicted they will complete their thesis in 34 days.
_____.

iv. Eric: For my lottery numbers, I chose 6, 14, 22, 35, 38, 40. What did you choose?
Steve: I chose 1, 2, 3, 4, 5, 6.
Eric: You idiot! Those numbers will never come up!
_____

v. Imagine that Ali holds a belief that left-handed people are more creative than right-handed people. Whenever Ali encounters a person that is both left-handed and creative, he place greater importance on this "evidence" that supports what they already believe.
_____ .

vi. People who are scared of flying, recall the crash scenes they've seen on films and the news easily, the idea of crashing becomes a far weightier factor in their decision whether to fly. So, its means they cannot control their _____ .

vii. Sonia Khan is in support of gun control. She seeks out news stories and opinion pieces that reaffirm the need for limitations on gun ownership. When she hears stories about shootings in the media, she interprets them in a way that supports her existing beliefs.
_____ .

viii. The sports team has contended for the National Championship every year for the past five years, and they always lose in the final round. This year is going to be their year!
_____ .

ix. Imagine that you are trying to negotiate a pay raise with your boss. You might hesitate to make an initial offer, but research suggests that being the first one to lay your cards down on the table might actually be the best way to go. Whoever makes that first offer has the edge.
_____.

x. If your parents were both very long-lived, you might automatically expect that you will also live a long life. Because of this, you might ignore the fact that your parents lived a healthier, more active lifestyle that probably contributed to their longevity while you eat poorly and are largely sedentary._____