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

SCHOOL OF COMPUTER SCIENCE

A LEVEL 1 MODULE, SPRING SEMESTER 2017-2018

FOUNDATIONS OF SOFTWARE ENGINEERING

Time allowed: **ONE HOUR AND THIRTY MINUTES**

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 Engineering Activities

[Section A carries a total of 20 marks]

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

Question 2: Requirements and Specifications are often confused. Define both of them separately, and give an example of how one type of UML diagram can be used differently for each.

[4 marks]

Question 3: Prototyping is a popular way of exploring the design of a new system. Describe 3 common risks associated with prototyping.

[3 marks]

Question 4: Identify the type of testing that relates most to Requirements, and another type of testing that relates to High-Level Specifications. Describe two ways in which these testing phases are different.

[4 marks]

Question 5: Describe how continuous integration can be used to make sure software is ready for deployment on different platforms.

[5 marks]

SECTION B: Project Management & Risks

[Section B carries a total of 15 marks]

Question 6: Project Risks and Software Risks are two types of Software Engineering Risks that project managers are concerned with. Define **Software Risks**, and describe how considering them should affect two key stages of the Software Engineering Process.

Question 7: The husband of your most experienced senior developer has been diagnosed with a long-term illness, and they may need to take leave several times during the project. Everyone else on the team are relatively junior developers. This is a **Project Risk** that can be mitigated with team organisation strategies.

(i) Describe two ways that Paired Programming can help the team mitigate this risk.
[2 marks]

(ii) Decide whether this senior develop should be assigned to Critical Path tasks or not. Give two reasons for your decision, and one counter argument.

[4 marks]

Question 8: Experienced companies often employ a Software Quality Assurance Team to monitor Software Quality across all projects.

(i) Explain why depending on the testing team to manage Software Quality could create a Project Risk.

[2 marks]

(ii) Identify four other Software Quality Assurance activities that can be used at other stages of the Software Engineering Process to improve the Software Quality.
[4 marks]

SECTION C: Agile Methodologies

[Section C carries a total of 15 marks]

Read the following scenario and answer the questions below.

You work as a developer in a large software company called InTheBank Apps, in the open-plan office, as part of a development team. Your company also has a strong requirements engineering team, and a testing and quality assurance team. The company has already gained a reputation for building high quality financial software for banks, conforming to the various legal and financial standards. You recently used traditional Software Engineering methods to rebuild the core financial software for The Major Bank of Bankland.

The Major Bank of Bankland has approached your company again, but to do something a little different this time: create an app for customers to track their financial spending for different types of things, like Bills, Shopping, Socialising, etc. It's a very vague idea so far. The app, however, is an extension of the previous software and so the project will still handle important financial data, but the users are clients of the bank, not staff at the bank. Because it's a new idea, the bank wants to explore lots of different options, but has identified a working group of potential users willing to come to a monthly discussion evening.

Question 9: Identify and briefly describe the four original values of the Agile Manifesto.

[4 marks]

Question 10: Explain how User Stories, as an agile form of requirements documentation, can be used to represent different stages of the Software Engineering process.

[4 marks]

Question 11: You and the rest of the project team at InTheBank Apps are considering whether, for this project, to use a traditional plan-based Software Engineering process or a more Agile Software Engineering process to develop the idea.

(i) Describe two reasons, from the scenario, for adopting each approach.

[4 marks]

(ii) Based upon these reasons, choose the approach you believe is most appropriate for the primary approach for this project. Complement this decision with two ways in which you will integrate the alternative approach.

[3 marks]