



Sri Lanka Institute of Information Technology

B.Sc. Honours Degree in Information Technology

Final Examination
Year 1, Semester 2 (2023)

IT1060– Software Process Modeling

Duration: 02 Hours

June 2023

Instructions to Candidates:

- ◆ This paper has four questions.
- ◆ Answer all questions in the booklet given.
- ◆ The total marks for the paper are 100.
- ◆ This paper contains seven pages, including the cover page.
- ◆ Electronic devices capable of storing and retrieving text, including calculators and mobile phones are not allowed.

Question 1**(40 Marks)**

Fellowship of the Royal College of Surgeons (FRCS) is a professional qualification required to practice as a surgeon in the United Kingdom and Republic of Ireland. Exams (written, oral, and clinical) play a crucial role in the maintenance of standards. Most Sri Lankan physicians are interested in applying for this qualification to improve their professional and academic qualifications.

Therefore, the medical council intended to develop "SL-Surgeons" software to handle all the processes of examination and smooth the steps of applying MRCS (the first part of FRCS) and FRCS. Analyze the case study related to SL-Surgeons given below and answer the questions given.

Any Sri Lankan physician who has worked for five years and has a medical registration number is eligible to register with the system. The system will refuse to register and display an unsuccessful notice to the user if the medical number is entered incorrectly. Additionally, the system checks the validity of the medical registration number using medical council details, calculates the years from the registration number, and displays an invalid entry alert to the user if the calculation does not exceed five years.

Once logged in to the system, users can submit documents that are published on the information page. In submission, the user must pay the submission fee through the Med-Pay gateway for all administrative tasks. So, this payment should be done in USD, and it can be done as an EFT (Electronic Fund Transfers) or credit card payment. If physicians make this payment as an EFT, central bank approval should be required to proceed with the payment.

Moreover, when the user submits the documents, the exam unit of the medical council will validate the document list. If there are any missing documents, the system will send an email to notify the user. The exam unit will generate an e-card as confirmation of the documents. Then, the system will show the e-card to the user, and in the e-card's description, the user can find the next required step as a medical submission. When the user sees the e-card of confirmation, user understands the next step as medical document submission. Then the exam unit will accept the medical submission and update the system.

Then the system shows registration links as the results of the medical submission. Then the user can register for examinations. There are written and practical examinations to complete. When registering, if the payment ID is missing, the system will redirect to the Med-Pay gateway to verify the details of the payment submission.

After registering for the written examination, the system will show the venue and date to attend. On the other hand, after registering for a practical examination, the user can find the hospital ward number on the screen. Furthermore, the medical council may handle the exam details and publish results through the system. Also, the medical council ranks the physician profile using published results and previous work records. So, in this process, the medical council may request previous work records from a third-party system called Hospital Management System (HMS). When ranking the profile, if work experience is more than twenty, medical council prioritizes the profile as qualified

Moreover, the medical council can do all the activities that the exam unit and HMS do.

Draw a Use Case Diagram with appropriate assumptions.

(40 Marks)

Question 2**(20 Marks)**

- a) The University of South Australia (UniSA) is popular for distance-learning PhD programs. Any candidate can apply online to proceed with their higher studies. So, UniSA provides an online portal called "DOU" to all distance learning students to make their process easier. Candidates can apply to available PhD programs at UniSA through DOU. Then DOU will request supportive documentation to proceed with the application. Once the candidate uploads those, DOU will treat the candidate as a potential PhD candidate. Then those candidates can access the research pool and read novel ideas to prepare their proposal. Also, they can read previous PhD students' proposals to gain more ideas. Meanwhile, DOU lists available scholarships for candidates. If they are interested, they could access scholarship details and apply through DOU. Moreover, candidates can access the research blog and contribute to it to enhance their knowledge.

Write two user stories considering UniSA-DOU application.

(06 Marks)

- b) "Open-source software is always free." Do you agree? Justify your answer.

(04 Marks)

- c) Compare and contrast Blackbox testing and Whitebox testing.

(06 Marks)

- d) "Spiral is commonly called as meta model" explain the statement.

(04 Marks)

Question 3**(20 Marks)**

“Prabuddha Citizen” is a fixed deposit scheme introduced by a renowned bank in the island. Their main purpose of introducing this new scheme is to provide senior citizens who are 60 years or above with high interest rates to enjoy their life. Users can use the following application to calculate the interest they get at the maturity.

Following fields need to be filled by the user to calculate the interest of the fixed deposit.

- **NIC – should be valid with 9 digits and lower case or upper-case letter “v”.**
- **Age should be an integer value. Maximum value user can enter is 90.**

User should deposit minimum 1 million in the fixed deposit scheme to get the new interest rates. However, new interest rates will apply up to an amount of 10 million and rest of the amount will be applied for a flat rate of 24% interest rate.

Below table shows the interest rate for each period.

Period	Interest Rate
3 months	20%
6 months	21%
1 year	22%
400 days	23%

a) Draw diagram/s showing equivalence partitions and boundary values that ensure all input values are tested for the system. Clearly mention the values.

- For Age:

(05 Marks)

- For Amount:

(05 Marks)

b) Write 10 Sample test data to check the format and the correctness of the user entered data to the above system. Use the below format.

(10 Marks)

Test Case ID	Input/s	Expected Test Results	Reason of Invalid
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Question 4**(20 marks)**

Analyze the case study related to Arogya given below and answer the questions given.

The ministry of health plans to propose the "Arogya" software system, which provides help to elderly people who suffer from dementia. So, this application is popular among many elders because of the ordering medicine facility.

A patient or caregiver can register with the system by entering the NIC number. Then the NIC validation unit will validate the NIC and generate a simple username and password for the user. Then the user will log into the system, and the user can see the home screen. Membership validation unit will verify the user and redirect to the home screen

Then the user will select the order option, and the medicine ordering unit will show the user interface, which has all the medicine relevant to dementia and elderly people. The patient or caretaker can select medicine and submit it to the medicine ordering unit. So, the medicine ordering unit will calculate the bill and show the bill to the user. If the user accepts the order, it will redirect to the Sampath Bank payment gateway to make the payment. If the user rejects the order, it will be saved by the medicine ordering unit for reference and exit the system.

When the user makes the payment, the system will show a successful message. In the meantime, a third-party delivery system will start the delivery and show a unique delivery number to the user. Once all processes are completed, the medicine ordering unit will show a successful message to the user and end the process.

Analyze the case study related to Arogya given above and answer the questions.

- a) What are the subsystems in Arogya software system?

(04 Marks)

- b) Draw activity diagram with swim lanes.

(16 Marks)

~End of the Paper~