UNIVERSITY OF ESWATINI

Faculty of Science and Engineering

Department of Computer Science

MAIN EXAMINATION

<u>April 2021</u>

<u>Title of Paper:</u> Integrative Programming and Technologies

<u>Course Code:</u> CSC 411

<u>Time Allowed:</u> 3 Hours   <u>Total Marks:</u> 100

<u>Instructions to Candidates:</u>

This Question Paper Consists of FOUR (4) Questions. Answer ALL Questions.

Marks are indicated in Square Brackets.

NB: You Are Not Allowed To Open This Examination Paper Until Permission Has Been Granted By The Invigilator

QUESTION ONE [35]

1.1 Define the following terms:
    a. Software architecture [1]
    b. Web service [1]

1.2 Describe the architecture for Web Service. [5]

1.3 Describe the Multi-Tier Architecture (n-tier Architecture). [4]

1.4 Briefly describe four (4) features that are provided by the Service-Oriented Architecture (SOA). [4]

1.5 What should be taken into account when invoking remote objects in distributed networks? [4]

1.6 State and describe three (3) identifiers configurations available in Windows Registry for DCOM. [3]

1.7 How does Common Object Request Broker Architecture (COBRA) objects differ from typical programming objects? [3]

1.8 With the aid of a diagram, briefly describe the Java Remote Method Invocation (RMI) architecture. [5]

1.9 Compare and contrast the Java Remote Method Invocation (RMI) and the Common Object Request Broker Architecture (COBRA). [5]

QUESTION TWO [20]

A bank uses a loan calculator to help customers to estimate the number of months it will take to pay back a loan. Suppose the bank wants to use RMI architecture for the calculator and that the bank offers the following loans and interests:
- 1.5% per month is charged on a housing loan of E500000 and less.
- 1.75% per month is charged on housing loans above E500000.
- 1.8% per month on financing a car costing E450000 and less.
- 1.95% per month on financing cars costing above E450000

(*All your programs must include the relevant exception handling and imports*)

2.1 Write a program that will create a server interface for the calculator. [3]

2.2 Write a program that will create a Java class that will implement the functions of the calculator. [5]

2.3 Write a program that will create a server process. [6]

2.4 Write a program that will create a client interface for the server interface in 2.1. Your code must include the relevant exception handling and imports. [1]

2.5 Write a program that will create a client process that will request the server to calculate the estimated time for a loan of 800000 for a house. (*Note: all calculations are done by the server, the client only sends the type of loan and the amount of money to server and display the estimated number of months*).
[5]

QUESTION THREE   [25]

3.1 What is an XML Schema?   [3]

3.2 Why is XSLT important to XML?   [1]

3.3 State any two (2) functions of server scripts.   [2]

3.4 State the characteristics of a well-formed XML document.   [4]

3.5 Briefly describe the XML building blocks.   [5]

3.6 State any four (4) characteristics of scripting languages.   [4]

3.7 What is the correct syntax for defining an XML version?   [1]

3.8 What is the purpose of the Document Type Declaration (DTD)?   [2]

3.9 State three (3) considerations that can be taken into account by a programmer when selecting a scripting language.   [3]

QUESTION FOUR   [20]

4.1 Define the following terms:
   a. Encryption   [1]
   b. Version control   [1]

4.2 Briefly describe the Microsoft's trustworthy computing initiative.   [5]

4.3 Briefly describe the three (3) types of Code Access permissions.   [6]

4.4 State any two (2) uses of versioning.   [2]

4.5 What is the difference between versioning and version control?   [2]

4.6 Why is it important to include security into every phase of the software development cycle?   [3]