Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2022/2023

COURSE NAME	:	SOFTWARE ENGINEERING
COURSE CODE	:	BEJ 42303
PROGRAMME CODE	:	BEJ
EXAMINATION DATE	:	JULY/ AUGUST 2023
DURATION	:	3 HOURS
INSTRUCTION	:	1. ANSWER **ALL** QUESTIONS. 2. THIS FINAL EXAMINATION IS CONDUCTED VIA **CLOSED BOOK.** 3. STUDENTS ARE PROHIBITED TO CONSULT THEIR OWN MATERIAL OR ANY EXTERNAL RESOURCES DURING THE EXAMINATION CONDUCTED VIA CLOSED BOOK.

THIS QUESTION PAPER CONSISTS OF **FIVE (5)** PAGES

Q1 (a) Explain the state machine models.

(5 marks)

(b) As a software engineer you have been given a project to develop a patient information system for mental health care namely as MHC-PMS. It is a medical information system that maintains information about patients suffering from mental health problems and the treatments that they have received. Analyse the following key features, then draw the classes and associations diagram of the system.

- Individual care management
  - Clinicians can create records for patients, edit the information in the system, view patient history, etc. The system supports data summaries so that doctors can quickly learn about the key problems and treatments that have been prescribed.
- Patient monitoring
  - The system monitors the records of patients that are involved in treatment and issues warnings if possible, problems are detected.
- Administrative reporting
  - The system generates monthly management reports showing the number of patients treated at each clinic, the number of patients who have entered and left the care system, number of patients sectioned, the drugs prescribed and their costs, etc.

(8 marks)

(c) **Figure Q1(c)** shows one of the architectural patterns in software engineering. Based on your evaluation, identify:

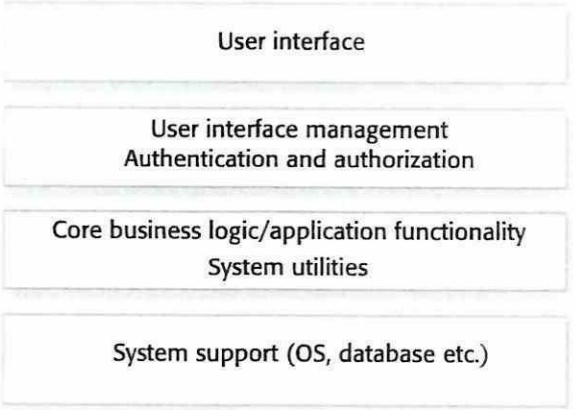

Figure Q1(c)

(i) The name of this architectural pattern;

(1 mark)

(ii) When it can be used;

(2 marks)

(iii) What is the advantage and disadvantage of this architectural pattern?

(3 marks)

(d) Describe **three (3)** view models of software architecture.

(6 marks)

Q2 (a) List the common activities of process stages in the object-oriented design process.

(5 marks)

(b) Describe **four (4)** types of Reuse-Based Software Engineering.

(6 marks)

(c) As an electronic engineer that specialized in software system engineering, you have been given a task to design a traffic management system. Explain the traffic management system with master-slave architecture.

(7 marks)

(d) As a software engineer, you have been given a task to develop a distributed system based on the two-tier client-server architecture, where the presentation layer is implemented on the client. Analyze this task, explain the possible architectural models and determine what is the best architectural model for this task.

(7 marks)

Q3 (a) Describe **two (2)** types of component interfaces in Component-Based Software Engineering.

(5 marks)

(b) You are required to supervise a junior testing engineer to do an interface testing of a system. As a senior testing engineer, produce the interface testing guidelines of the system.

(5 marks)

(c) Explain the software testing process model.

(6 marks)

(d) **Figure Q3(d)** shows the strategy for evolving a legacy system in your company. Analyse the figure and explain it.

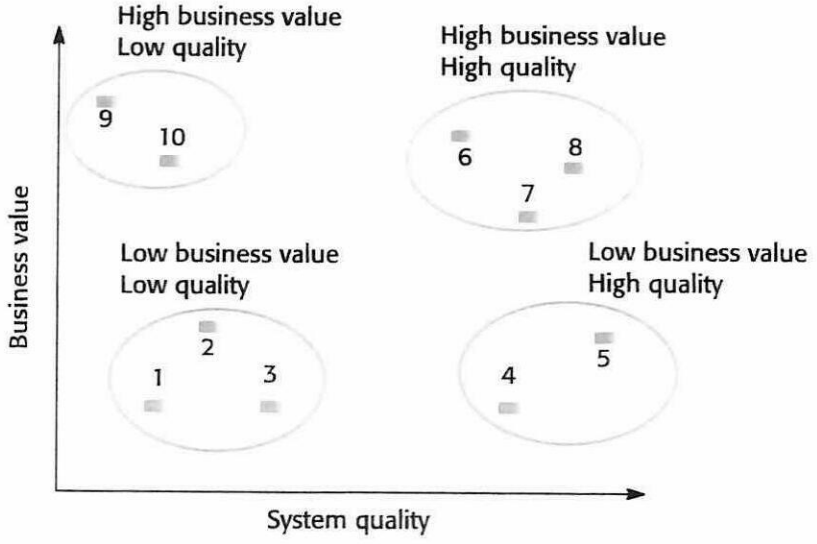

Figure Q3(d)

(9 marks)

Q4 (a) Describe the sub models in COCOMO 2.

(4 marks)

(b) Write and describe the formula to estimate software cost based on the reuse model.

(8 marks)

(c) As a project manager, you have to manage several risks that could be occurred during a project development. Based on your evaluation, provide the strategy to help manage the following risk.

(i) Organizational restructuring

(1 mark)

(ii) Underestimated development time

(1 mark)

(iii) Requirements changes

(1 mark)

(iv) Staff illness

(1 mark)

(v) Organizational financial problems

(1 mark)

(d) A high-speed train is composed of several millions of individual parts and requires thousands of workers to assemble. A 100-storey building is another example of complexity. The first version of Microsoft Word, required 55 person-years, resulted into 249,000 lines of source code, and was delivered four (4) years late. High-speed train and 100-storey building are usually delivered on time and below budget, whereas software is often not. Discuss what are, in your opinion, the differences between developing a high-speed train, a 100-storey building, and a word processor, which would cause this situation?

(8 marks)

-END OF QUESTIONS -