THE CATHOLIC UNIVERSITY OF EASTERN AFRICA

A. M. E. C. E. A

MAIN EXAMINATION

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JANUARY – APRIL 2022

FACULTY OF SCIENCE

DEPARTMENT OF COMPUTER SCIENCE

REGULAR PROGRAMME

CMT 211/LIS307: OBJECT ORIENTED PROGRAMMING II

Date: APRIL 2022	Duration: 2 Hours
1. **INSTRUCTIONS: Answer Question ONE and any other TWO Questions. Calculators MAY be used for this Examination.** 2. **The exam makes use of a CASE which is attached at the end of the exam**	

An Object Oriented Based software is needed to manage the Afcon (Africa Cup Of Nations) tournaments. (AFSMS). Such a system must take into consideration everything that involves teams , players, Games among others. A game is a schedule competition between any two teams.

Q1. (You may refer to the case as attached)

    a) Explain what is meant by the following terms:

       i. Data Abstraction   **(1 mark)**

       ii. Method abstraction   **(1mark)**

      iii. Java Packages   **(1 mark)**

      iv. Method overloading   **(1 mark)**

      v. Method overriding   **(1 mark)**

      vi. Constructor   **(1 mark)**

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  vii. Exception   **(1 mark)**

  viii.Message passing   **(1 mark)**

  ix. Multiple inheritance   **(1 mark)**

  x. WORA   **(1 mark)**

b) Discuss java oop features supported that makes it appropriate programming platform choice to develop an AFSMS.   **(4 marks)**

c) To develop an AFSMS you need to abstract a number of classes. Assume classes Team, Player, Game, Coach , Schedule and Referee.

   i. Describe the relationship that exist between

    (a) Team and Player   **(1 mark)**

    (b) Team and Game   **(1mark)**

    (c) Referee and Game   **(1 mark)**

    (d) Team and Coach   **(1 mark)**

     d) Draw UML class diagram for each of the classes Team, Player and Referee showing data member sand undefined getter and setter methods.   **(9 marks)**

     e) List any six reports that can be generated by the AFSMS.

                      (3 marks)

Q2

a) Give five differences that exist between Java and C++ programming platforms   **(5 marks)**

b) Write a Java method that will receive any number of integer marks and then print the mark and the corresponding grade using the grading criteria below.   **(8 marks)**

Marks	Grade
$x \geq 80$	A
$75 \leq x < 80$	A^-
$70 \leq x < 75$	B^+
$65 \leq x < 70$	B^-
$60 \leq x < 65$	B

50<=x<60   C
          x<50   F
    c) Draw the Flow chart of the program in b) above   (**7 marks**)

Q3

        a) You are given the variables var int x=5; int y=25; int z=3; int m=60;

        b)   Give the results of the following expressions.   **(10 marks)**

                i.   System.out.println(--y);

               ii. System.out.println(x++);

                iii.   System.out.println(!(x<y));

                iv. System.out.println(Math.pow(--x,z++);

    v.   System.out.println((z>>(y%3));

    vi.   System.out.println((z>2)^(2>7));

    vii.   System.out.println (m >= 40) ? 'P': 'F');

    viii.   System.out.println(m%=(Math.pow(z,2));

    ix.   System.out.println((z<<2));

        c) Write a java method getSalary() that creates and return an array to store 20
            employee salaries ranging from 30,000 to 75,000 shillings. The salaries are
            randomly generated. Demonstrate the use of such a method in a program
                                                                        (10marks)

Q4

    a) You are given a string object **mystr="This question is cool for all those who
        have read and made sure they understand String class methods"**.

        i. Which string method will you use to return the number of characters in the
            string?   **(1 mark)**

        ii. Which string method will you use to search for a token from the left end of the
            string?   **(1 mark)**

        iii.Which string method will you use to search for a token from the right end of the
            string?   **(1 mark)**

iv. Which string method will you use to help you know the number of tokens in the string? **(1 mark)**

v. Write a java program that will print out the number of white space in the string and replace the white spaces with the character "*".? **(6marks)**

b) Write a java method that will receive the string above and then return the largest token in the string. Illustrate the working of this method in a program. **(10 marks)**

Q5

a) Consider class Player as you abstracted in qn 1 above.

i. Write the class code with all the methods fully **defined** **(6 marks)**

ii. It is assumed that a team must have at least 20 players including reserves. Write a method getPlayers() that creates and return an array of 20 Players with all their details. Illustrate the use of the method in a program. **(14marks)**

END

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