COMSATS University Islamabad, Abbottabad Campus

Department of Computer Science

Examination – Mid Term Exam (Fall 2025)

Reviewed! 28/10/25

Class: BSSE 7th A/B/C
Date: 29th OCT, 2025
Subject: Software Reverse Engineering
Instructor: Ms. Faiza Hameed
Total Time Allowed: 1hr 30 Mins
Max Marks: 30
Name: _____
Registration # _____

SECTION-A (Marks: 16)

Q1: [CLO 1, Learning Level: Understanding]: What is a legacy system in reverse engineering, define its characteristics and why is it often **difficult to** maintain or modernize? **[4 Marks]**

Q2: [CLO 1, Learning Level: Understanding]: Reverse engineering is often misunderstood as simply examining source code. Discuss how reverse engineering process extends beyond code analysis and plays a role in systems-level re-engineering. **[4 Marks]**

Q3: [CLO 2, Learning Level: Applying]: Apply the concept of architecture restructuring to explain how it can improve the performance and maintainability of a legacy system along with an example? **[4 Marks]**

Q4: [CLO 2, Learning Level: Applying]: Differentiate among the following tools used in reverse engineering: **Disassembler, Decompiler, Debugger,** and **Binary Analysis Tools**. For each, explain its primary purpose, input, output, and requirement of source code. **[4 Marks]**

SECTION-B (Marks: 14)

Q5: [CLO 1, Learning Level: Understanding]: Scenario: An organization plans to modernize its **legacy travel booking system** through **reverse engineering**. The existing system calculates ticket prices based on customer types such as *regular*, *student*, and *senior citizen*. Currently, the system uses multiple conditional statements within a single method to handle different discount rules. As the business expands and introduces new pricing policies, such as *promotional* or *group discounts*, the codebase has become messy and difficult to maintain. As a software engineer, which **design pattern** would you apply to improve the flexibility, maintainability, and extensibility of the system? **[7 Marks]**

- Which design pattern you would apply? [2 Marks]
- How does this design pattern improve the flexibility in modern system? [2 Marks]
- Draw the UML class diagram for above scenario. [3 Marks]

Q6: [CLO 2, Learning Level: Applying]: Answer the following questions practically. [7 Marks]

- How we can activate **Checkstyle** for a project? [1 Marks]
- What is "**Token**" in **SonarQube**, how we can generate it? [2 Marks]
- What refactoring step should you perform to **refactor** this line? [1 Marks]
  - **let total = price * 1.17;**
- Design **ESLint** rules for; [2 Marks]
  - Enforce 4-space indentation
  - Allow missing semicolons
- Why we use quick attach feature in **Jprofiler**? [1 Marks]

CamScanner