MSc. Software Engineering

Cohort: MSE/11A/PT

Examinations for 2011 / Semester 1

MODULE: Service Oriented Architecture

MODULE CODE: WAT 5101

Duration: 2 Hours

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 4 pages.

QUESTION 1: (25 MARKS)

a) Define the term ‘software architecture’?

(3 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) How is a service repository linked to services?

(5 marks)

d) Describe the process of binding services at development time.

(8 marks)

QUESTION 2: (25 MARKS)

a) Loose Coupling is one characteristic of SOA. In practice, this is achieved with the help of WSDL (Web Services Description Language). Explain how.

(6 marks)

b) Differentiate between the abstract and concrete description of a WSDL document.

(4 marks)

c) Describe the three main building blocks of a SOAP message.

(9 marks)

d) What do you understand by the term: ‘SOAP HTTP binding’?

(3 marks)

e) What is the role of a SOAP engine, such as the Axis Apache SOAP engine?

(3 marks)

QUESTION 3: (25 MARKS)

We identified three expansion stages that signify the different levels of maturity of an SOA in the enterprise: the fundamental SOA, the networked SOA and the process-enabled SOA.

a) Imagine an airline web site that utilises four services - Flight Service, Customer Service, Booking Service, Payment Service - that encapsulates the major business entities and their behaviours that are relevant to the business processes that are exposed to their customers.

   Using the layering approach to SOA and with the help of a diagram describe how the above could be arranged in order to meet the requirements of the fundamental SOA. Clearly state any assumptions you made.

   (10 marks)

b) The third expansion stage is the fully leveraged SOA and is termed as the process-enabled SOA, which deals with process-centric services. What are possible reasons for introducing a process-centric service?

   (5 marks)

c) Imagine now having a new process “Booking process” which encapsulates the business process “Booking”. Without using facades or any other type of intermediary layer, provide an enhanced diagram of your booking process in **part a** above. Clearly state any assumptions you made.

   (10 marks)

QUESTION 4: (25 MARKS)

a) What is the difference between a software bus and a service bus?

(4 marks)

b) Explain why the distinction between a software bus and service bus is important in the context of SOA?

(3 marks)

c) Existing service bus products available on the market are categorised as either communication frameworks or execution containers or both. All the questions below (i – v) deal with different concepts under Communication Frameworks only.

i. Completely describe the roles of the stub and dispatcher components.

(6 marks)

ii. What is code generation?

(3 marks)

iii. Differentiate between the top-down and bottom-up approaches for code generation.

(4 marks)

iv. Which code generation approaches in part iii, is preferred in SOA? Explain why.

(4 marks)

v. Give an example of a type of product that falls under the communication framework category.

(1 marks)

******END OF QUESTION PAPER******