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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	**: EEX4347 Software Engineering Concepts**
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 **Four (4)** questions in **Four (4)** pages.
3. Answer **All** questions.
4. This is a Closed Book Test **(CBT).**
5. Answers should be in clear handwriting.

Question 1

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 the 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 commend the ride by calling or via 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. The system should provide monthly reports on income/expenses and driver performance.

(You may make realistic assumptions when answering this question, but all assumptions need 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 (2) 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)

f) This software system can be hosted in the *Cloud*. What is meant by the three (3) service models IaaS, SaaS and PaaS which are offered by the companies that offer *cloud* services? (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 a 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 considering the given pseudocode.

```
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 pseudocode. (6 marks)

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

Question 3

a) When you are going to develop a software system for a given set of requirements, what criteria would be used to determine a suitable Software Process Model? (6 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) What differences would you come across when designing a web page compared to designing for printed media? (3 marks)

d) One aspect of software maintenance is detection and repair of defects. Briefly describe how Object oriented programming eases this operation in contrast to structured programming. (2 marks)

e) Briefly describe organizational aspects of software maintenance and technical aspects of software maintenance. (3 marks)

Question 4

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

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 for theOrder Processing System. (8 marks)

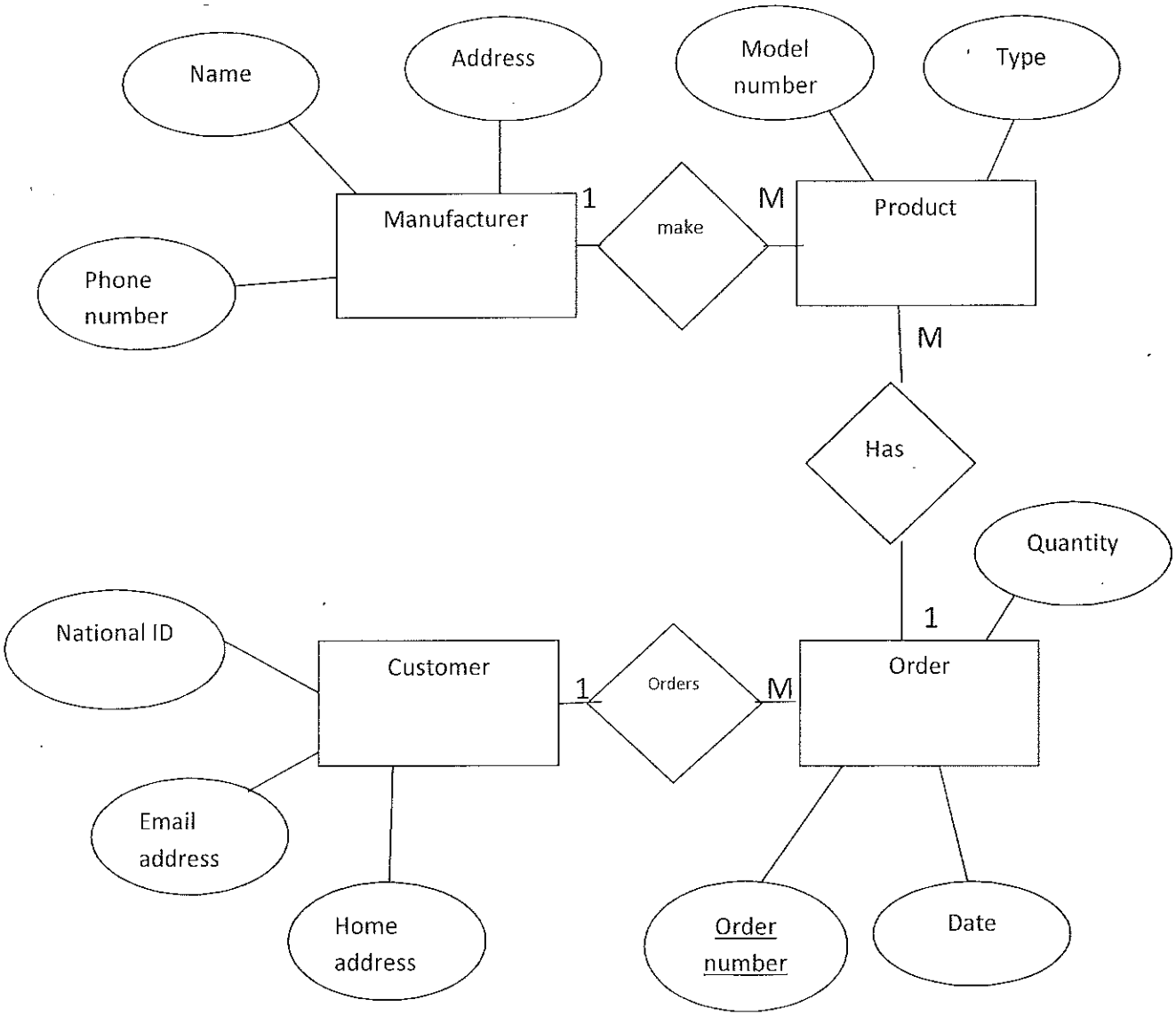


Figure 1: ER Diagram of the Order Processing System