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| **National University of Computer and Emerging Sciences, Lahore Campus** | | | | |
| C:\Users\saif\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Word\final design.jpg | **Course:** | **Introduction to Software Engineering** | **Course Code:** | **SE110** |
| **Program:** | **BS (SE)** | **Semester:** | **Spring 2021** |
| **Duration:** | **90 Minutes (1.5 Hour)** | **Total Marks:** | **40** |
| **Paper Date:** | **12-April-2021** | **Weight** | **12.5%** |
| **Section:** | **All** | **Page(s):** | **5** |
| **Exam:** | **Midterm I** |  |  |
| **Instruction/Notes:** | 1. Attempt all questions on the question paper. Do not submit any extra sheet, it will not be graded.  2. You are allowed to use a single-sided, hand-written, A-4 size help sheet.  3. State your assumptions clearly | | | |

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Roll Number: \_\_\_\_\_\_\_\_\_\_\_\_\_\_ Section \_\_\_\_\_

**Question 1** (Max. Marks = 5)

In each of the following MCQs, **circle** the most appropriate **single** option (unless otherwise specified). Unclear answers will not be given any credit.

1. Which of the following is a quality attribute of software?
   1. Portability
   2. Correctness
   3. Robustness
   4. Usability
   5. All of the mentioned
2. Which of the following can improve understandability of a computer program? **Note:** You may select multiple options**.**
   1. Good control structure
   2. Meaningful variable names
   3. Meaningful documentation of code
   4. All of the mentioned
3. In a newly developed application, the keyboard shortcut for saving work is Ctrl + X. Which of the following quality characteristics will be affected: **Note:** You may select multiple options
   1. Reliability
   2. Evolvability
   3. Usability
   4. Correctness
   5. None of the mentioned
4. Errors introduced in which of the following software lifecycle phases are most costly to fix during acceptance testing?
   1. Requirements gathering
   2. Design
   3. Coding
   4. Unit testing
   5. Integration testing
5. Which of the following is the responsibility of a software engineer?
   1. Adopt a systematic and organized approach, effectively, to produce high quality software
   2. Remain concerned and aware about all aspects of software production during the engineering process
   3. Manage conflicts between goals of acceptable quality, cost effectiveness, timely completion
   4. a and b only
   5. all of the mentioned

**Question 2** (Max. Marks = 5)

Order the following phases in the software lifecycle w.r.t. the waterfall model and rewrite all the phases in the correct order:

maintenance phase, unit (or module) testing, requirements analysis and specification phase, high level (or system) design phase, low level (or detailed or program) design phase, system testing phase, implementation (or coding) phase, deployment (or delivery) phase.

**Question 3** (Max. Marks = 10)

Classify each of the following software application into one of the categories (or application domains). The broad categories are: System Software, Application Software, Engineering/Scientific Software, Embedded Systems, Product-line Software, Web/Mobile Applications, Artificial Intelligence Software

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| --- | --- |
| Description of Software Application | Category Name |
| 1. A mobile application for our large scale Student Management System called Flex needs to be developed |  |
| 1. Owing to growing number of students, FAST library staff believes that an interactive online system is needed to keep track of books and rentals. |  |
| 1. A turn based two player game (like chess) which runs on a stand-alone computer and the players take turn on the same computer. |  |
| 1. A game engine which will allow other developed games to run |  |
| 1. An android like operating system for our new smart phones |  |
| 1. An application which receives images of fields with crops and based on its learning from the past images, identifies the weeds (unwanted wild plants that can affect growth of the crop) in the crop |  |
| 1. An application which runs on a drone (with a camera) and takes photographs of the agriculture fields after the set intervals as the drone follows a preplanned path. |  |
| 1. An application which allows a hardware dealer to manage and keep track of the inventory in his/her shop. The application runs of the dealer’s machine. |  |
| 1. An application which is officially provided as a moonsighting utility in Pakistan |  |
| 1. An automated ticketing system which allows travelers to get the tickets issued and cancelled using their own computers and without visiting the ticketing office. |  |

**Question 4** (Max. Marks = 10)

Give two examples where one software quality emphasizes the other. Explain your answer.

**For example**, to achieve the **reliability** of a specific software product, its **correctness** should be achieved first.

**Question 5** (Max. Marks = 1+9 = 10)

We need to write software for an ATM machine. The software will deal with customers’ requests regarding withdrawal of money, change of PIN, checking of account info etc. The hardware will include an ATM Machine at which the software runs and the software interacts with the ATM card reader and a keypad to get the input. The machine will display messages on screen to keep the customers informed during the processing of customers’ transaction. The software system needs to perform the following functions:

* The system shall validate the user entered PIN from the database
* The system shall process the amount withdrawal request for the valid ATM card and PIN
* The system shall check for the sufficient amount for withdraw from the database
* The system shall process PIN change request for a valid ATM card and valid PIN
* The system shall process Balance Check request for a valid ATM Card and valid PIN
* The system shall process the print receipt request for any successful transaction

During the development of this software **note the following points:**

* As the system deals with the very sensitive information related to money, so function needs to be error free (for example in terms of calculations, debiting and crediting the correct customer account etc.)
* The system should provide 24 hours services to all the customers i.e. system can’t deny its services to the customers.
* As the system can also facilitate the customers of other banks so, if their bank system is down, our system should always be available for all customers. Also keep in mind that people with different backgrounds can use the system.

1. **Which application domain does this system belong to? State only one from the list provided in Question 3**
2. **Keeping in mind the above information, state 3 software qualities that this system must have? Give reasons.**