The University of Nottingham Ningbo, China

School of Computer Science

A Level 1 Module, Spring Semester 2020-2021

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 20 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: Multiple Choice Questions

Section A carries a total of 30 marks, each question carries 2 marks

Choose **ONE** option for each of the following questions.

Question 1

Which of the following is **NOT TRUE** about Agile methodologies?

a) Agile methods are incremental development methods.

b) Agile methods do not involve developers and customers to get rapid feedback on changing specifications in the development process.

c) Agile approaches to software development consider design and implementation to be central activities in the software process.

d) Agile methods minimize documentation by using informal communications rather than formal meetings with written documents.

Question 2

Which of the following is **NOT** a metric for specifying quantitative non-functional requirements of a system?

a) Reliability: Rate of failure occurrence.

b) Portability: Percentage of target dependent statements.

c) Ease of use: Number of help frames.

d) Flexibility: Ability to adapt to future changes.

Question 3

In the UML, which of the following is ***NOT*** presented in the Class Diagram?

a) The name of the object class is in the top section.

b) The class attributes in the lowest section.

c) The operations associated with the object class.

d) The interaction between attributes and operations in the class.

Question 4

The practices of Extreme Programming (XP) does **NOT** include:

a) Pair programming.

b) Small releases.

c) Complex and full design

d) Collective ownership.

Question 5

Which of the following is **NOT** a notation for writing system requirements?

a) Structured natural language.

b) Prototype.

c) Graphical notations.

d) Mathematical specifications.

Question 6

Which of the following is **NOT TRUE** for Software Testing?

a) Software validation is the process of checking that the software meets its stated functional and non-functional requirements.

b) The goal of verification and validation processes is to establish confidence that the software system is"fit for purpose".

c) Verification and validation processes are concerned with checking that software being developed meets the specification and delivers the functionality expected by the people paying for the software.

d) The verification and validation processes continue through all stages of the development process.

Question 7

Which of the system below is **NOT** appropriate for applying the Waterfall model in Software Engineering?

a) Critical systems where there is a need for extensive safety and security analysis of the software specification and design.

b) Robotic systems where requirements are at a moderate to high risk of changing.

c) Large software systems that are part of broader engineering systems developed by several partner companies.

d) All the above ARE appropriate.

Question 8

The decision on whether to use an agile or plan-driven approach to development should **NOT** depend on:

a) Budget allocated to the software.

b) Capabilities of the development team.

c) Type of the software.

d) Culture of the company developing the system.

Question 9

Which of the purpose of following UML diagrams is **NOT TRUE**?

a) An activity diagram may be used to model the processing of data, where each activity represents one action step.

b) A use case diagram describes interactions between users and systems in the system being designed.

c) A context diagram shows how system that is being modeled is positioned in an environment with other systems and processes.

d) A state diagram is used to model a systems behavior in response to internal or external events.

Question 10

The benefits of test-driven development do **NOT** include:

a) Code coverage.

b) Requirements validation.

c) Regression testing.

d) System documentation.

Question 11

The stages in the testing process are?

a) Customer testing → System testing → Component testing

b) Component testing → Beta testing → System testing

c) Beta testing → Component testing → Customer testing

d) Component testing → System testing → Customer testing

Question 12

The responsibilities of the Scrum Master do **NOT** include:

a) Ensuring the Scrum process is followed and guides the team in the effective use of Scrum.

b) Should not be thought of as a project manager.

c) Interfacing with the rest of the company.

d) Ensuring that the Scrum team is not diverted by inside interference.

Question 13

Which of the following user testing is **TRUE**?

a) Alpha testing, where selected group of software users work closely with the random users to test early releases of the software.

b) Beta testing, where a release of the software is made available to all users to allow them to experiment and to raise problems that they discover within the system developers.

c) Acceptance testing, where customers test a system to decide whether it is ready to be accepted from the system developers.

d) None of the above.

Question 14

A prototype is an early version of a software system commonly used to anticipate changes that may be required: (Choose the **CORRECT** answer)

a) In the requirements engineering process, a prototype can help with the elicitation and validation of system requirements.

b) System prototypes allow potential users to see the cost they need to pay for the system.

c) In the system design process, a prototype can be used to identify software bugs.

d) None of the above.

Question 15

You may develop different models to represent a system from different perspectives. Which of the following is **TRUE**?

a) An interaction perspective, where you model the interactions between components of a system, or between a system and its environment.

b) A behavioral perspective, where you model the organization responses of the system.

c) A structural perspective, where you model the structure of actions processed by the system.

d) An external perspective, where you model the user experiences of the system.

SECTION B: Process/Project Management

Section B carries a total of 10 marks

Question 16

List the **THREE** main roles in Scrum. (3 marks)

Question 17

Briefly explain Pair Programming and describe **TWO** of its benefits. (3 marks)

Question 18

Fill in the table below to provide the possible **direct coping strategy** to deal with each different risk item. (4 marks)

Risk Item	Direct Coping Strategy
Organizational financial problems	
Staff illness	
Defective components	
Requirements changes	

SECTION C: Agile Methodology

Section C carries a total of 10 marks

Company A develops information systems for the health care services. The main system manages electronic information related to patient records and is used by doctors, nurses, and clerks. In addition, the company delivers sub-systems to laboratories, radiology departments, and pure X-ray institutions. The company has 140 employees and locations in four cities in the country. Company A is organized with one centralized administration and several line departments. The line organization deals with all personnel, technical, and administrative conditions. Production occurs in projects or teams. By following the waterfall model they have long iterations of development, with delivery of the software several months later. The developers spend much time on specifying the system before they start to code. When they finally deliver the system to the customers they experience that the system doesn't fulfill the customers' requirements. They also experience that following the waterfall model led to a mentality where a lot of work is done at the end of the development period and that code is not tested during development. The software contains many errors and the developers have to work much overtime to correct the errors. In short they experience that the period before delivering the system to the customers are chaotic and usually comes out of control. A manager in Company A says that they experience the waterfall model as cumbersome. When customers have new or changed requirements, they experience that it is difficult to adapt to these, since they already have committed to a plan that described the functionality that should be delivered. In addition the method makes it difficult to make effective use of new employees. The last couple of years the company has hired many new employees and the manager expresses that the waterfall model makes it difficult to gain profit proportional to the growth of employees. Company A now wants their information system to be developed using the Agile model.

Question 19

List out at least **FOUR** reasons why Company A wants to re-develop their system using the Agile model. (4 marks)

Question 20

List out at least **SIX** benefits Company A can expect from using the Agile model. (6 marks)