

136



(KNOWLEDGE FOR DEVELOPMENT)

KIBABII UNIVERSITY (KIBU)

UNIVERSITY EXAMINATIONS
2020/2021 ACADEMIC YEAR

END OF SEMESTER EXAMINATIONS
FIRST YEAR SECOND SEMESTER

FOR THE DEGREE IN INFORMATION
TECHNOLOGY/COMPUTER SCIENCE

COURSE CODE: BIT 122/CSC 120

COURSE TITLE: OBJECT ORIENTED PROGRAMMING 1

DATE: ²¹14/07/2021

TIME: ^{P. 00}2.00PM-4.00PM

INSTRUCTIONS

ANSWER QUESTIONS ONE AND ANY OTHER TWO.

QUESTION ONE (COMPULSORY)

[30 MARKS]

- a. Explain the following concepts of object-oriented programming.
 - i. Inheritance [2 marks]
 - ii. Polymorphism [2 marks]
 - iii. Encapsulation [2 marks]
- b. What are the effects of the keyword final when applied to a class and a variable? [2 marks]
- c. What does a call to *super ()* does in a constructor of a subclass? [2 marks]
- d. Define a class student with member variables as roll number and name. Generate an object and initialize its variables using constructors and display them. [4 marks]
- e. To read inputs from the keyboard, we use the java object Scanner. You have to use an import statement to access the class **java.util.Scanner**
 - i. Write a signature to create and initialize a Scanner object. [2 marks]
 - ii. You were to read in a string and a double value respectively, give signatures to implement these. [4 marks]
- f. Using relevant signatures differentiate between Accessor methods and mutator methods [4 marks]
- g. i. what is meant by the term array in the context of programming [2 marks]
- ii you are given the following elements:

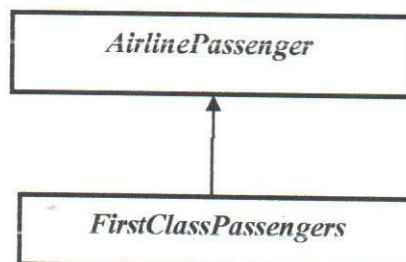
44	34	54	52	43
21	42	37	49	11

Using a relevant array name, write a java code that will create and initialize the above array elements. [4 marks]

QUESTION TWO

[20 MARKS]

- a. Using relevant examples, define the following terms and concepts as used in study of OOP:
 - i. Object [2 Marks]
 - ii. Class [2 Marks]
- b. Explain how the concept of composition is deferent from inheritance as used in object oriented programming. [2 marks]

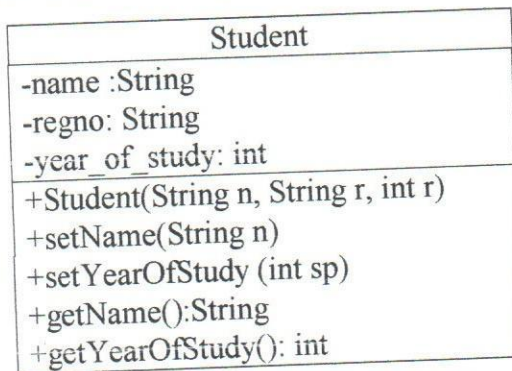


- c. Translate the above inheritance hierarchy into a java program give the following information: an *AirlinePassenger* has a name and a flightNumber. The name of the passenger can not be changed but the flightNumber can be changed, and might not initially be known. *FirstClassPassenger's* meal preference has be specified (meat of vegetarian). All passengers are given an initial luggage allowance of 20kg while *FirsClassPassengers* are given an extra 10kg luggage limit. [14 marks]

QUESTION THREE

[20 MARKS]

- a. What is the difference between **public**, **private** and **protected** members of class? [3 marks]
- b. Why class is called an ADT? Give a signature for creating an object in a class. [4 marks]
- c. Define *function overriding* and *function overloading*, in each case give a relevant concept of OOP that implements it. [6 marks]
- d. Below is a UML diagram of a *Student* class. Convert it to a java program. [7 marks]



QUESTION FOUR

[20 MARKS]

- a. Differentiate between data abstraction and data encapsulation, give a relevant example in each case. [4 marks]
- b. A consider definition of class Student shown below: -

```
public class Student
{
    private String name;
    private double height;
    private int age;
    public Student ()
    {
        //
    }
}
```

- i. Write **THREE** method definitions that will initialize the class variables [2 marks]

- ii. Write **THREE** method definitions that will return the values of the variables [2 marks]
- iii. Write the values of the variables as initialized in the constructor Student [2 marks]
- iv. Write a class definition for a class *Student* that inherits Person's properties and methods. In addition to Person's properties, the student has regNo, programme and yearOfStudy. Write getters and setters for the Student class. Use *Person's* methods to initialize and return the name, age and height properties of the Student. [5 marks]

- v. Write a class definition for a class *GraduateStudent* that inherits Student's properties and methods. In addition to Student's properties, the *GraduateStudent* has researchArea. Write getters and setters for the *GraduateStudent* class. Use *Person's* and *Student's* methods to initialize and return the name, age, yearOfStudy, regNo and height properties of the *GraduateStudent*. [5 marks]

QUESTION FIVE

[20 MARKS]

- a. Define **early binding** and **late binding**. [4 marks]
- b. An abstract class cannot have instances. What then is the use of having abstract classes? [4 marks]
- c. Define method overloading with an example? [4 marks]
- d. Define a class called Increment; the class contains one integer data member. Overload the object of the class for both pre-increment and post-increment operator. [5 marks]
- e. Explain the differences between a *for-loop* and a *switch-case* statement using a flow chart. [3 marks]