The University of Nottingham Ningbo, China

School of Computer Science

A Level 1 Module, Spring Semester 2022-2023

INTRODUCTION TO SOFTWARE ENGINEERING (AE1FSE-COMP1035)

Time Allowed: ONE HOUR

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 9 questions

Total Marks Available: 50

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 both the exam papers and the answer booklets at the end of the exam.

SECTION A

Section A carries a total of 25 marks

Question 1

Software specifications should be tied to a requirement which system specifications can be formed in different notations. Describe **FOUR** notations for writing system specification. (4)

Question 2

Draw a use case diagram for a library system based on the scenario below:

a. A librarian can input a new record, modify existing records, and remove records of books in the library.

b. A student, staff or librarian can borrow and/or return a book.

c. A student needs to pay a fine for overdue books.

d. A student can leave a review of book.

e. A student can edit his/her profile.

f. A staff can borrow a journal.

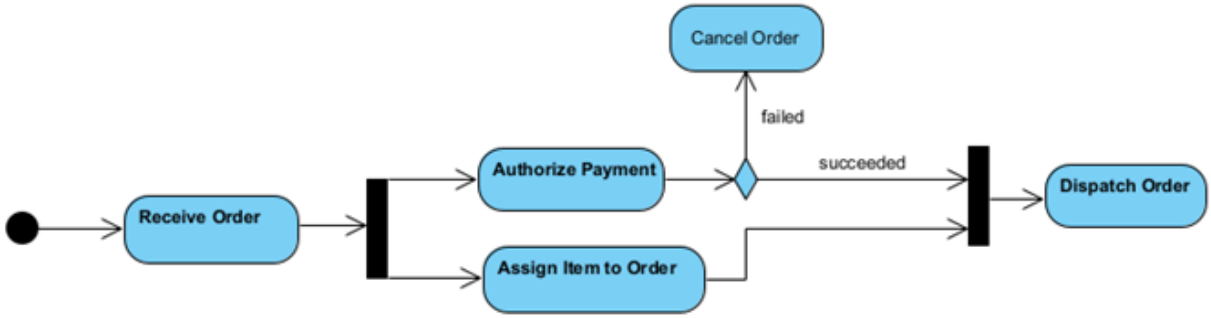
g. A staff can edit his/her profile.

h. A staff can reserve up to three books.

(13)

Question 3

Which of the following series of actions are permissible according to the activity diagram shown below?



a. Receive Order → Authorize Payment → Dispatch Order

b. Receive Order → Assign Item to Order → Dispatch Order

c. Receive Order → Authorize Payment → Cancel Order → Dispatch Order

d. Receive Order → Authorize Payment → Cancel Order

e. Receive Order → Authorize Payment → Assign Item to Order → Dispatch Order

f. Receive Order → Authorize Payment → Assign Item to Order → Cancel Order

g. Receive Order → Assign Item to Order → Cancel Order

h. Receive Order → Assign Item to Order → Authorize Payment → Dispatch Order

i. Receive Order → Assign Item to Order → Authorize Payment → Cancel Order

(4)

Question 4

Prototyping is a crucial elements in a software design process. Fidelity reflects how detailed and functional a prototype is, which commonly divided into low and high fidelity. Describe **TWO** cases when one should go for low-fidelity prototype and **TWO** cases when one should go for high-fidelity prototype. (4)

SECTION B

Section B carries a total of 14 marks

Question 5

Consider the following chunk of code:

```
Prints (int a, int b){
int result = a + b;
if (result > 0)
  Print ("Positive", result)
Else
  Print ("Negative", result)
}
```

- if `a=3` and `b=9`, what are the statement coverage and condition coverage ? (2)
- if `a=-3` and `b=-9`, what are the statement coverage and condition coverage? (2)
- What are the total statement coverage and condition coverage for the above two scenarios? (2)

Question 6

Compare and contrast **FOUR** different testing stages. (8)

SECTION C

Section C carries a total of 11 marks

Software development is activity that uses a variety of technological advancements and requires high levels of knowledge. Because of these and other factors, every software development project contains elements of uncertainty. This is known as project risk. The success of a software development project depends quite heavily on the amount of risk that corresponds to each project activity. As a project manager, it's not enough to merely be aware of the risks. To achieve a successful outcome, project leadership must identify, assess, prioritize, and manage all of the major risks. The goal of most software development and software engineering projects is to be distinctive - often through new features, more efficiency, or exploiting advancements in software engineering. Any software project executive will agree that the pursuit of such opportunities cannot move forward without risk.

Question 7

What is the difference between a risk and an opportunity? Is risk a problem or not? (3)

Question 8

What is the workflow for risk management in software engineering? (4)

Question 9

Generally, what are the strategies for risk control and among these strategies, which one is the best? (4)