DEPARTMENT OF INFORMATION TECHNOLOGY, NITK SURATHKAL

MID SEMESTER EXAMINATION, SEPTEMBER 2017

IT206: PARADIGMS OF PROGRAMMING - I

Class: III SEM B.TECH (IT) Time: 1½ Hrs.

Date: 12 /09/2017 Marks: 40

Register No. | 1 | 6 | I | T | 2 | 0 | 2 |

NOTE: 1. Answer all questions

1. Can you access a non-static variable in the static context? Justify. 3M

2 (a) In "MyClass", there is a method called "myMethod" with four different overloaded forms. All four different forms have different visibility (private, protected, public and default). Is "myMethod" properly overloaded?Justify. 3M

2 (b) In the below class, is constructor overloaded or is method overloaded? Support your answer. 3M

```
public class A
    {
        public A()
            {
                //-----> (1)
            }

        void A()
            {
                //-----> (2)
            }
    }
```

3 (a) What will be the output of the following program? Justify. 2M

```
#include <stdio.h>
int main()
{
int a[5] = {1,2,3,4,5};
int *ptr = (int*)(&a+1);
```

*printf("%d %d", *(a+1), *(ptr-1)); return 0; }*

i) 25 ii) 15 ii) Garbage value iii) Compiler Error iv) Segmentation Fault

3 (b) Differentiate call by value and call by reference in Java using an example. 3M

4 (a) Can typecasting be implemented in structures? Support your answer. 3M

4 (b) Can an int primitive type of data implicitly casted to Double derived type? How? 3M

5 (a) State the use of constructor and finalize () method in Java using a programming example. Show how garbage collection is achieved here. 5M

5 (b) Create a Java class shape with constructor to initialize the one parameter dimension. Now create three sub classes of shape with following methods 10 M

i) Circle-with methods to calculate the area and circumferences of the circle with dimension as radius.

ii) Square-with methods to calculate the area and length of diagonal square with dimension as length of one side.

iii) Sphere-with methods to calculate volume and surface area of the sphere with dimension as radius of the sphere.

Write appropriate main method to create object of each class and test every method. Implement Single,Multiple and Hierarchical inheritances.

5 (c) What is the output of this C code? Why do we use functional pointers? Provide the syntax of functional pointers. 5M

```
#include <stdio.h>
int mul(int a, int b, int c)
{   return a * b * c; }

 void main() {

int (function_pointer)(int, int, int);   function_pointer = mul;

printf("The product of three numbers is:%d", function_pointer(2, 3, 4));  }
```

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DEPARTMENT OF INFORMATION TECHNOLOGY, NITK SURATHKAL

MID SEMESTER EXAMINATION, SEPTEMBER 2013

IT-206: PARADIGMS OF PROGRAMMING – I

Class: III SEM B.TECH (IT)
Date: 12/9/2013

Time: 1½ Hrs.
Max Marks 50

Register No: | 1 | 2 | 1 | T | 1 | 4 | |

Instructions to students:

1. *Answers should be clear and concise. NOT lengthy explanations.*
2. *Do not write or mark on the question paper.*
3. *Answer paper should contain only answers.*

PART A: Briefly support your answers (2 marks each)

1. "A signed data type has an equal number of non-zero positive and negative values available". Is this statement valid?

2. Write down the valid identifiers (variable names) from those listed below. Why do you think they are valid or invalid?

   a. $int
   b. finalist
   c. Bytes
   d. $1
   e. x#b

3. What is valid declaration for main() function of Java? Why the main() function is declared in such a way?

4. Is the below code fragment valid? If so, what will be the output?

```
double d = 10;
System.out.println ("The output: " + (d += 10));
```

5. Consider the following code fragment. What will be the output?

```
int x = 10/2*5;
int y = 10+2-3;

System.out.println("After Operator Precedence " + x + y);
```

PART B

6. Differentiate between abstract classes and interfaces with the help of examples. (5 marks)

7. Differentiate between a Class and Object with examples. (5 marks)

8. Briefly explain the meaning of the following terms. (5 marks each)

a. Immutable Objects
b. Garbage Collection
c. Polymorphism:
   i. static/dynamic binding
   ii. overriding
d. Life Time of an Object

9. Write a Java program to: (10 marks)

a. Define a class *Person* with the following capabilities
   i. Person ID
   ii. Person Name
   iii. Member Functions to access the above identifiers
b. Inherit 2 classes from *Person*
   i. *Teacher*
   ii. *Student*
c. *Student* class should be able to support the following
   i. Store Grade for one subject
   ii. Member variables to set and access the Grade
d. Additional functions
   i. Input the marks from the keyboard. (Input Exception must be handled)
   ii. Store the marks in *Teacher* object
   iii. Marks should be converted into Grades in *Teacher* object and stored in *Student* object. Student is graded according to the following rules
      1. Marks 81 to 100 = Grade A
      2. Marks 61 to 80 = Grade B
      3. Marks 41 to 60 = Grade C
      4. Marks 21 to 40 = Grade D
      5. Marks Equals or Below 20 = Grade E
e. *Teacher* class should be able to support the following
   i. Store marks entered for <u>one</u> student (No need to create an array of student's marks)
   ii. Capability to read the marks from the keyboard
   iii. Capability to calculate the Grades based on marks

NOTE: Answer must include the Class Diagram (Showing the Inheritance). O-O concepts Inheritance, Polymorphism, Encapsulation, Exceptions must be followed to implement the solution.

2.a. Given a statement: *"A home is a house that has a family and pet dogs"*. Write the class diagram and define the classes for implementing the above requirement. [5 marks]

2.b Given below is a class HasVariables. Mention exactly at what point the variables x, y, n, a[], al[] are initialized and to what value?

```
class HasVariables {
        int x = 20;
        static int y = 50;
        HasVariables( ) {
        }
        public void aMethod( ) {
                int a[] = new int[5];
                Integer al[] = new Integer[1];
                int n;
        }
}
```

[5 marks]

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3. A Conversation Policy(CP) is a concept where a certain adminstrative-control executes in parallel with the programmer's code. It is used to ensure correctness of the user protocol-implementation. Suggest a mechanism of how it is implemented using Threads. [10 marks]

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4. Write a JAVA class that has a public method that returns the n-th fibonacci number. Show its working by calling from a main method in another class. Both, of the classes should be public. [10 marks]

DEPARTMENT OF INFORMATION TECHNOLOGY, NITK SURATHKAL

MID SEMESTER EXAMINATION, SEPTEMBER 2016

IT206: Paradigms Of Programming

Class: III SEM B.TECH (IT)
Date: 05/09/2016

Time: 1½ Hrs.
Marks: 50

Register No. | 1 | 5 | 1 | T | 2 | 4 | 1 |

NOTE: Answer all questions to the point only.

1. Which command from the JDK should be used to compile the following source code contained in a file named SmallProg.java ? javac SmallProg.java

```
public class SmallProg {
  public static void main(String[] args) { System.out.println("Good luck"); }
}
```

java SmallProg.

Further, what is the command that should be used to execute at the OS-prompt. [4 marks]

2. The following program has several errors. Modify the program so that it will compile and run without errors.

```
// Filename: Temperature.java
PUBLIC CLASS temperature {
  PUBLIC void main(String args) {
    double farenheit = 62.5;
    */ Convert /*
    double celsius = f2c(farenheit);
    System.out.println(farenheit + 'F' + " = " + Celsius + 'C');
  }
  double f2c(float fahr) {
    RETURN (fahr – 32) * 5/9;
  }
}
```

```
public class Temperature {
  public static void main (String args[])
  {
    double farenheit = 62.5;
    double celsius = F2C (farenheit);
    System.out.println (farenheit + 'F' = ' +
                        celsius + 'C');
  }
  double f2c (double fahr)
  {
    return (fahr – 32) * 5/9;
  }
```

[10 marks]

3. What are access qualifiers ? Where can they be used ? Name them. [5 marks]

private
protected
public
default

4. Can inner classes be instantiated directly ? Explain with an example. [6 marks]

5. Write short notes on: i) Inheritance. ii) Polymorphism. iii) Upcasting. [5+5+5 marks]

(P.T.O)

PART – A : Answer the following in about three lines. Write short Java source code to support your answer. No need for the declaration of package, main() and imports, unless specified (3 marks each)

1. What is finalize() method? Can an object's finalize() be invoked while it is reachable?
2. What are the restrictions for naming the Java package and source code files?
3. What is the difference between the String and StringBuilder classes?
4. If a variable does not have an access modifier, where may the variable be accessed?
5. What is constructor? Does a class inherit the constructors of its superclass?
6. What is the difference between static and non-static variables?
7. Use "this" and "super" with the constructors.
8. What is "final" keyword? Can an abstract class be final?
9. What is Aggregation? When would you use Aggregation?
10. What is an Immutable class? Create a complete user defined Immutable class.

PART – B : (5 marks each)

11. How would you use upcasting to avoid overloading of the methods? Write Java source code to explain your answer.
12. Explain with the help of Java source code the essential concepts of Object Oriented Programming.