THE HONG KONG POLYTECHNIC UNIVERSITY
HONG KONG COMMUNITY COLLEGE

Subject Title	: Software Engineering	**Subject Code**	: CCN3143
Session	: Semester Two, 2018/19	**Time**	: 09:30 – 12:30
Date	: 19 May 2019	**Time Allowed**	: 3 Hours
Subject Examiner(s)	: Dr Pin NG		

This question paper has a total of **TWELVE** pages (including this covering page).

Instructions to Candidates:

1. There are THREE sections in this paper.
   - Section A (30%) – Multiple-choice Questions. Answer ALL questions in this section on the multiple-choice answer sheet provided. Each question carries 1 mark.
   - Section B (30%) – Short Questions. Answer any FIVE out of the SIX questions in this section in the answer book provided. Each question carries 6 marks. If you answer more than five questions, only the first five attempted questions will be marked. Indicate in your answer book clearly which five questions you are attempting.
   - Section C (40%) – Long Questions. Answer any TWO out of the THREE questions in this section in the answer book provided. Each question carries 20 marks. If you answer more than two questions, only the first two attempted questions will be marked. Indicate in your answer book clearly which two questions you are attempting.
2. For Section B and Section C, begin each question on a fresh page in the answer book provided.
3. Candidates are NOT allowed to retain the multiple-choice answer sheet, the answer book and the examination question paper.
4. Show all your work clearly and neatly. Marks will be deducted for untidy work.

Authorised Materials:

	YES	NO
CALCULATOR	[ ]	[✓]
SPECIFICALLY PERMITTED ITEMS	[ ]	[✓]

DO NOT TURN OVER THE PAGE UNTIL YOU ARE TOLD TO DO SO

Section B (30%) – Short Questions

Answer any FIVE out of the SIX questions in this section in the answer book provided. Each question carries 6 marks. If you answer more than five questions, only the first five attempted questions will be marked. Indicate in your answer book clearly which five questions you are attempting.

Question B1 software process model

(a) Johnny is going to develop an innovative travel planning system with AI (artificial intelligence) technology that helps users plan their journeys. Suggest an appropriate software process model that is most suitable for this project. Explain your choice. (4 marks)

(b) In software development, productivity may not be proportional to the number of people working on a task. Do you agree? Justify with some reasons. (2 marks)

Question B2 design and implementation

The following is a description of a learning management system:

> "Moodle is a free and open-source learning management system (LMS) written in PHP and distributed under the GNU General Public License. Developed on pedagogical principles, Moodle is used for blended learning, distance education, flipped classroom and other e-learning projects in schools, universities, workplaces and other sectors." – *Wikipedia*

(a) What are the major characteristics of open source development? (2 marks)

(b) Explain the meaning of GNU General Public License. (2 marks)

(c) Many startup companies are also using an open source approach to develop software products. Briefly explain their business model. (2 marks)

Question B3 architectural design

(a) What are the **TWO** ways in which an architectural model of a system may be used? (2 marks)

(b) Client-server architecture is a commonly adopted architectural model. What is the most important advantage of a client-server architecture? Give an example for illustration. (4 marks)

Question B4

agile method

Extreme programming expresses user requirements as stories (or scenarios). Explain any **THREE** advantages and any **THREE** disadvantages of using this approach in documenting requirements. (6 marks)

Question B5

requirement engineering

(a) Briefly describe the **FOUR** principal Requirements Engineering activities. (4 marks)

(b) Explain the difference between functional and non-functional requirements. (2 marks)

Question B6

testing

(a) Software Inspection and Software Testing are complementary verification techniques. Explain the differences between these two techniques. (4 marks)

(b) Give any **TWO** reasons why software change is considered as inevitable. (2 marks)

- End of Section B -

Section C (40%) – Long Questions

Answer any TWO out of the THREE questions in this section in the answer book provided. Each question carries 20 marks. If you answer more than two questions, only the first two attempted questions will be marked. Indicate in your answer book clearly which two questions you are attempting.

Question C1 project planning

(a) Some project managers commented that: "the process of project planning is iterative and the project plan must be continually reviewed during a software development project". Do you agree? Explain why. (4 marks)

(b) Given the following information of a set of project activities

Activities	Expected duration (Weeks)	Preceding activities
A	8	-
B	5	-
C	6	-
D	6	A
E	12	B
F	10	B
G	5	F
H	10	C
I	8	D, E
J	8	G, H

(i) Sketch a Gantt Chart for the project. (10 marks)

(ii) Identify the critical activities and determine the overall project duration. (2 marks)

(iii) For **EACH** of the following situations, determine how the overall project duration would be affected:

- Activity A is delayed by 5 weeks. (2 marks)
- Activity E is delayed by 5 weeks. (2 marks)

Question C2 testing

(a) Explain the differences between *verification* and *validation* in software development. (4 marks)

(b) Given the following program specification:

```
If ( condition p or condition q )
        Then
            While condition k
                If  ( condition m )
                  Then
                      procedure f
                Endif
                procedure g
            EndWhile
        Else
            procedure h
Endif
```

(i) Construct a flow graph based on the program specification. (10 marks)

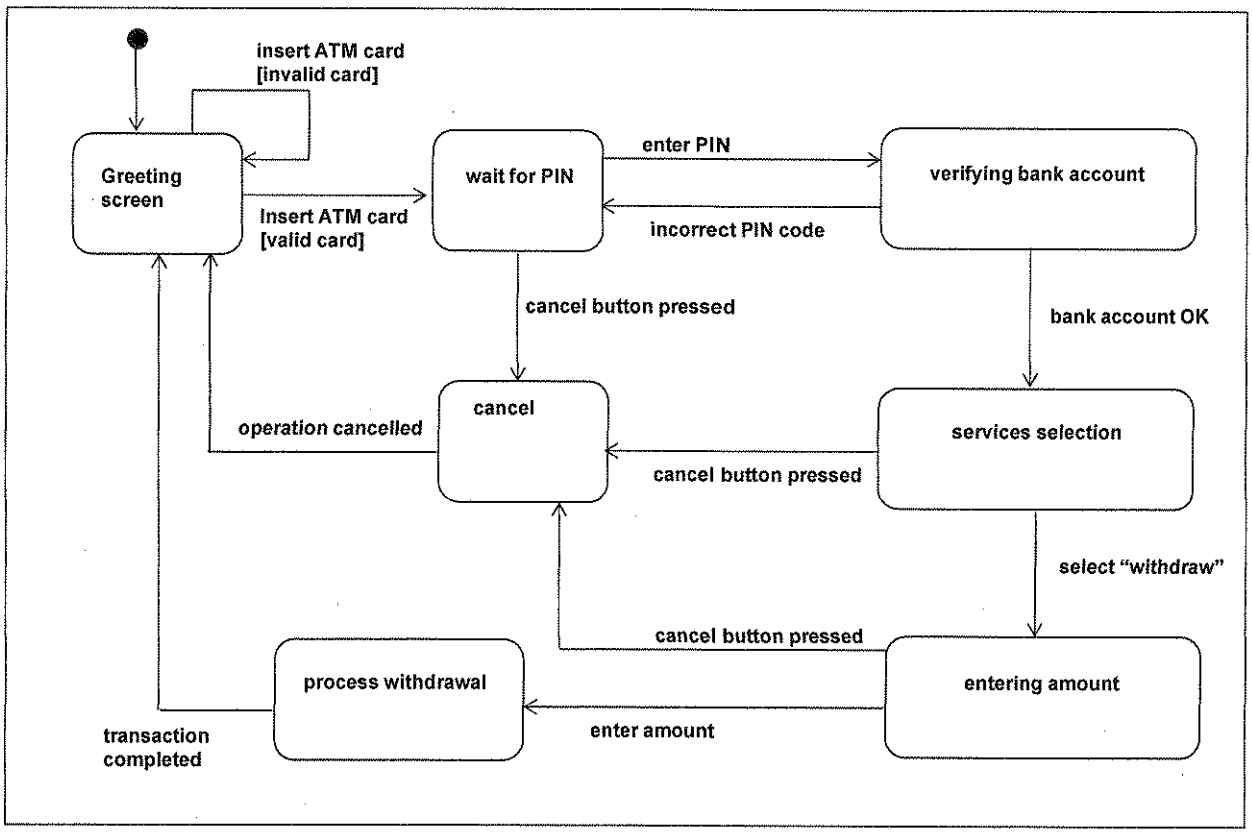
(ii) Calculate the cyclomatic complexity of the flow graph constructed in (i). Specify all the independent paths. (6 marks)

Question C3

system modeling testing

(a) What is system modelling? Explain its importance in software development project. (5 marks)

(b) The following state diagram specifies the operations of an ATM (automated teller machine). With reference to the state diagram, design **FIVE** test cases, with appropriate expected result, for testing the ATM system. (15 marks)



- End of Section C -

- END OF PAPER -