Autumn Examinations 2021-2022

Course Instance Code	3BCT1; 1EM1
Exam	3rd University Examination in Computer Science and Information Technology
Module Code	CT5106
Module	Software Engineering II
Paper No.	1
External Examiner	Dr Ramona Trestian
Internal Examiners	Dr. Michael Madden *Dr. Stephen Bradshaw Dr. Karl Mason
Instructions	Each question has a total of 25 marks. Answer any four of five.
Duration	2hrs
Discipline	Computer Science
Course Co-ordinator(s)	Colm O'Riordan
No. of Answer Books	1
Requirements	None
No. of Pages	6

1. Answer all parts below.

a) Define Software Engineering.

[3 marks]

b) Discuss the standard Maven directory set-up. What advantages are there for structuring the directory as they do?

[3 marks]

c) Name two items one would expect to find in the POM file.

[2 marks]

d) Name any two phases in the Maven Life Cycle.

[2 marks]

e) What is the purpose of doPost() and doGet()? Include in your answer some differences between the two methods.

[3 marks]

f) Why should a JSP page not contain any business logic?

[2 marks]

g) What is the purpose of a *Gantt Chart*?

[2 marks]

h) Why is it bad practice to set a variable using JSP Expression Language (el)?

[2 marks]

i) Distinguish between the project management styles *Prince* and *Agile*.

[3 marks]

j) What type of file format is the *POM* ?

[2 marks]

k) What is a *POJO* ?

[1 mark]

Total: 25 Marks.

2) Answer all parts below.

(a) What does the next() command return from the ResultSet returned from Hibernate?

[2 marks]

(b) What quality characteristics that are relevant to software architecture design should be considered when engaging with designing a system?

[3 marks]

(c) In relation to software architecture design, what are non functional requirements? Include two examples in your answer.

[3 marks]

(d) Briefly explain how Test Driven Development is done.

[3 marks]

(e) In relation to architectural design, what are some system trade-offs that one might make?

[6 marks]

(f) Outline some coding principles used in good architecture design.

[4 marks]

(g) What is a design constraint and why would one be imposed during the development process of an application?

[2 marks]

(h) What is meant by the *Separation of Concerns* in relation to system design?

[2 marks]

Total: 25 marks

3) Answer all of the following parts.

(a) Explain what Conway's Law is, and how it may have a bearing on a system during development.

[2 marks]

(b) In Software Design what are the pros and cons of utilising *shared resources* when designing a system?

[4 marks]

(c) In Layered Architecture explain the difference between open and closed layers. What are the factors that influence the decision of using one over the other ?

[3 marks]

(d) What is meant by *the inverted pyramid of use* ?

[2 marks]

(e) Outline 3 changes that came when Java 8 was introduced.

[3 marks]

(f) Using a real life example discussed in class, outline the experiences of a company implementing or changing a given architecture. What were the challenges/results from using said architecture? *Information looked for might include reference to identification of the issues with the old architecture, the proposed benefits of the new structure. Additionally you might make reference to some of the technologies used.*

[11 marks]

Total: 25 Marks

4) Answer all of the following parts.

a) Describe and contrast two Software Architectural Patterns that we have engaged with in class. Include in your answer the strengths and weaknesses of each, and why one would consider using one over the other in a given situation.

[12 marks]

b) What is meant by *crosscutting concerns* in relation to system design?

[3 marks]

c) Why would the application type have a bearing on which architecture is selected for a project?

[4 marks]

d) What is the difference between Synchronous and Asynchronous Interactions ?

[3 marks]

e) Why would one consider using the *Façade Pattern* when designing a system?

[3 marks]

Total: 25 Marks

5) Answer all of the following parts.

a) Typically what coding paradigm is used when Hibernate is used to persist your data ? Why is this the case ?

[3 marks]

b) Over-engineering a system can lead to the creation of anti-patterns. Name any two anti-patterns that are associated with Service Orientated Architecture (SOA). Include a brief description of what each is.

[3 marks]

c) Name a type of queue that one would find in event-based systems. Include in your answer a brief description of what it is used for.

[4 marks]

Task	Description	Duration (days)	Predecessors
A	**Requirements Analysis**	**5**	
B	**System Design**	**15**	**A**
C	**Programming**	**25**	**B**
D	**Telecoms**	**15**	**B**
E	**Hardware installation**	**30**	**B**
F	**Integration**	**10**	**C,D**
G	**System Testing**	**5**	**E,F**
H	**Training/Support**	**5**	**G**
I	**Handover and Deployment**	**5**	**H**

d) Taking the critical path as reference, how many days will this project take to complete ?

[3 marks]

e) What role do *channels* play in SOA? Include in your answer a reference to how they relate to messages.

[4 marks]

f) In SOA what is your understanding of a component?

[2 marks]

g) What do we mean when we say a service is language agnostic ?

[2 mark]

h) In relation to Service interaction (as found in microservices) distinguish between the issue of being *unavailable* as opposed to *unresponsive*.

[4 marks]

Total: 25 Marks

[END]