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 2014/15

EBU5304 Software Engineering

Paper A

Answer ALL THREE 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 Matthew Huntbach, Dr Gokop Goteng

Filename: 1415_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* and *Software Engineering*:

[5 marks]

i) *Heterogeneity* is one of the key challenges in software engineering. Explain the meaning of *Heterogeneity*.

(1 mark)

ii) *Generic Software* and *Custom Software* are the basic two types of software products. However, the distinction between the two types of software products is becoming increasingly blurred. Explain this statement with an example.

(2 marks)

iii) Is *Software engineering* the same as *Programming*? Explain.

(2 marks)

	Do not write in this column
	5 marks

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

[10 marks]

i) For what types of system are Agile approaches particularly likely to be successful?

(3 marks)

ii) What is *pair programming*? Briefly describe the advantages of *pair programming*.

(4 marks)

iii) What is a *Scrum sprint*? What is the role of the *Scrum master*?

(3 marks)

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	10 marks

c) Answer the questions below about *Requirements*:

[10 marks]

i) "*The software should be portable*." Is it a functional requirement or a non-functional requirement? What is the problem with this requirement statement? Re-write the statement to correct the problem.

(3 marks)

ii) What is *Product Backlog*?

(2 marks)

iii) Fill in the blanks in the statement. "The _____ chooses the stories for inclusion in the next release based on their priorities and the schedule estimates. The _____ break them down into implementation tasks."

(1 mark)

iv) Explain the MoSCoW method of story prioritisation.

(4 marks)

	Do not write in this column

		10 marks

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

[8 marks]

i) What are *Boundary* classes? Give examples.

(2 marks)

ii) What is the fundamental characteristic of a *repository architecture*? What are the advantages of the *repository architecture*?

(4 marks)

iii) Describe the relationship between the Bank Account, Current Account, Junior Account and Saving Account.

(2 marks)

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	8 marks

Question marking: $\frac{-}{5} + \frac{\text{—}}{10} + \frac{\text{—}}{10} + \frac{-}{8} = \frac{\text{—}}{33}$

Question 2

a) In software development project, a *risk* is the probability of something undesirable happening during the development process. Answer the following questions using the above definition of *risk*.

[8 marks]

i) Describe THREE examples of software project risks.

(3 marks)

ii) Give ONE example of a product risk.

(1 marks)

iii) What are *Contingencies*? Describe TWO *Avoidance Strategies*.

(4 marks)

	Do not write in this column
	8 marks

b) Using your knowledge of software *quality management*, answer the following questions:

[6 marks]

i) Briefly describe what you understand by *Quality Management* in software engineering.

(2 marks)

ii) Differentiate between a *Bug* and a *Feature*.

(2 marks)

iii) Give ONE attribute of quality in a software and describe one trade off of attributes in software.

(2 marks)

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	6 marks

c) Open Source Software (OSS) is software which is free of charge and free of legal restrictions on how it can be used. Using this knowledge, answer the following questions:

[3 marks]

i) Describe TWO reasons why some software engineers choose to work for free.

(2 marks)

ii) Describe ONE freedom in relation to OSS.

(1 mark)

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	3 marks

d) One of the most time consuming stages of software development process is testing. Use your knowledge of software testing to answer the following questions:

[8 marks]

i) Describe TWO goals of testing a software.

(4 marks)

ii) Describe what you understand by a *Good Test*.

(2 marks)

iii) Describe what you understand by *Black Box* testing technique.

(2 marks)

	Do not write in this column
	8 marks

e) Answer the following questions about *Testing*:

[8 marks]

i) Describe how you will perform loop testing for *Concatenated* and *Unstructured* loops.

(4 marks)

ii) What does *TDD* stand for in software engineering? Using your knowledge of *TDD*, describe *TDD cycle* and name one application framework used for supporting *TDD*.

(4 marks)

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	8 marks

Question marking: $\frac{-}{8} + \frac{-}{6} + \frac{-}{3} + \frac{-}{8} + \frac{-}{8} = \frac{--}{33}$

Question 3

a) In Java variables are set to refer to objects, and it is possible for two or more variables to be set to refer to the same object. Explain the problems that can occur if this possibility is not taken into consideration in software design and implementation. In particular, explain the problem of *exposing the representation*.

[12 marks]

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	12 marks

b) Another issue in Java and similar programming languages to do with variables referring to objects is that a variable has a declared type, but it can be set to refer to an object whose actual type is a subtype of that declared type. Explain the advantages which this gives, but also the problem which led to the *Liskov Substitution Principle (LSP)* being declared as an important guideline for good practice.

[12 marks]

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	12 marks

c) Suppose that a variable is set to refer to an object whose actual type is an *immutable view* of the type of the variable. Explain what is meant by *immutable view* and what effect this would have if this variable were used as an argument to a method call.

[10 marks]

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