BSc (Hons) Web Technologies

Cohorts: BWT/09/FT & BWT/08/PT

Examinations for 2010 – 2011 / Semester 2

MODULE: Service Oriented Architecture Essentials

MODULE CODE: WAT 2108

Duration: 2 Hours and 30 Minutes

Instructions to Candidates:

1. Answer **all** questions.
2. Questions may be answered in any order but your answers must show the question number clearly.
3. Always start a new question on a fresh page.
4. All questions carry equal marks.
5. Total marks 100

This question paper contains 4 questions and 5 pages.

QUESTION 1: (25 MARKS)

a) Briefly describe the role of each of following four main abstractions that form part of an SOA:

    i.   Application Front-end

    ii.   Service

    iii. Service Repository

    iv. Service Bus

(8 marks)

b) A service is a software component of distinctive functional meaning that typically encapsulates a high-level business concept, and is usually made up of three parts. Describe the **three** sub-components that make up a service.

(9 marks)

c) List and describe each of the two particular methods for binding to a service.

(8 marks)

QUESTION 2: (25 MARKS)

Intermediary services can be classified as stateless services that bridge technical inconsistencies or design gaps in an architecture. They act as both clients and servers in a Service Oriented Architecture, and cut through technology gateways, adapters, façades and functionality-adding services.

a) Describe the following components with respect to intermediary services:

    i.   Technology gateways,

    ii.   Adapters,

    iii. Façade,

    iv. Functionality-adding services.

(16 marks)

b) Briefly describe the other three categories of services, apart from intermediary services, in an SOA?

(6 marks)

c) Considering all the four different types of services in an SOA, which one is considered the most complex type? Justify your answer.

(3 marks)

QUESTION 3: (25 MARKS)

a) The service-oriented architecture (SOA) provides the theoretical model for all Web Services.

   i.   What are Web Services?

(3 marks)

   ii.   Describe the three entities and three operations that represent the Web Services model defined by SOA. (Support your answer with a diagram).

(7 marks)

b) Describe the role of the following three core Web Service standards:
   i.   SOAP
   ii.   WSDL
   iii. UDDI

(15 marks)

QUESTION 4: (25 MARKS)

Imagine that you are implementing a web client application in **C#** using Microsoft Visual Studio to consume a Web Service named '*MauritianRupeeConvertor*'. This service has one operation, named '*getExchangeRate*', which returns the exchange rate of the Mauritian Rupee against another foreign currency.

a) Use extracts from the WSDL file provided below to define the signature of the method '*getExchangeRate*'.

(6 marks)

```
<s:element name="getExchangeRate">

<wsdl:types>

<s:element name="getExchangeRate">
  <s:complexType>
    <s:sequence>
      <s:element minOccurs="0" maxOccurs="1" name="to" type="s:string" />
    </s:sequence>
  </s:complexType>
</s:element>

<s:element name="getExchangeRateResponse">
  <s:complexType>
    <s:sequence>
      <s:element minOccurs="1" maxOccurs="1" name="getExchangeRateResult" type="s:double" />
    </s:sequence>
  </s:complexType>
</s:element>

</wsdl:types>
```

b) What is a proxy class and why is it required when consuming a Web Service?

(4 marks)

c) Complete the following C# code below for the calculate button click event on the web client you have designed to consume the operation '*getExchangeRate*'. The button click will return the exchange rate of the Mauritian Rupee against the currency specified in the textbox '*text_currency'*, and will return its value to the variable '**rate**' which will have to be displayed in another textbox, named '*text_exRate'*. The variable '**service**' of type '**CurrencyConvRef**' is the reference to the '*MauritianRupeeConvertor*' service.

```csharp
protected void calculateRate_Click(object sender, EventArgs e)
    {
        String foreignCurrency = text_currency.Text;
        double rate = 0;
        CurrecyConvRef.Service service;

        …


    }
```

(12 marks)

d) Another company, who works only with Java programming language, wants to implement the same service in JSP. Do think that it is possible to do so without changing the implementation for the service? Justify your answer.

(3 marks)

END OF QUESTION PAPER