Semester 1 Examinations, 2019/2020

Exam Code	3BCT1, 1EM
Exam	3rd University Examination in Computer Science
Module Code	CT5106
Module	Software Engineering II
Paper No.	1
External Examiner **Internal Examiners**	Dr. Jacob Howe Prof. Michael Madden Dr. Owen Molloy *
Instructions	You **must answer Question 1** (60 marks) and **any other 2** questions (30 marks each). *(Marks will be adjusted to total 100%.)*
Duration	2hrs
No. of Answer Books	1
Discipline	Computer Science
Requirements	None
No. of Pages	4

1. [60 marks] (you must answer this question) Answers should be concise. Answer all parts. Each part is worth [5] marks.

a. If you were asked to manage a project to develop a new website for a hotel, including an online booking system, list 3 different stakeholders which you might identify, their source of power relative to the project, and how they might be positively or negatively affected by the project.

b. Explain the purpose of the urlPatterns annotation as found in servlets, and how they can be used in servlets to turn them into routers for HTTP requests.

c. Explain the difference in scope between the request, session and application in JSP / Servlet applications.

d. Add JPA annotations to the following Java bean class in order to store product instances in a specific table ("STUDENTS"), and where the id is to be auto-generated by the database.

```
public class Student implements Serializable
{
private int id;
private String firstname;
private String surname;
… // getters and setters can be ignored for this question
}
```

e. What is the purpose of a Daily Scrum meeting in Agile, and what questions should scrum team members answer?

f. What information should a Sprint Backlog contain?

g. If you are using Planning Poker for estimation in an Agile project, what are the steps that the team follow in playing?

h. Explain, using a simple diagram, how the Model View Controller architecture can be implemented in a Java Enterprise application.

i. Assuming the following lines of code are executed in a servlet, and that the request is then dispatched to a JSP page, write the JSP code necessary to print out the user's username and email address:

```
u1 = new User();
u1.username = "JohnS";
u1.email = "john.s@bigmail.com";
request.setAttribute ("user", u1);
```

j. Explain the difference between the following 2 lines of JSP code, and what will happen when they are executed:

```
<%! int numVisits1 = 0; %>

<% int numVisits2 = 0; %>
```

k. Explain the following Project Management terms (as used in Gantt charts):

a) Critical Path
b) Lead Time
c) Task Dependencies

l. Explain briefly how factors such as non-functional requirements, and environmental factors, are taken into account when using estimation techniques such as Function Point Analysis and Use Case Point Analysis.

2. A Java Enterprise application must implement a simple registration function using Servlets and JSP. You must also use a Java Bean data class for the User, and a DAO (Data Access Object using embedded SQL) class to handle persistence of the User class. The User class simply contains the *username* and *password* of the new user.

a) Describe, using a simple diagram, how the Model View Controller architecture is implemented in this application.

[10 marks]

b) Write the HTML code for the Registration.html page. This page would simply contain a form which calls the Registration Servlet. The form is used to input the username and password used to register.

[10 marks]

c) Write the Java code for the servlet. You do not have to write the code for the DAO class – just assume that it is already written, and use appropriate methods which you would expect it to have.

[10 marks]

3. A servlet creates a List of Product objects, where each Product object has the properties *productName*, *description* and *price*. The servlet adds this List to the session object and forwards to a JSP page where the list of products is displayed as a table, using JSTL to handle the retrieval of the list of products from the session, and the iteration over the list of products.

(a) Write the JSP code to display the table of products.

[20 marks]

(b) Explain, using sample code, your ideas on how you might implement a simple filtering system in the JSP page to display only products between a certain price range.

[10 marks]

4. You have been asked to manage a project which involves the design, implementation, test and rollout of a new till system for a large supermarket chain. Answer the following questions in relation to this project.

a) Explain how you would go about performing the Stakeholder Analysis and outline the kinds of information which you would need to capture.

[10 marks]

b) Describe the most important stakeholders in the project, and what specific issues might arise or need to be handled with respect to them.

[10 marks]

c) What would you expect to be contained in the Communications Management Plan for the project?

[10 marks]

5. As part of a new project to develop a new web app for an online betting shop, you are asked to set up the Agile planning process. So far, you have received the Product Backlog from the customer

a) Explain how you would do an initial estimate, of the story points needed for each item in the Product Backlog, using Planning Poker with your Agile team.

[10 marks]

b) Describe how you would create a Release Plan for the project sprints, based on initial velocity estimates, and how you would adjust your estimates and sprint planning as the project progresses.

[10 marks]

c) Sketch and explain examples of the two main types of burndown charts which you would use to track progress in the project and its sprints. Explain how they can be used to highlight problems with both under-estimation and over-estimation.

[10 marks]

6. As part of a new project to develop a JEE online shop application, you are asked to manage the estimation of the development cost. So far, the requirements have been described using detailed Use Case diagrams and descriptions.

a) Explain the steps involved if you were to perform an estimation of the project duration (development hours) using the Use Case points methodology

[21 marks]

b) Provide 2 examples of each of the following as used in estimation by Use Case Points:

- Actor Weight **[3 marks]**
- Technical Complexity Factor **[3 marks]**
- Environmental Complexity Factor **[3 marks]**