The Open University of Sri Lanka
Faculty of Engineering Technology
Department of Electrical and Computer Engineering

Study Programme	: Bachelor of Technology Honours in Engineering
Name of the Examination	: Final Examination
Course Code and Title	**: EEX4547/ECX4247 Software Engineering**
Academic Year	: 2019/20
Date	: 14th August 2020
Time	: 0930-1230hrs
Duration	: **3 hours**

General Instructions

1. Read all instructions carefully before answering the questions.
2. This question paper consists of **Five (5)** questions in **Four (4)** pages.
3. Answer **Question 1** and any other **three (3)** questions only.
4. This is a Closed Book Test **(CBT).**
5. Answers should be in clear hand writing.

Question 1 (Compulsory)

Read the given scenario and answer the questions.

Anytime-Anywhere Service

Anytime-Anywhere is a Service offered by a taxi company. They want to upgrade their business with a web/mobile based system to enhance their business with following additions.
The company wants to expand so that without buying vehicles they can use other drivers with vehicles. They will be registering drivers and their vehicles with the company so that for each ride the company will get a percentage of the fee. Customers call the company telephone number when they want a taxi and all calls are diverted to drivers in nearby locations. All calls to and from clients are logged at the company. Clients can complain or commends the ride through by calling or by their website. The company keeps a dashboard on each driver and his/her performance based on feedback received by clients.

This service is made available for vehicle-pooling also. If the client/s agree, another passenger/s can be taken on the same ride and the fee will be reduced to all passengers based on the number of passengers and distance travelled.

The company has contracts with certain Restaurants to deliver food so the drivers may be called for delivery orders as well.

The management mentions that the system must be easy to use by managers as well as clerks in the company and the system should provide monthly reports on income/expenses and driver performance.

(You may make realistic assumptions when answering this question, but all assumptions needs to be clearly stated in the document)

a) Draw a complete use case diagram to illustrate the given requirements. (14 marks)

b) Draw a class diagram with attributes, relationships and operations to support the business processes in the use case diagram. (8 marks)

c) Briefly describe three (3) non-functional requirements for this system, which can be objectively validated (6 marks)

d) List two ambiguous requirements or platitude/s that can be found in this Requirement Statement. (4 marks)

e) Assume that the software development was outsourced to an off-shore company. When delivering the software, the salesperson says: "We have exhaustively tested this software using both black box and white-box methods. The bugs that were found were removed so we are quite certain that the software will not fail in operation".

   i. As the IT consultant of the taxi company, would you believe that the software had been 'exhaustively' tested under either of the testing methods? Briefly state your reasons. (3 marks)

ii. Would you accept that the software is certain not to fail? Justify your answer. (2 marks)

iii. *"When there are 2 separate teams in a project for development and testing tasks, the quality of the product will increase."*
Do you agree with the above statement? Justify for your answer. (3 marks)

Question 2

a) Briefly explain boundary value analysis in black box testing. (2 marks)

b) Read the following module description and answer the questions:
This module is web page collecting donations for flood victims in Sri Lanka. It allows entry of a contribution from Rs. 100 to Rs. 999,999.99.

For each test case generated by boundary values analysis, specify the boundary values covered, input values, and expected outputs. (10 marks)

c) Answer the following questions regarding the given pseudo code.

```
Integer A, integer B
        Read A
        Read B
        If A < B then
                Print 'A is the smaller number'
        Else
          If A = = B then
                Print 'they are same'
          Else
                Print 'B is the larger number'
        Endif
```

i) Draw a flow graph for the above algorithm (6 marks)

ii) What is the Cyclomatic Complexity for this flow graph? (2 marks)

Question 3

a) Briefly describe three (3) ways that you can collect requirements from a customer. (3 marks)

b) Give two reasons why expert users may not prove to be a good source of information about the requirements for an interactive system (2 marks)

c) List the five (5) documents that are produced as the output of any Process Model. (5 marks)

d) When you are going to develop a software system for a given set of requirements, what criteria would use to determine a suitable Software Process Model? (6 marks)

e) Briefly describe two (2) Software Process Model that gives high attention to risk. (4 marks)

Question 4

a) There are 6 principles widely accepted as general design principles for user interface design. Briefly describe 4 of them. (8 marks)

b) To assess the suitability of the user interface, usability evaluation is carried out. List three (3) most common methods of evaluation. (6 marks)

c) Errors are unavoidable in software development. However, they could negatively affect the human-computer interaction. When an error is occurred, it is very important to inform the user the relevant action to be taken. Design an error message using an example. (3 marks)

d) What differences would you come across when designing a web page compared to designing for printed media? (3 marks)

Question 5

Consider the given ER diagram in Figure 1 for an Order Processing System.

a) Normalize the data to 3rd Normal form. Identify Primary keys and Foreign keys. (12 marks)
(You may make reasonable assumptions and state them clearly)

b) Draw the Relational Database diagram. (8 marks)

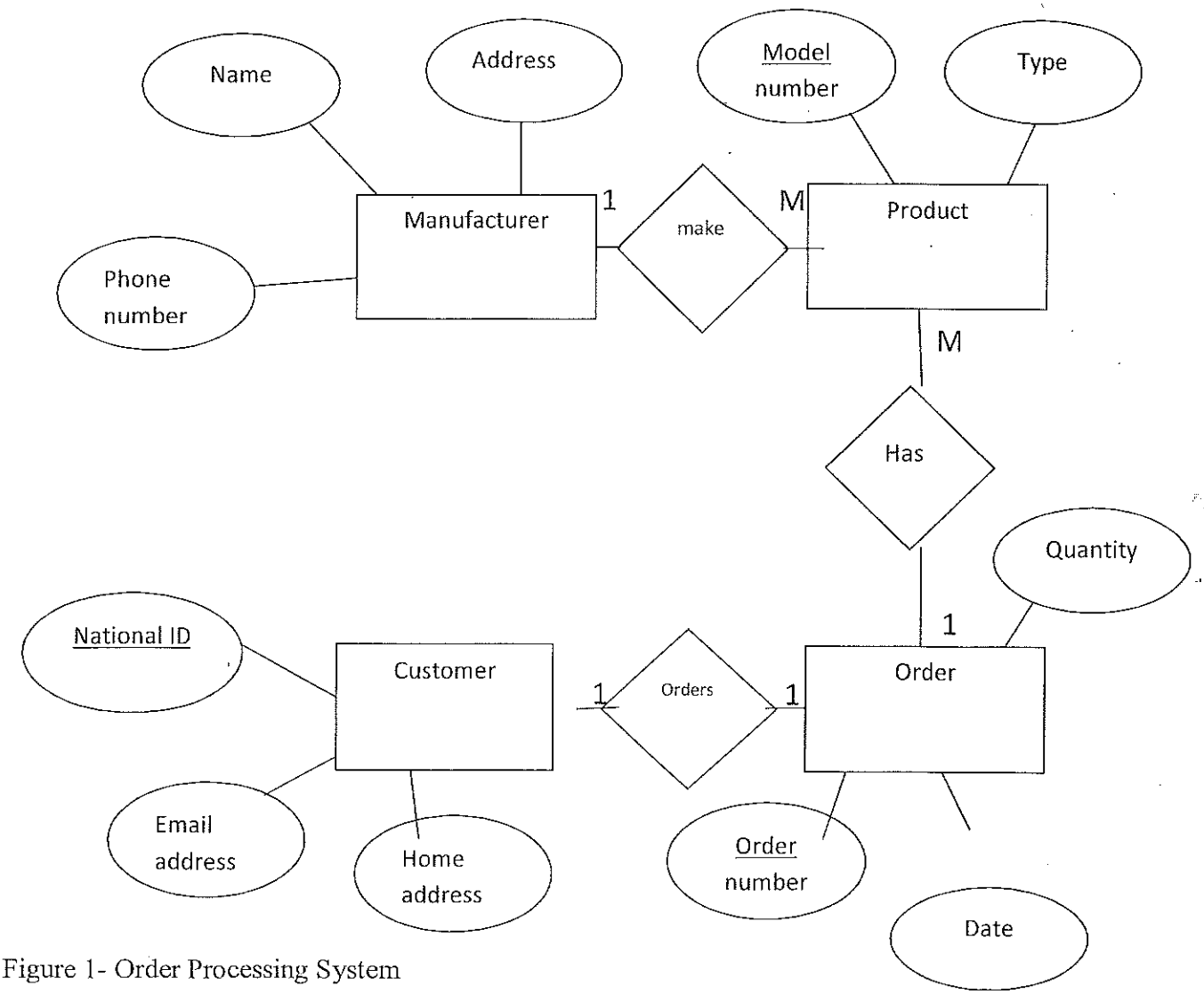

Figure 1- Order Processing System