00762

The Open University of Sri Lanka
Faculty of Engineering Technology
Bachelor of Software Engineering Honours

Department	: Electrical and Computer Engineering
Level	: 3
Name of the Examination	: Final Examination
Course Title and - Code	: Software Engineering Concepts and Programming – EEX3467
Academic Year	: 2022/23
Date	: 20/05/2023
Time	: 9.30am – 12.30pm
Duration	: 3 hrs.

General Instructions

1. Read all instructions carefully before answering the questions.
2. This question paper consists of **four (4)** questions in **three (3)** pages.
3. Answer all **four (4)** questions. Each question carries equal marks.
4. Answer for each question should commence from a new page.
5. Draw fully labelled diagrams where necessary.
6. Write answers in clear and concise format appropriately in points/bullet form.
7. Involvement in any activity that is considered as an exam offense will lead to punishment.
8. Use blue or black ink pen to answer the questions.
9. Clearly state your index number in your answer script in every page.

QUESTION 1

Read the following **description** of *E-Channeling System* and answer the parts of QUESTION 1.

> Patients and doctors can create their accounts and login to the system. Patients can browse through the list of available doctors and view their profiles, which include information about their specialties, experience, and availability. Patients can book an appointment with a doctor and select a convenient date and time. Doctors can view and confirm the received appointment requests from patients. Doctors can update the status of the appointment from "booked" to "in progress" when they start the appointment. Doctors can also update the status of the appointment to "completed" when the appointment is finished. Patients can track the status of their appointment in real-time. Patients can pay for their appointment through the system.

1.1) Draw a flow chart for the algorithm based on the description. (10 marks)

1.2) The above *E-Channeling System* has to calculate payment for daily paid doctors who are working in the E-Channeling system according to the following method.

> The user has to input the number of doctors, rate per hour, doctor ID, hours worked per week to compute the gross pay of a doctor.
>
> Pay should be at the normal rate for up to 28 hours per week and double the hourly rate for all hours worked beyond 28 hours.
>
> Design a function called calPay() to calculate the payment and returns the value.
>
> Inputs should be positive numbers, otherwise the program should display an error message.
>
> After weekly pay is calculated, the Doctor ID and the amount need to be paid should be written to a Text file.

Write a C code to implement the above program including header files, main function, inputs, outputs, iteration and conditional structures. Include comments where necessary. Give meaningful names to variables. (15 marks)

QUESTION 2

QUESTION 2 is based on the **description** of QUESTION 1.

2.1) Identify the *actors* in the description. (1*3 = 3 marks)

2.2) Draw a comprehensive *Use Case* diagram with all the assumptions. (6 marks)

2.3) Define the terms *extend* and *include* in use case diagrams. (2*2 = 4 marks)

2.4) Suggest and briefly describe two (2) objectively valid (verifiable and measurable) non-functional requirements for this system. (3*2 = 6 marks)

2.5) Discuss about one (1) platitude, one (1) omission and one (1) ambiguity of the requirements (given in the **first** rectangle box) of the system. (2*3 = 6 marks)

QUESTION 3

3.1) Describe three (3) ways in which you can elicit requirements for a mobile application. (2*3 = 6 marks)

3.2) Define the term stakeholder. Give three (3) possible stakeholders in the above mobile application in general. (5 marks)

3.3) List the three (3) documents that are produced as the output of any *Software Process Model*. Briefly describe them. (3*3 = 9 marks)

3.4) Differentiate between *black box testing* and *white box testing*. (5 marks)

QUESTION 4

Fibonacci number is a number in the Fibonacci series. Each number in this series, starting with 0 and 1, is the sum of the two numbers before it. The first 10 Fibonacci numbers, for instance, are 0, 1, 1, 2, 3, 5, 8, 13, and 21.

Following algorithm shows how to calculate the Fibonacci number for any position:

- Start
- Declare variables 'n', 'first', 'second', and 'next'.
- Read the value of 'n' from the user.
- Initialize variables 'first' and 'second' to 0 and 1 respectively.
- If 'n' is less than or equal to 1, print 'n' and exit.
- Otherwise, enter a loop with a range from 2 to 'n'.
    - Within the loop, calculate the value of 'next' as the sum of 'first' and 'second'.
    - Assign the value of 'second' to 'first' and the value of 'next' to 'second'.
    - Print the value of 'next'.
- Exit

4.1) Draw a *flow chart* for the above algorithm. (10 marks)

4.2) Write the complete *C program* including header files with adding comments appropriately. (15 marks)

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