北京郵電大學

Queen Mary University of London

EBU5304 A

Complete the information below about yourself very carefully.

QM student number										
BUPT student number										
Class number										

Joint Programme Examinations 2015/16

EBU5304 Software Engineering

Paper A

Time allowed 2 hours

Answer ALL questions

NOT allowed: electronic calculators and electronic dictionaries.

For examiners' use only

1	
2	
3	
Total	

INSTRUCTIONS

1. **You must not take answer books, used or unused, from the examination room.**
2. Write only in black or blue pen **and in English**.
3. Do all rough work in the answer book – **do not tear out any pages**.
4. If you use Supplementary Answer Books, tie them to the end of this book.
5. Write clearly and legibly.
6. **Read the instructions on the inside cover.**

Examiners

Dr Ling Ma, Dr Gokop Goteng, Dr Matthew Huntbach

Filename: 1516_EBU5304_A No answerbook required

Instructions

Before the start of the examination

1) Place your BUPT and QM student cards on the corner of your desk so that your picture is visible.

2) Put all bags, coats and other belongings at the back/front of the room. All small items in your pockets, including wallets, mobile phones and other electronic devices must be **placed in your bag in advance**. **Possession of mobile phones, electronic devices and unauthorised materials is an offence.**

3) Please ensure your mobile phone is switched off and that no alarm will sound during the exam. **A mobile phone causing a disruption is also an assessment offence.**

4) Do not turn over your question paper or begin writing until told to do.

During the examination

1) You must not communicate with or copy from another student.

2) If you require any assistance or wish to leave the examination room for any reason, please raise your hand to attract the attention of the invigilator.

3) If you finish the examination early you may leave, but not in the first 30 minutes or the last 10 minutes.

4) For 2 hour examinations you may **not** leave temporarily.

5) For examinations longer than 2 hours you **may** leave temporarily but not in the first 2 hours or the last 30 minutes.

At the end of the examination

1) You must stop writing immediately – **if you continue writing after being told to stop, that is an assessment offence.**

2) Remain in your seat until you are told you may leave.

Question 1

a) Answer the following questions about *Software Engineering* and *Software Processes*:

[7 marks]

i) Software engineering is not recognised as a sane engineering discipline – no standardised certificates required to become a software engineer. Discuss the advantages and disadvantages of certification, and whether software engineers should be certified in the same way as doctors or lawyers.

(4 marks)

ii) Suggest the most appropriate software process that might be used as a basis for developing a system to control anti-lock braking in a car. Give your reasons.

(3 marks)

	Do not write in this column
	7 marks

b) Answer the questions below about *Agile Methods*:

[10 marks]

i) One of the Agile principles is "*Individual and interactions over processes and tools*." Explain the meaning of this principle and how this principle can lead to the accelerated development and deployment of software.

(4 marks)

ii) What are the main differences between the Scrum approach and the conventional plan-based approaches in managing team meetings?

(4 marks)

iii) *Consistency* is one of the people management factors. Explain the meaning of *Consistency*.

(2 marks)

	Do not write in this column

		10 marks

c) Answer the questions below about *Requirements*:

[10 marks]

i) What is the meaning of *story points*? Fibonacci Sequence: 1,2,3,5,8,13,21…is commonly used in estimating story points. Why?

(3 marks)

ii) You have developed a simple banking system during the lab sessions. Based on that simple banking system, you are required to develop an ATM (cash machine) system. Write a user story of "Withdraw Cash" on an ATM.

(3 marks)

iii) "*The ATM should respond fast.*" Re-write this non-functional requirement to make it verifiable.

(2 marks)

iv) _____ and _____ together determine the next release content of user stories. Fill in the blanks.

(2 marks)

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		10 marks

d) Answer the questions below about *Analysis and Design*:

[6 marks]

i) What is *Refactoring*?

(2 marks)

ii) What are the fundamental characteristics of a *repository architecture*? What are the advantages and disadvantages of a *repository architecture*?

(4 marks)

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		6 marks

Question marking: $\frac{}{7} + \frac{}{10} + \frac{}{10} + \frac{}{6} = \frac{}{33}$

Question 2

a) A team from the software development department of Alibaba embarked on developing a new functionality that will see their e-commerce platform attracting additional customers other than their traditional Chinese customers. This project may cause some disruption, so they started by identifying areas of possible failures and planning for alternatives in case these failures occur in practice. They identified that they may have problems with the skills of staff to undertake the project which may involve larger changes to the requirements than they originally envisaged. They also think that some third party software needed for attracting Western customers may not perform as expected.

[10 marks]

i) Describe the software engineering activity the team were trying to perform as a good practice in any software engineering project and suggest what you think they could do more.

(4 marks)

ii) Identify and classify THREE types of these software engineering management activities which they identified based on the above narrative.

(6 marks)

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		10 marks

b) A company hired some external Systems Analysts to establish processes and standards that will advise its internal software engineers to ensure they produce high quality software for the company. They want the software to meet all its intended requirements. At the end of the software development project, one user discovered some undesirable behaviours in the software and started blaming the Systems Analysts for not doing a good job. However, another user on using one of the undesirable behaviours very often, she finds out that it is actually making her work faster and easier and she decided to approach the team of software engineers not to remove that aspect of the software.

[8 marks]

i) Describe the activity being carried out in this scenario in terms of software engineering as a discipline.

(2 marks)

ii) Classify and explain each aspect of the Systems Analysts, internal software engineers and users as regards software management and quality of the software.

(6 marks)

	Do not write in this column

	8 marks

c) What do you understand by "*Free Software*?" Describe TWO reasons why some software engineers develop software and make it available to all users for free, including its source codes.

[4 marks]

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	4 marks

d) Describe what you understand by the term "*Cyclomatic Complexity*" in Basis Path Testing technique. Using *Basis Path Testing* technique, study Figure 1 below and list ALL the *independent paths* and also calculate the *Cyclomatic Complexity*.

[7 marks]

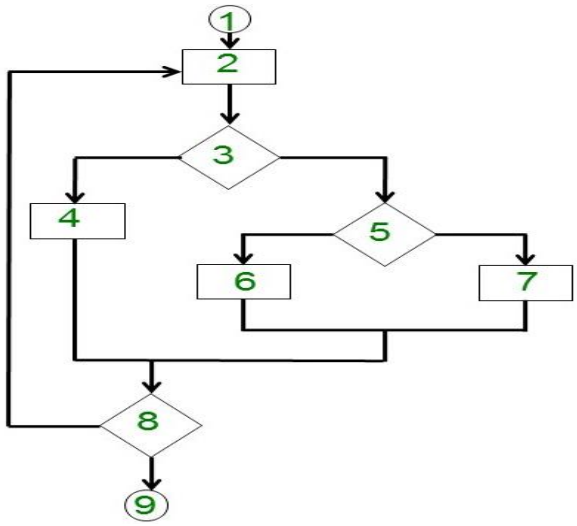

Figure 1: Basis Path of a given Software Program

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	7 marks

e) Briefly describe *Object-Oriented Testing (OOT)* and *Test-Driven Development (TDD)* .

[4 marks]

	Do not write in this column

		4 marks

Question marking: $\frac{}{10} + \frac{}{8} + \frac{}{4} + \frac{}{7} + \frac{}{4} = \frac{}{33}$

Question 3

a) Explain what is meant by *aliasing* in Java programming, and why care needs to be taken over the possibility of aliasing occurring. Explain how aliasing can lead to the problem of "*exposing the representation*" and why exposing the representation could have serious consequences.

[12 marks]

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	12 marks

b) What is the general idea of a *design pattern* in software development?

[4 marks]

	Do not write in this column
	4 marks

c) Suppose you want to generalise code in the following way: you have a method that involves creating and using objects of a particular type, but you want the details of the objects created to be determined elsewhere. You want a single parameter to your method that is used to link to whatever code is used to provide these details. Name the design pattern that can be used to do this, and explain how it works. State what other useful properties of this design pattern are.

[8 marks]

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	8 marks

d) Explain the general idea of the *Strategy Design Pattern*, and how one example of that general idea is the `sort` method provided in Java's API which enables you to generalise sorting through the use of a `Comparator` object.

[10 marks]

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		10 marks

Question marking: $\frac{}{12} + \frac{}{4} + \frac{}{8} + \frac{}{10} = \frac{}{34}$

Use this section for rough work

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