

KASNEB

CICT PART II SECTION 4

OBJECT ORIENTED PROGRAMMING

THURSDAY: 25 May 2017.

Time Allowed: 3 hours.

Answer ALL questions. Marks allocated to each question are shown at the end of the question. Show ALL your workings.

ALL programs written should be in Java object oriented programming language.

QUESTION ONE

- (a) Describe each of the following concepts as used in object oriented programming:
- (i) Get methods. (2 marks)
 - (ii) Set methods. (2 marks)
- (b) State four properties of external objects in object oriented programming. (4 marks)
- (c) Citing an example in each case, distinguish between checked and unchecked exceptions. (4 marks)
- (d) Write a recursive program in Java language that accepts a user input number, computes and displays the factorial of that number. (8 marks)
- (Total: 20 marks)**

QUESTION TWO

- (a) Describe two conditions that should be met for a class to be serialised successfully. (2 marks)
- (b) Using examples in each case, explain the following terms as used in object oriented programming:
- (i) Widening casting. (2 marks)
 - (ii) Narrowing casting. (2 marks)
 - (iii) Boolean casting. (2 marks)
- (c) Differentiate between each of the following pairs of terms as used in object oriented programming:
- (i) Constructors and methods. (4 marks)
 - (ii) Inheritance and polymorphism. (4 marks)
- (d) Study the program given below:

```
class arithmetic
{
public static void main (string [ ] args)
{
int i = 3;
i++;
system.out.println (i); ----- (i)
++i;
system.out.println (i); ----- (ii)
system.out.println (++i); ----- (iii)
system.out.println (i++); ----- (iv)
system.out.println (i);
}
}
```

Required:

Write the output generated by the lines labelled (i) to (iv) above when the program is run.

(4 marks)
(Total: 20 marks)

QUESTION THREE

- (a) Java programming language has become more popular than other object oriented languages in recent years. Citing five reasons, justify the above statement. (10 marks)
- (b) Citing two uses, explain the meaning of the term "triggers" in the context of object oriented programming. (4 marks)
- (c) Using a code segment, illustrate two methods that could be used to pass an argument to a sub-routine. (6 marks)
- (Total: 20 marks)**

QUESTION FOUR

- (a) Describe each of the following kinds of polymorphism supported by Java programming language:
- (i) Coercion. (2 marks)
 - (ii) Overloading (2 marks)
 - (iii) Parametric. (2 marks)
- (b) Study the Java program given below:

```
class Animal
{
    void eat ( )
    {
        system.out.println ("eating");
    }
}
class dog extends Animal
{
    void bark ( )
    {
        system.out.println ("barking");
    }
}
class Babydog extends dog
{
    void weep ( )
    {
        system.out.println ("weeping");
    }
}
class testInheritance
{
    public static void main (String args [ ])
    {
        Babydog d = new Babydog ( );
        d.weep ( );
        d.bark ( );
        d.eat ( );
    }
}
```

Required:

- Use a sketch to describe the type of inheritance depicted by the program above. (4 marks)
- (c) Highlight four rules of defining generic methods in Java programming language. (4 marks)

(d) (i) Study the exception handler extract shown below:

```
try
{
}
catch (Exception e)
{
}
catch (ArithmeticException a)
{
}
```

Required:

Point out the error in the implementation of this handler that makes it not to compile. (2 marks)

(ii) Write a program in Java to create a text file named "myfile" in drive C. The program should write the word "success" in the file on compiling, otherwise it should display an error message, "Error, file not created" on the screen. (4 marks)

(Total: 20 marks)

QUESTION FIVE

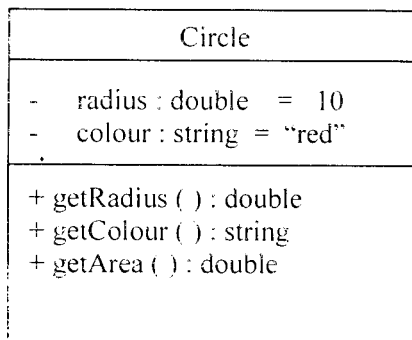
(a) (i) Explain the term "memory leak" in Java programming language. (2 marks)

(ii) Enumerate a procedure that a programmer could use to mitigate against memory leak. (2 marks)

(b) Outline four categories of iterator class used in object oriented programming. (4 marks)

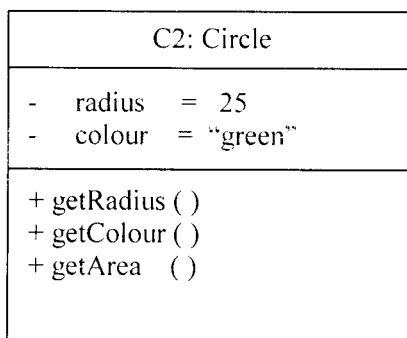
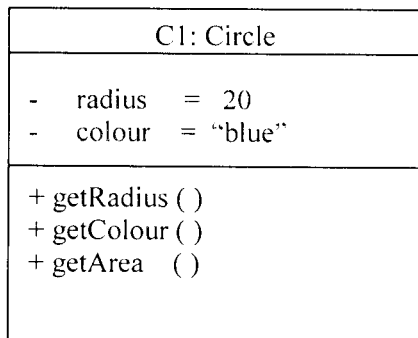
(c) Write a Java program to calculate the sum and average of a one dimensional integer array of size n. (6 marks)

(d) A class called circle is defined as shown in the class diagram below:



Required:

Write a Java program to implement instances of circles named C1 and C2 shown below:



(6 marks)
(Total: 20 marks)

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