The Open University of Sri Lanka
Faculty of Engineering Technology
Department of Electrical & Computer Engineering

045

Study Programme	: Bachelor of Software Engineering Honours
Name of the Examination	: Final Examination
Course Code and Title	: **EEI6567 Software Architecture and Design**
Academic Year	: 2021/22
Date	: 16th February 2023
Time	: 09:30-12:30hrs
Duration	: 3 hours

General Instructions

1. Read all instructions carefully before answering the questions.
2. This question paper consists **Four (4) questions** in **Four (4) pages**..
3. **Answer all** the questions. All marks are indicated on the paper.
4. Answer for each question should commence from a new page.
5. This is a Closed Book Test (CBT).
6. Answers should be in clear hand writing.
7. Do not use red colour pen.

Answer All the Questions.

1) Company SipEng has been asked to develop a software system for the problem mentioned below. The company has decided to assign you as an architect for the project.

Young children are at increased risk for infectious diseases because their immune systems have not yet built up the necessary defenses to fight serious infections and diseases. Making sure that children have access to proper healthcare and immunization against diseases that can be prevented by vaccines, is a huge challenge that is being faced by developing countries like Sri Lanka.
This highlights the importance and need of having a better, smarter system in place, to improve the situations. This application provides a system to give information, store records, and help parents schedule vaccination appointments for their children.
Child Vaccination Management System helps parents book vaccination appointments for their children with just a few clicks. Admin will manage the child registration and vaccination report and approval of the appointment. Medical office of Health (MOH) will update the status of the vaccination applied for the child.

a) It is obvious that this kind of an improvement to the health department is costly. Is it worth spending a large amount of money for this kind of project? Justify your answer providing reasons. **(5 marks)**
b) Identify a few more features that can be provided by introducing a software system. **(5 marks)**
c) Draw a use case diagram for this system. **(5 marks)**
d) Identify major software components that should be included in this project. **(5 marks)**
e) List down the stakeholders of this system **(5 marks)**
f) Draw a diagram to depict the high-level logical architecture of this system you are going to design **(10 marks)**
g) Discuss two non-functional requirements that need to be considered in this system - (Explain why these are important in this system) **(5 marks)**

2) You are the Architect of your company and there is project proposal from a local medical authorities with below problem statement.

In today's traffic world, ambulance plays a major role when an accident occurs on the road network and the need arises to save valuable human life. Transportation of a patient to an emergency hospital seems quite simple but, it is quite difficult and gets more difficult during peak hours.

In our Ambulance Booking System, people can easily book an ambulance. There are three major users namely User, Ambulance, and Hospital. Users can register and log in using credentials. Users can edit their profile and change their password in an emergency. Any Upcoming Ambulance Booking details if anyone wants to Book an Ambulance or if there is an Emergency.

For booking an ambulance users must select ambulance size, pick-up point & hospital, and date & time. In an emergency will automatically book the nearest ambulance & hospital. Users will get a list of all the bookings of Ambulances.

In this system, there are four entities User, Ambulance and Hospital. The user must register and log in using a username and password. After logging in, the user can Book Ambulance, Book Hospital, View nearby Hospitals, View Previous Booked Ambulances and Hospitals, and it can also change its password.

When the user books an ambulance and hospital, a booking request is sent to the respective representatives of the ambulance and hospital. In view, Nearby Hospitals the user can view the nearest hospitals in their location. The ambulance driver must register and then login in using a username and password.

After logging in, the driver can view booking requests, nearby hospitals, and their previous bookings i.e., previously accepted requests. In Booking requests, it can either accept or decline the user requests. The hospital must register and log in using a username and password. After login in the hospital representative can view the booking request and either accept or decline the user request.

a) As an architect, what do you consider as your responsibilities? **(5 marks)**
b) Write down five functional requirements and five non-functional requirements with higher priority. Explain the reasons for selecting them as higher priority requirements. **(5 marks)**
c) Write down three architectural decisions you made as the software architect of this project. **(5 marks)**
d) Name the stakeholders of the given case. Write down how each stakeholder is involved in the system **(5 marks)**

3) Quality attributes are important as they are the Non-Functional requirements of Software that can be used to evaluate its performance to ensure the expectations of the stakeholders and users are met. Answer all the questions.

a) Explain the importance of software quality attributes on software development process including the main 3 categories of software quality attributes. Give 2 examples for each category **(6 marks)**
b) Why software quality attribute prioritization is required and provide 2 examples on selecting the priority based on the problem statement. **(4 marks)**
c) Performance is the key software quality attribute that we must consider while designing the system. List down 5 actions that we can take to improve the performance of the software system. **(5 marks)**
d) List down 5 decision that you can take during the user interface design to improve the usability of the system. **(5 marks)**

4) Software deployment strategy is one of major part of the defining software architecture. Most of the architects selected cloud infrastructure for the deployment. Provide detailed answer for below questions.

a) Explain how you can improve your deployment strategy to provide high availability and disaster recovery **(5 marks)**
b) Explain most valuable 3 advantage and 2 disadvantages on cloud computing. **(5 marks)**
c) Name 4 types of cloud and describe each with its characteristics. **(5 marks)**
d) What are the main 3 common Cloud service models describe it with its characteristics **(5 marks)**

End of the paper