National University

of Computer and Emerging Sciences Peshawar Campus

Student Name: _____ Roll No: _____

Program: BS(SE)
Semester: Fall-2023
Time Allowed: 1 hour
Course: CS2007 Human Computer Interaction

Examination: Sessional 2
Total Marks: 55 Weightage: 15
Date: November 11th 2023 03:00 PM
Instructor Name: Zeshan Khan

NOTE: Read each question completely before answering it. There are **7 questions** on **2 pages**. Don't attempt the question # 1 as it has zero marks.
In case of any ambiguity, you may make assumption. But your assumption should not contradict any statement in the question paper.

Question No. 1	**Solve**	
Time: 0 Min	**CLO-0**	**Marks: 0**

There are N candies. The tastiness of the ith candy is denoted by A[i] . The candies have a special property, the tastiness of the candies decreases by 1 after every second. For example: if the initial tastiness of a candy is 4 then the tastiness of the candy after 1 second has passed is 3 . Bob decides to eat all the candies and he can eat only 1 candy in 1 second. But he can't eat a candy with a tastiness strictly less than K . If Bob starts from 0 seconds, find the number of candies he can eat in first N seconds.

Input Format

The first line contains an integers T - The number of test cases.

The second line contains 2 integers N and K

The third line contains N integers A[1], A[2], ..., A[n] - The tastiness of the candies.

Output Format

For each test case, in a new line, print a single integer - The number of candies he can eat.

Question No. 2	**Design Principle**	
Time: 20 Min	**CLO-4**	**Marks: 15**

Anxiety and depression are among the leading mental health issues in the world. One of the ways to reduce stress and anxiety in everyday life is through practicing mindfulness. Mindfulness involves paying attention (on purpose) to what is going on inside and outside ourselves, moment by moment, without judgment. Mindfulness is a technique that can be learned/taught and practiced over time.

In your role as a designer at a design agency, you have been tasked with creating a mindfulness app that university students can use.

A) Propose one product-specific design principle that this mindfulness app design should follow and motivate your proposition.

B) Explain four prototyping methods you would use and why you would use them while exploring the design space for this mindfulness app.

Solution A) One product-specific design principle for the mindfulness app should be "User-Centered Design." This principle emphasizes designing the app with a deep understanding of the specific needs, preferences, and challenges of university students. To motivate this proposition, consider that university students have unique stressors and time constraints, so the app should offer features and content tailored to their academic and personal lives, making it more relevant and effective in reducing their anxiety and depression.

Solution B) Any four prototypes can be used with the justification of each.

Paper Prototyping: This low-fidelity method allows you to quickly sketch out the app's user interface on paper. It's useful for early ideation and feedback gathering because it's easy to make changes and iterate rapidly. University students can provide input on the app's layout and features in the initial stages.

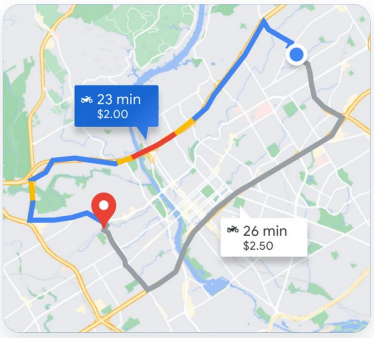
Interactive Wireframes: Interactive wireframes are a step up from paper prototypes. They provide a digital representation of the app's layout and functionality. These are valuable for testing the user flow and navigation within the app, helping to ensure that students can easily access mindfulness exercises and resources.

High-Fidelity Mockups: High-fidelity mockups provide a detailed visual representation of the app's interface, including color schemes, typography, and visual elements. They are helpful for fine-tuning the app's aesthetics, ensuring it aligns with the target audience's preferences and expectations.

Interactive Prototypes: Creating interactive prototypes with tools like InVision or Figma allows you to simulate the user experience of the app. This is crucial for testing the app's usability, as students can interact with the app as if it were fully functional. It helps identify potential usability issues and gather user feedback on the overall user experience.

Question No. 3	**Evaluate**	
Time: 10 Min	**CLO-3**	**Marks: 10**

A) Does the Shneiderman's principle of "Recognition rather than recall" is followed in the google maps application? Yes/No. Explain.



B) List any two (other than consistency and recognition) of the violations of the Shneiderman's principle in the flex (student).

Solution A) Google's search homepage is a prime example of consistent interface design. The layout, colors, and fonts are all consistent across different devices and platforms. This consistency makes it easy for users to find what they are looking for, regardless of where they are accessing the search engine.

Solution B) Any two with justification

Question No. 4	**GOMS**	
Time: 10 Min	**CLO-4**	**Marks: 10**

In a hospital, you're tasked with creating a user-friendly computer system for healthcare staff to access patient information. How can the GOMS Model help you identify the main objectives (Goals), actions (Operators), approaches (Methods), and decision criteria (Selection Rules) that will guide the design process?

Solution)

Goals:
a. Efficiently access patient information.
b. Accurately update and record patient data.
c. Ensure data security and privacy.
d. Minimize errors in data entry.
e. Provide a user-friendly and intuitive interface.
f. Support fast retrieval of critical patient data in emergency situations.

Operators:

a. Keyboard Input: Typing patient information, notes, and queries.
b. Mouse Input: Navigating through menus and graphical elements.
c. Touch Input: For touchscreen devices (e.g., tablets).
d. Voice Input: For hands-free interaction in some cases.
e. Reading: To review patient records and reports.
f. Writing: Adding notes or updating patient records.
g. Searching: Retrieving patient records quickly.
h. Selecting: Choosing options and actions from menus.
i. Clicking: Interacting with on-screen buttons and controls.
j. Dragging and Dropping: Reorganizing elements, such as patient lists.

Methods:
a. Data Entry Method: Specify how users input data, validate inputs, and ensure data accuracy.
b. Navigation Method: Define the menu structure, screen layout, and organization of patient information.
c. Search Method: Explain how the search function works, including search criteria and results presentation.
d. Authentication and Authorization: Ensure secure access to patient records based on user roles.
e. Data Retrieval: Describe how patient data is retrieved, cached, and presented to users efficiently.
f. Error Handling: Detail how the system detects and handles errors, such as duplicate entries or missing data.
g. Emergency Protocol: Outline a specific protocol for accessing critical patient data in emergency situations.
h. User Training: Develop training materials and sessions to educate hospital staff on the system's use.

Selection Rules:

a. Menu Selection: Specify how users select options from menus.

b. Form Field Selection: Detail the process of selecting and interacting with form fields for data entry.

c. Navigation Selection: Define how users navigate between different sections of patient information.

d. Search Result Selection: Explain how users select and view search results.

e. Error Handling Selection: Clarify the steps users should follow when errors occur.

f. Authentication and Authorization Selection: Describe the process of user login and access control.

g. Emergency Data Retrieval Selection: Define a streamlined procedure for accessing critical patient data in emergencies.

Question No. 5	**Prototype**	
Time: 5 Min	**CLO-2**	**Marks: 5**

Creating a high-fidelity prototype for a new e-commerce website's homepage, what are the essential components that need to be incorporated? Please list five of them.

Solution) Any five some are following**:**

- Navigation menu
- Search bar
- Product listings
- Shopping cart icon
- Promotional banners

Question No. 6	**Color Selection**	
Time: 5 Min	**CLO-2**	**Marks: 5**

You have been assigned the responsibility of designing a mobile application intended to assist visually impaired individuals in navigating their surroundings. This application employs computer vision technology, utilizing a mobile camera to audibly identify objects in the user's path. Furthermore, the application incorporates an Optical Character Recognition (OCR) module to read and relay text visible through the

camera for enhanced guidance. Your task is to recommend a color scheme for the application, choosing from the permitted colors of Blue and Red.

Solution)

A) Any color is OK for a blind person.

B) If considered OCR color then red is suitable

C) If considered some helper for the application then Blue is suitable as red have some special meanings.

Question No. 7	**Evaluate**	
Time: 10 Min	**CLO-3**	**Marks: 10**

In the FLEX system, teachers can utilize the student search feature, which allows them to find students by either their complete roll number, full name, or by providing partial letters as a wildcard (e.g., "Zes" for "Zeshan"). Write pseudo code to test the student search functionality.

Solution) A pseudo code for the searching. A sample is provided below:

0) Results=[] //List for the results

1) Searches=[] //List of users to search

2) Open browser

3) For each search in searches:

    4) goto URL

    5) sbox=Find_search_box

    6) sbtn=Find_search_btn

    7) sbox.send_values(search)

    8) sbtn.click()

    9) wait()

    10) if(page.text==”Welcome/Student etc.”)

        11) results.add(1)

    12) else

        13) results.add(0)