

## Higher National Diploma in Information Technology

Second Year, Second Semester Examination – 2019

### IT2411 - Enterprise Architecture -Model Answers

#### Instructions to Candidates:

Answer five (05) questions only.

All Questions carry equal marks

**Time: Three Hours (03)**

No. of Pages :03

No of Question :06

Q1.

I. Define the term **Computing Paradigm**?

(4 marks )

*A computing paradigm refers to the set of*

- **concepts,**
- **principles, and**
- **methods**

*of expressing computation that*

- *allows **human command** on one hand and*
- *allows the **computer to efficiently execute** on the other hand.*

II. List 4 elements in Service-Oriented Computing.

(4 marks )

- i. *Service Oriented Architecture*
- ii. *Service Orientation*
- iii. *Service Oriented Solution Logic*
- iv. *Services*
- v. *Service Compositions*
- vi. *Service Inventory*

Any 4 x 01 mark= 04 marks

III. Compare Object Oriented Computing and Service Oriented Computing in terms of “Code sharing and reuse”.

(6 marks)

|  |   |
|--|---|
| <i>OOC:<br/>Code reuse through inheritance of class members and through library functions. Library functions have to be imported at compilation time and are platform dependent.</i> | <i>SOC:<br/>Code reuse at the service level. Services have standard interfaces and are published on Internet repository. They are platform-independent and can be searched and remotely accessed. Service brokerage enables systematic sharing of services.</i> |
|--|---|

03 marks for each x 2 =06 marks

IV. Briefly explain the reasons for replacing RPC protocol with SOAP.

(6 marks)

*Most of the RPC protocols are too low level and certainly not compatible among each other (gateways are needed)*

Since RPC represents a compatibility and security problems, firewalls and proxy servers will normally block this kind of traffic.

To address this problem, XML was used to define SOAP.

Q2.

- I. A Web Services Description Language (WSDL) document describes a web service using major elements. Name and explain two of them. (4 marks)

- **Types**
  - ☐ What data types will be transmitted
- **Messages**
  - ☐ What messages will be transmitted
- **Port Types**
  - ☐ What business operations (functions) will be supported
- **Bindings**
  - ☐ How will the messages be transmitted on the wire?
  - ☐ What message protocol (e.g. SOAP) specific details are there?
- **Service ports**
  - ☐ Where is the service located?

Name any 2 elements. 02 marks  
Describe them briefly 02 marks

- II. Explain 3-tiered architecture ? (6 marks)

- *Client tier - client program makes requests to middle tier*
- *Middle tier - handles client requests by processing application data (business logic – business tier)*
- *Data tier - persistent data store (database / legacy system / etc.)*

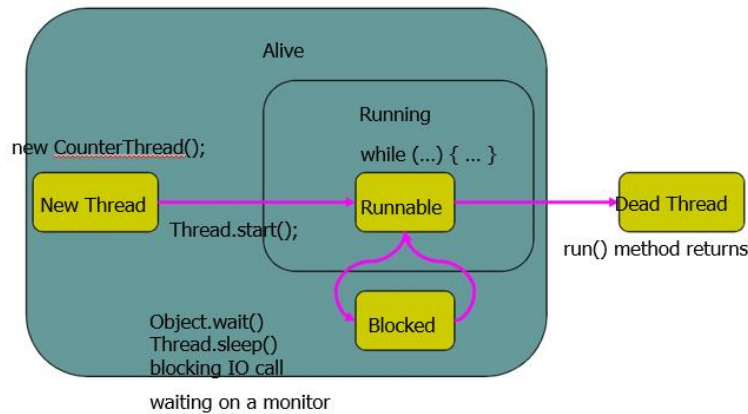
- III. In Java, there are the two methods which can be used to implement threads. Name each method. (04 Marks)

*java.lang.Thread : Extend the java.lang.Thread class*

*java.lang.Runnable : implement the java.lang.Runnable interface*

02 Marks for each x 2= 04 Marks

- IV. Explain Thread State diagram. (06 marks)



Name 04 4 states with methods 04 marks  
 Show how new thread → runnerble 01 mark  
 Show “alive” 01 mark

Q3.

I. State usage of the Prepared Statement in SQL. (4 marks)

*PreparedStatement objects are used to send SQL commands to the db. This object allows you to execute parameterized queries.*

II. State the different between `executeQuery()` and `executeUpdate()` methods in Statement Object (JDBC). (4 marks)

- `executeQuery()`
  - Executes the SQL query and returns the data in a table (ResultSet)
- `executeUpdate()`

*Used to execute for INSERT, UPDATE, or DELETE SQL statements*  
 02 marks for each x 2 = 04 marks

III. Consider the given scenario. (12 marks)  
 Assume that you are using mysql database. Database name is SLIATE. Student is one of the table in that database.

Ex: Student

| Reg No | Name         | ContactNo  | Address      | Gender | Age | GPA |
|--------|--------------|------------|--------------|--------|-----|-----|
| 1111   | C.D. Perera  | 0372228222 | Kurunegala   | M      | 20  | 3.9 |
| 1112   | C. Basnayake | 0362255222 | Awissawella  | M      | 21  | 3.5 |
| 1114   | N.S. Bandara | 0812234567 | Kandy        | F      | 20  | 3.8 |
| 1115   | K. Peris     | 0112876655 | Colombo      | M      | 21  | 3.0 |
| 1116   | S. Menike    | 0253456654 | Anuradhapura | F      | 21  | 2.6 |

Write sample code segments to display all details of students whose GPA is greater than 3 using following six steps.

1. Load the JDBC Driver

```
Class.forName("com.mysql.jdbc.Driver");
```

 01 mark

2. Establish the Database Connection

```
Connection con = DriverManager.getConnection("jdbc:mysql://localhost/exam",  
"root", "");
```

01 mark

3. Create a Statement Object

```
Statement stmt = con.createStatement();
```

 01 mark

4. Execute a Query

```
ResultSet rs = stmt.executeQuery("SELECT * FROM Student where GPA >  
3");
```

02 marks

5. Process the Results

```
while (rs.next()) {
```

 1 mark

```
int id = rs.getInt("Reg_No ");
```

```
String name = rs.getString("Name ");
```

```
int Tele= rs.getInt("ContactNo ");
```

```
String address= rs.getString("Address ");
```

```
String gender= rs.getString("Gender ");
```

```
int age= rs.getInt("Age ");
```

```
float gpa= rs.getFloat(" GPA ");
```

3 mark

```
System.out.print(id + " " + name + " " + Tele+ " " +Address+"  
" + " " +gender+ " " +age+ " " + gpa);
```

 1 mark

```
}
```

6. Close the Connection

```
rs.close();
```

```
stmt.close();
```

```
con.close();
```

02 marks

Q4.

- I. Explain what is the Model View Controller (MVC)

(4 marks)

The intent of MVC is to keep neatly separate objects into one of three categories

Model

The data, the business logic, rules, strategies, and so on

View

Displays the model and usually has components that allows user to edit change the model

Controller

*Allows data to flow between the view and the model*  
*The controller mediates between the view and model*

II. Name the framework which used following concepts.

- make J2EE development easier to use and promotes good programming practices by enabling a POJO-based programming model **Spring framework**
  - an Object-Relational Mapping (ORM) solution for JAVA **Hibernate**
- (4 marks)

III. Consider the index.html, which generate a form with three text inputs Group (name of the text field–txtg), Date (name of the text field - txttd) and Tme (name of the text field –txtt), and a submit button. Data are passed into **RegSch servlet**. In the servlet three parameter values are display. Fill the blanks in REgSch servlet. (6 marks)

```
Public class RegSch extends HttpServlet {
protected void processRequest(HttpServletRequest request, HttpServletResponse response)
throws ServletException, IOException, ClassNotFoundException, SQLException {
response.setContentType("text/html;charset=UTF-8");

try (PrintWriter out_ = response.getWriter()) {

String gtxt,dtxt,txtt;
gtxt=request.getParameter("txtg");;
dtxt=request.getParameter("txttd");;
txtt=request.getParameter("txttt");;

out.println("<!DOCTYPE html>");
out.println("<html>");
out.println("<head>");
out.println("<title>Servlet RegSch</title>");
out.println("</head>");
out.println("<body>");

out.println("<h1> " + gtxt + "</h1>");
out.println("<h1> " + dtxt + "</h1>");
out.println("<h1> " + txtt + "</h1>");
```

01 mark each x 6 =06 marks

IV. Following code segments are taken from two servlet files called servlet1 and servlet2 In servlet1, create a cookie and pass that value to servlet2. Then in sevlet2 display value in cookie. Fill the blanks in given codes. (06 marks)

**servlet1**

```
String v= "SLIATE";
Cookie c1=new Cookie("value",v); 02 marks
response.addCookie(c1); 02 marks
```

**servlet2**

```
Cookie ck[]=request.getCookies(); 01 marks
```

out.print("Hello "+ck[0].getValue()) 01 mark

Q5.

- I. Name two main categories of JSP elements? ( 4 marks )

*Directive elements*

*Scripting elements*

*Action elements*

Any 2 element 02 marks x 2 =04 marks

- II. Briefly explain what is an Enterprise Bean? ( 4 marks )

An enterprise bean is a server-side component that encapsulates the business logic of an application. The business logic is the code that fulfills the purpose of the application.

- III. Assume that you have provided index.html file for collecting First name, and Last name. Following JSP code which collect the request and display the full name. Fill the blanks. Note: in index.html, two text filed are named as txtFname and txtLname. In JSP, If any parameter is empty display "Welcome" Otherwise display full name

(6 marks)

```
<%  
    String fn=request.getParameter("txtFname "); 01 marks  
    String ln=request.getParameter("txtLname "); 01marks  
    if (fn.isEmpty() || ln.isEmpty())  
    {  
        out.print("Welcome"); 02 marks  
    }  
    else  
    {  
        String FullName= fn + " " + ln; 02 marks  
        out.print(FullName);  
    }  
%>
```

- IV. Write output of following JSP code. (06 marks)

```
<body>  
  
    <% out.println("SLIATE"); %>  
    <br>  
  
    <%= "HNDIT"%>  
    <br>  
    <%-- HNDIT --%>  
    <br>  
  
    <% String name = null;
```

```

        if (name == null)
        { %>
        <h3>Please supply a name</h3>
        <% }
        else
        { %>
        <h3>Hello <%= name %></h3>
        <% } %>
    </body>

```

SLIATE  
HNDIT

### Please supply a name

02 mark for each output x 3 =06 marks

Q6

- I. Explain the term **XML passer** (4 marks )

*To read and analyse the content of an XML document , you need an XML parser. A **parser** is a program that reads a document , checks whether it is syntactically correct, and takes some actions as it processes the document.*

- II. State two ways that you can define DTDs (4 marks )

*Internal DTD  
External DTD*

- III. Create a XML file for following scenario.

Booklist has details of book. Book has a **topic** as an attribute. Book has title, author and price. Author has first-name and last-name. A book may has many authors. Create a XML file to keep following data set. (06 marks)

| Book             | Title             | Author     |           | Author     |           | Price |
|------------------|-------------------|------------|-----------|------------|-----------|-------|
|                  |                   | First-Name | Last-Name | First-Name | Last-Name |       |
| topic="software" | Rapid Development | Steve      | McConnell | Bryan      | Syverson  | 48.99 |
| topic="UML"      | UML Distilled     | Martin     | Fowler    |            |           | 34.99 |

<booklist> ----- 01 mark  
 <book topic="software" > ----- 01 mark  
 <title>Rapid Development</title> ----- 0.5 mark  
 <author>  
 <first-name>Steve</first-name> } ----- 01 mark  
 <last-name>McConnell</last-name>  
 </author>  
 <author> } ----- 01 mark  
 <first-name>Bryan</first-name>  
 <last-name>Syverson</last-name>  
 </author>  
 <price>48.99</price> ----- 0.5 mark  
 </book>  
 <book topic="UML">  
 <title>UML Distilled</title>  
 <author>  
 <first-name>Martin</first-name> } ----- 01 mark  
 <last-name>Fowler</last-name>  
 </author>  
 <price>34.99</price>  
 </book>  
 </booklist>

IV. Create a DTD file for above scenario. Title, first-name, last-name and price consider as PCDATA (06 marks)

<?xml version="1.0" encoding="iso-8859-1"?>

<!ELEMENT booklist (book+)> ..... 01 mark  
 <!ELEMENT book (title, author+, price)> ..... 01 mark  
 <!--ATTLIST book topic CDATA #IMPLIED--> ..... 01 mark  
 <!ELEMENT title (#PCDATA)> ..... 0.5 mark  
 <!ELEMENT author (first-name, last-name)> ..... 01 mark  
 <!ELEMENT first-name (#PCDATA)> ..... 0.5 mark  
 <!ELEMENT last-name (#PCDATA)> ..... 0.5 mark  
 <!ELEMENT price (#PCDATA)> ..... 0.5 mark