



UNIVERSITY OF RUHUNA

Faculty of Engineering

End-Semester 4 Examination in Engineering: February 2020

Module Number: EE4106 Module Name: Software Engineering Principles

[Three Hours]

[Answer all questions, each question carries 10 marks]

-
- Q1 a) What are the advantages of Inheritance with Object Oriented Programming?
[1 Mark]
- b) Write short notes on following topics.
i) Abstraction
ii) Polymorphism
iii) Encapsulation
[3 Marks]
- c) A passenger car is having four wheels and four doors. It has an engine and a battery. The engine of the car may be using petrol or diesel as the energy source. Program the car class using php or C# that contains.
i) Attributes to store fuel type, number of wheels and doors with appropriate visibility.
[2 Marks]
ii) Setter and Getter methods for manipulating the attributes in Q1(c)(i).
[2 Marks]
iii) Write a new method for the car class named **isPetrolCar** that will return true or false depending on the fuel type.
[2 Marks]
- Q2 a) Write two advantages of drawing a class diagram.
[2 Marks]
- b) Draw a class diagram to model animals in the zoo.
Note: Use minimum four classes. You may use Object oriented concepts like Inheritance (Once class can inherit form more than one parent class), Abstract class and Encapsulation. Include basic behavior of animals as methods.
[4 marks]
- c) Draw a class diagram to model a Computer. Use Aggregation or Composition if required. Include the components a computer has and functions a computer can do.
Note: Use minimum four classes.
[4 marks]

- Q3 a) List four sequential phases in Waterfall model. [2 Marks]
- b) Describe four situations where the waterfall model is most appropriate. [2 Marks]
- c) List the four project life-cycle phases in Rational Unified Process. [2 Marks]
- d) What are the differences between Agile and Waterfall model? [2 Marks]
- e) Describe two disadvantages of Agile software development life cycle model. [2 Marks]
- Q4 You are asked to develop software for the module registration of university students. Following are some of the main requirements. Other requirements you can assume and mention in your answer.
- i) Students have to be registered in the system.
 - ii) Students have to register for modules for each semester.
 - iii) Staff needs to record the attendance and the grades of the registered students.
 - iv) Students have to complete the prerequisite modules before registration of a module.
- a) Draw a use case diagram related to the above software for the actors admin, teacher and student. [3 Marks]
- b) Draw appropriate classes for the above mentioned module registration system. [4 Marks]
- c) Draw the associations among the classes you have drawn in Q4(b). [3 Marks]
- Q5 a) Draw the Entity Relationship (ER) diagram related to the software in Q4. [4 Marks]
- b) Assume that you are given the following part of an ER diagram (Figure Q5 in page 3) of an online shopping system.
- Draw the table structure you get when the tables are created in a database management system.
- Note: Mark auto increment, primary key and foreign key fields if available. Also mention the data types and size of each field.
- [6 Marks]

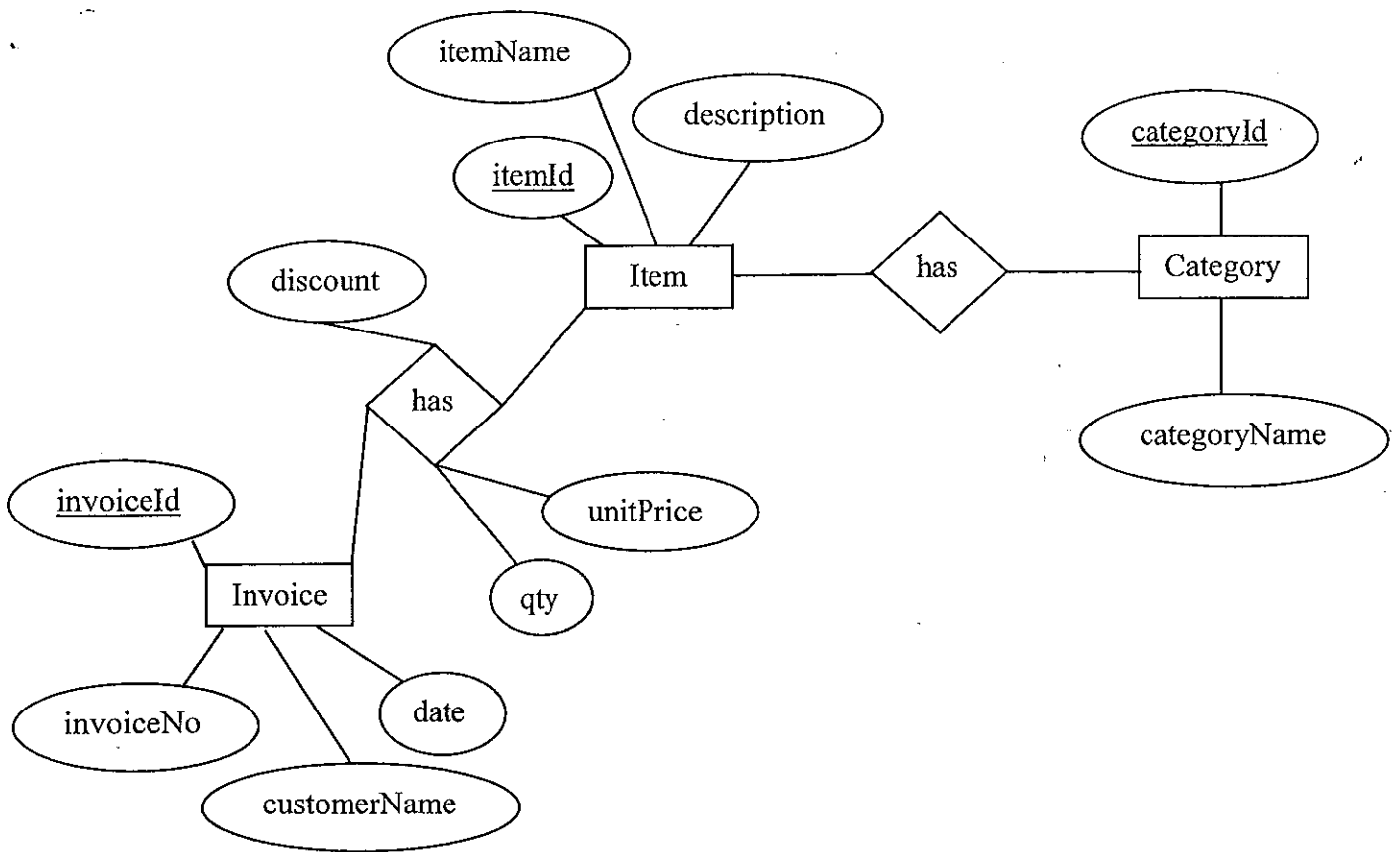


Figure Q5: ER diagram of an online shopping system