The University of Nottingham, UK
&
The University of Nottingham, Ningbo China

SCHOOL OF COMPUTER SCIENCE

A LEVEL 1 MODULE, SPRING SEMSTER 2016-2017

FOUNDATIONS OF SOFTWARE ENGINEERING

Time allowed: SIXTY (60) MINUTES (1 HOUR) + FIFTEEN (15) MINUTES READING TIME

Candidates may complete the front cover of their answer book and sign their desk card but must NOT write anything else until the start of the examination period is announced

Answer ALL questions

No calculators are permitted in this examination.

Dictionaries are not allowed with one exception. Those whose first language is not English may use a standard translation dictionary to translate between that language and English provided that neither language is the subject of this examination. Subject specific translation dictionaries are not permitted.

No electronic devices capable of storing and retrieving text, including electronic dictionaries, may be used.

DO NOT turn examination paper over until instructed to do so

ADDITIONAL MATERIAL: None.

INFORMATION FOR INVIGILATORS: Collect examination question papers at the end of the examination.

SECTION A: Software Quality

[Section A carries a total of 20 marks]

Question 1: Name and briefly describe the four fundamental activities common to all Software Engineering Processes.

[4 marks]

Question 2: The Requirements Engineering phase is considered extremely important for properly planning the project and the product. Identify 3 different techniques for Validating Requirements.

[3 marks]

Question 3: Prototypes are typically designed to fulfil one of three roles. Identify these three possible roles. For each role, give an example of how it would be used in the software engineering process.

[6 marks]

Question 4: Paired programming is an implementation approach designed to increase quality of software. Briefly describe three ways that paired programming can increase software quality.

[3 marks]

Question 5: Continuous Integration and Automated Testing can be used to prepare software for release. Describe Continuous Integration and describe how it can be used with automated testing to prepare a product for release.

[4 marks]

SECTION B: Project & Risk Management

[Section B carries a total of 15 marks]

You are a project manager in a medium-sized software company. Your team, with 6 developers, has recently been assigned a project, and the company's senior management have asked you to coordinate it. After examining the details carefully, you have identified thirteen (13) major tasks that will need to be completed. You have determined the relationship among these tasks, in terms of which ones need to be completed before other tasks can begin. You have also estimated the amount of time (in days for a pair of developers working together) that each task should require to complete. Your estimates are as follows:

Task	**Duration (days)**	**Dependencies**	**Milestone**
A	5 days		
B	6 days	A	M1
C	3 days	B	
D	10 days	B	
E	7 days	D	
F	2 days	D	
G	4 days	C	M2
H	2 days	C	
I	6 days	G; H	M3
J	2 days	F	
K	7 days	F	
L	5 days	F; J	
M	3 days	L	M4

Question 6:

(i) Draw a Gantt chart for these tasks, showing the task dependencies and durations, from the start to the end of the project.

[3 marks]

(ii) How long is the critical path of the project?

[1 mark]

(iii) On which day of the project will you have a staffing problem?

[1 mark]

(iv) Which task should you delay to remove this staffing problem, without extending the critical path? Explain why

[2 mark]

Question 7: There are two types of risks: risks for the software and risks for the project

(i) Explain the difference between risks for software and risks for the project

[2 marks]

(ii) Describe how identified software risks affect Requirements Engineering

[2 marks]

Question 8: There are different types of strategies to handle project risks: avoidance, minimization, and contingency. Your company is very small and an expert in testing in your team has been diagnosed with a long-term illness that may sometimes affect their ability to work in the future.

Describe two strategies for handling this risk, and identify which type of strategy they are.

[4 marks]

SECTION C: Agile Methodologies

[Section C carries a total of 15 marks]

Question 9: Explain why, in the 90s, Formal Software Engineering approaches were losing favour.

[3 marks]

Question 10: Identify and briefly describe the four original values of the Agile Manifesto.

[4 marks]

Question 11: Describe, with a diagram, how the Scrum technique works.

[4 marks]

Question 12: Describe how the four original values of the Agile Manifesto are represented in the Scrum technique.

[4 marks]