01098

Sri Lanka Institute of Information Technology

B.Sc. Special Honours Degree/Diploma
in
Information Technology

Final Examination
Year 3, Semester I (2022)

IT3030 – Programming Applications and Frameworks

Duration: 2 Hours

June, 2022

Instructions to Candidates:

- This paper contains 4 pages excluding the cover page.
- This paper contains 4 questions. Answer all the questions.
- Total marks for the paper is 100.
- Write answers in the booklet given, start new answer from a new page and make sure to properly indicate the question number (e.g. 1.a), 1.b), etc…).
- Answer for any single sub question cannot go beyond a **single page**.
- **Answer in point form** (take the marks allocation into consideration).
- Electronic devices capable of storing and retrieving text, including calculators and mobile phones are not allowed.

Question 1 (24 marks)

a) Differentiate the programming paradigms and types of computer languages discussing their key features (provide at least 6 paradigms and types of language). **(12 marks)**

b) Discuss the importance of the code quality (discuss at least 3 aspects), indicating different techniques (indicate at least 3 techniques) to maintain the code quality and their impact on the quality. **(12 marks)**

Question 2 (24 marks)

a) Value the distributed systems over standalone systems explaining their pros (discuss at least 3 aspects) and explain the architectural elements of the distributed systems. **(12 marks)**

b) Evaluate 2-tier architecture discussing its advantages and disadvantages (discuss at least 3 advantages and 3 disadvantages). **(12 marks)**

Question 3 (26 marks)

a) Design RESTful APIs for the following functional requirements.

ElectroGrid power supply company uses a web service to implement endpoints for following features/tasks. State any assumptions or/and any specific cases/instructions you make.

I. Meter readers use a mobile app to enter the monthly meter reading of houses. **(9 marks)**

II. Admins can update the monthly readings upon meter readers' requests. **(9 marks)**

III. Admins can remove the contact number of a meter reader and enter a new number. **(8 marks)**

Question 4 (26 marks)

Develop a browser-based Rich Web-based client app for the power consumers of the ElectroGrid company to view their monthly consumption. The consumers can select the year and the month from a form and view the consumption details below the form. When the year/month is changed, a request should be sent to the web service asynchronously and once the response is received, the month's consumption details should be displayed by partial rendering the necessary elements.

Assumptions: The user is already logged in and visited the page with the above feature.

This feature uses the RESTful endpoint given below.

Resource: House Request: GET electrogrid/house/accNo Type: Formdata Dataset: year, month Response: HTML table

I. Sketch a GUI of the view indicating all the required elements in the form and the area to display the consumption. **(5 marks)**

II. Implement an algorithm to validate the form on button click. You may use flowchart, pseudocode or even JS. If you use JS, the code does not need to be 100% correct. Make sure the algorithm is clear and contains all the necessary steps. State assumptions if any. **(6 marks)**

III. Implement an algorithm to send asynchronous request to the service to get the consumption details of given month. You may use flowchart, pseudocode or even JS. If you use JS, the code does not need to be 100% correct. Indicate all the data/parameters. Make sure the algorithm is clear and contains all the necessary steps. State assumptions if any. **(5 marks)**

IV. Implement an algorithm to capture the response, process data, and show the output on the GUI. You may use flowchart, pseudocode or even JS. If you use JS, the code does not need to be 100% correct. Indicate all the data/parameters. Make sure the algorithm is clear and contains all the necessary steps. State assumptions if any. **(10 marks)**

End of the Paper