|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **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:** | **Software Design and Analysis** | **Course Code:** | **CS-3004** |
| **Program:** | **BS (Computer Science)** | **Semester:** | **Fall 2024** |
| **Duration:** | **45 Minutes** | **Total Marks:** | **25** |
| **Quiz Date:** | **30-Oct-24** | **Roll No.** |  |
| **Section:** | **BCS-5A** | **Name:** |  |
|  |  |  |  |
|  |  | | | |

**Question 2) Refactor the code by applying SOLID Principles and mention which SOLID principle is violated by this code? (10 Marks)**

|  |  |
| --- | --- |
| **class SingingMermaidAction {**  **public:**  **void sing() {**  **cout << "Sings melodious songs." << endl;**  **}**  **void combHair() {**  **cout << "Combs hair with a fork." << endl;**  **}**  **void collectPearls() {**  **cout <<” Collects shiny pearls from sea" << endl;**  **}**  **};**  **int main() {**  **SingingMermaidAction mermaid();**  **cout << "Mermaid's Actions:" << endl;**  **mermaid.sing();**  **mermaid.combHair();**  **mermaid.collectPearls();**  **}**  **// SRP is violated in this code** | **class SingingMermaidAction {**  **public:**  **void sing() {**  **cout << "Sings melodious songs." << endl;**  **}**  **}**  **class CombHairAction {**  **public:**  **void combHair() {**  **cout << "Combs hair with a fork." << endl;**  **}**  **}**  **class CollectPearlsAction {**  **public:**  **void collectPearls() {**  **cout <<” Collects shiny pearls from sea" << endl;**  **}**  **}**  **int main() {**  **SingingMermaidAction singMermaid();**  **CombHairAction combHairMermaid();**  **CollectPearlsAction collectPearlsMermaid();**  **cout << "Mermaid's Actions:" << endl;**  **singMermaid.sing();**  **combHairMermaid.combHair();**  **collectPearlsMermaid.collectPearls(); }** |

**Q2)** Give a UML state diagram for the alarm clock. **(10 marks)**

An alarm clock can have an alarm set or no alarm set. When the user sets an alarm, a bell sign will be displayed on the clock. When a user cancels an alarm, the bell sign will disappear from the clock. If user sets an alarm, the alarm will start ringing at the specified time. Now the user can either dismiss the alarm or it gets snoozed. If dismissed, there is no alarm set. If the alarm is ringing and the user has not dismissed it, then after a minute the alarm is set again as it is automatically snoozed.

A diagram of alarm clock

Description automatically generated

**Question 3 (5 Marks)**

The following part shows partial designs (using UML 2 design class diagrams) of software applications. You are required to refactor/improve the designs using SOLID principles. Exactly one SOLID principle should be used

**A**

**B**

Important Instructions: In the future, Class B may be replaced by Class C or Class D.

*Uses*

**Before**

