



MACHAKOS UNIVERSITY COLLEGE

(A Constituent College of Kenyatta University)
University Examinations for 2015/2016 Academic Year

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

FIRST SEMESTER EXAMINATION FOR DEGREE IN BACHELOR OF SCIENCE IN
STATISTICS AND PROGRAMMING

SST 202: OBJECT ORIENTED PROGRAMMING

Date: 11/8/2016

Time: 8:30 – 10:30 AM

INSTRUCTIONS

Answer **question ONE** and any other **TWO** questions

QUESTION ONE (30 MARKS) (COMPULSORY)

- a) Explain the terms as applied to Object Oriented Programming
- An Object
 - A Class
 - Inheritance
 - A package
- (8 marks)
- b) Explain **any three** benefits that are derived from bundling code into individual software objects.
- (6 marks)
- c) Method declarations have six components. Please explain **any five** such components
- (5 marks)
- d) Giving examples of each, differentiate between primitive and reference data types.
- (4 marks)
- e) Explain the concept of encapsulation and code reuse as used in object oriented programming.
- (3 marks)

- f) With the aid of a table, explain the access to members permitted by each modifier as applied to the Java programming language (4 marks)

QUESTION TWO (20 MARKS)

- a) A Bicycle has the following attributes
- speed,
 - pedal cadence, and
 - Number of gears
- i. Model the Bicycle as a software object and provide methods for changing its various states.
 - ii. Write a main method application that will drive the Bicycle object and invoke it's methods
- (10 marks)
- b) The Bicycle above is the super class of another object called a mountain bike. Modify the software to reflect the following concepts
- The fact that no real life object exists that is called a Bicycle but that we have different types of bicycles such as mountain bikes, tandem bikes etc
 - A mountainBike object that inherits from the Bicycle class
 - A mountainBike overloaded Constructor that takes no parameters and one that takes three integer values for the speed, pedal cadence and number of gears
 - An attribute that captures the seatHeight of the mountainBike and one accessor method that returns the seat height and one mutator method that modifies the seat height.
- (10 marks)

QUESTION THREE (20 MARKS)

- a) List and explain, while noting their lifecycles, **any two** common sizes of computer programs. (4 marks)
- b) Explain the **four** properties that an algorithm must possess to be considered complete and precise. (8 marks)
- c) Name and explain the **four** basic building blocks forms for flowcharts. (8 marks)

QUESTION FOUR (20 MARKS)

- a) List and explain any **three** programming personalities that have been identified in computer programming practice. (6 marks)
- b) Name and explain any **two** types of testing techniques used in software engineering (4 marks)
- c) Explain any **five** ways in which algorithms can be represented in computer programming (10 marks)

QUESTION FIVE (20 MARKS)

Define the following in Java or C++ based on the following description:

- a) Define an abstract Java Class of type Animal with the following
- Double variable that stores its hunger state and
 - Boolean variable that stores its awake or asleep state.
 - An accessor method that returns its hunger state
 - An accessor method that return whether it is awake or asleep
 - a mutator method that makes it sleep
 - an abstract method that returns the sound that the animal makes
- b) A public interface that identifies if the animal is trainable with two methods that print out if it can sit or stand
- c) A public abstract class called Canine inherits from the class Animal which has two methods
- bite and
 - roam
- d) A public class doberMan which inherits from Canine and implements the Trainable interface.
- e) A public class Wolf which also inherits from Canine
- f) In both doberMan and Wolf implement polymorphism in the behavior sound made from class Animal.