BINDURA UNIVERSITY OF SCIENCE EDUCATION

FACULTY OF APPLIED SCIENCE AND ENGINEERING

DEPARTMENT OF COMPUTER SCIENCE

BSc HONS DEGREE IN SOFTWARE ENGINEERING

SWE403 -SOFTWARE EVOLUTION AND RE-ENGINEERING

DURATION: 3 HOURS TOTAL MARKS: 100

INSTRUCTIONS TO CANDIDATES:

1. Answer ALL Questions.
2. Use the given answer sheet for answers

OCT 2024

## Question 1

a) Define a legacy system. [2]

b) Analyze any four challenges involved in evolving legacy software systems over time. [12]

c) Explain the key decision-making factors that organizations should consider when planning the evolution of legacy software systems. [6]

## Question 2

a) Suggest a comprehensive software maintenance process that an organization can follow to effectively manage the ongoing evolution and upkeep of their software systems. [10]

b) Discuss the key benefits of software refactoring and why it is considered a critical practice for maintaining the long-term health and value of software systems. [10]

## Question 3

Mahindra Corporation is a leading provider of enterprise software solutions for the healthcare industry. One of their core products is a legacy billing and invoicing application that has been in use for over 15 years. The application is built on outdated technology, and codebase has become increasingly complex and difficult to maintain over time.

The billing system is mission-critical for Mahindra's customers, as it is responsible for accurately processing millions of dollars in monthly transactions. However, the system has performance issues, frequent bugs, and a lack of flexibility to adapt to changing regulatory requirements. The IT team has been struggling to keep the application running, and technical debt has been accumulating rapidly.

Mahindra's executive team is now considering a major software re-engineering initiative to modernize the legacy billing system.

Conduct a comprehensive feasibility analysis to assess the viability of this re-engineering project. **[15]**

## Question 4

a) Explain the importance of software architecture in facilitating software evolution and adaptation **[5]**

b) Propose a software architecture and design pattern strategy for a legacy system that needs to be modernized. Justify the selected patterns and explain how they would enable a more sustainable and adaptable system architecture. **[15]**

## Question 5

a) Explain the importance of performing a comprehensive feasibility assessment prior to initiating a software re-engineering initiative. **[10]**

b) Discuss the common organizational and technical challenges that organizations encounter during a software transformation initiative. Suggest effective strategies and solutions to overcome these challenges. [15]

**THE END**