Department of Computer Science

Final Term Exam Spring 2020

Subject: Object Oriented Programming

**BS (CS, SE)** Instructor: M.Ayub Khan

There are total **5** questions in this paper. Max Marks: 50

***Note:***

***At the top of the answer sheet there must be the ID, Name and semester of the concerned Student.***

***Students must have to provide the output of their respective programs. Students have same answers or programs will be considered fail. Programs in Java or codes should be explained clearly.***

***As this paper is online so in case of any ambiguity my WhatsApp no. is 034499121116.***

**Each question carries equal marks.**
**Please answer briefly.**

Q1. a. Why access modifiers are used in java, explain in detail Private and Default access modifiers?

ANSWER

ACCESS MODIFIER

Modifier can be used for class , member , variables ,and function .

Access modifier help to implement the concept of encapsulation in OOPs .

Encapsulation helps to hide the data and also has behaviour .

Access modifier affect the accessibility at the two levels ;

Class

Member methods and instance variables .

They use in access modifier because the data abstraction hiding is one of the concept of of object programming .this means client will not know the implementation detail .

This can be achieved through the access modifier .

E. G

If an attribute is made private than it can ba accessed only in the class which define it .

Private access modifier

If a method variables or constructor is define as a private than it can only be accessed within the decleared class , itself access is not available outside the class .

2 ) The private member of a class can be accessible only in the class in which it is decleard by function .

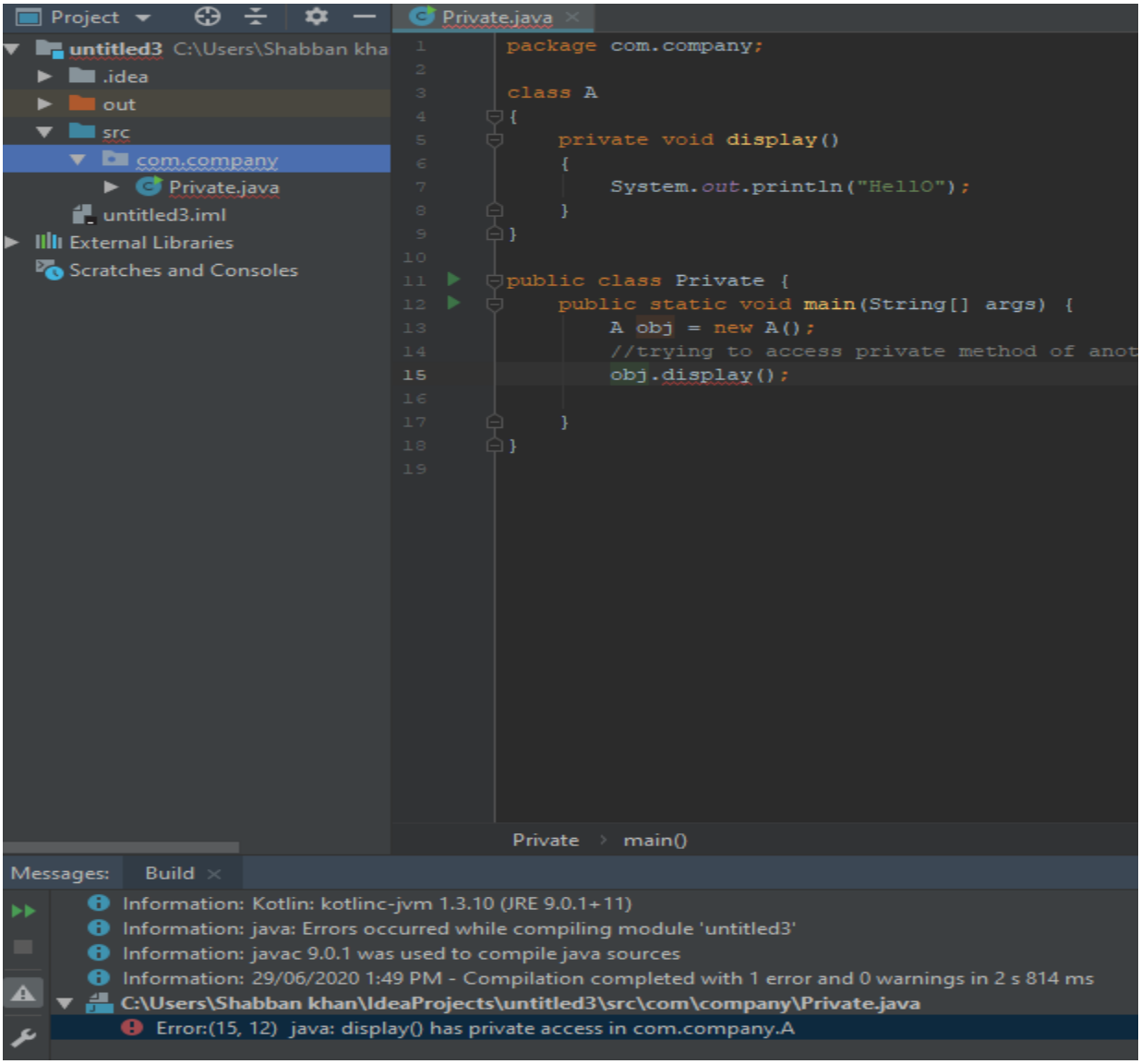
3) It can be used within inheritance .

4) It can be access through public member , function of that class .

DEFULT ACCESS MODIFIER

b. Write a specific program of the above-mentioned access modifiers in java.

# Private:



# Default:

```
package com.company;

public class OtherClass {

    void display()
{
    System.out.println("Hello World!");
}

}
```

```
package com.company;


public class Defult {
    public static void main(String[] args) {

    OtherClass otherClass= new OtherClass();
    otherClass.display();

    }
}
```

```
"C:\Program Files\Java\jdk-9.0.1\b
Hello World!

Process finished with exit code 0
```

Q2. a. Explain in detail Public and Protected access modifiers?

ANSWER

Public access modifier

If the made of access specifier is public than we can access the public member with in the class and outside of the class .

2) The public member is intevited for device class

3) It does not provide any security for its data member .

4) Public member of a class can be accessible from anywhere within in program .

5) It can be used without inheritance

6) Public key words is used to declare define public members of a class .

7) There are many non access modifiers such as static ,abstract ,synchronized ,native etc . Here we are going to learn the access modifiers only .

PROTECTED ACCESS MODIFIERS

1) It is similar to private but the member of a class are accessible by class derived from that class in which protected member is decleard .
2If the made of access of specifier is protected than is can accessible for the class itself in case of inheritance accessible for its device its class .

3It is inhierited for device class with in range

4 )It is mainly used inheritance .

b. Write a specific program of the above mentioned access modifiers in java.

b. Write a specific program of the above-mentioned access modifiers in java.

## Protected:

```
"C:\Program Files\Java\jdk-9.0.1\bin\java.exe"
Hello World! Protected

Process finished with exit code 0
```

```
package com.company;

public class Protec extends OtherClass {
    public static void main(String[] args) {
        Protec protec=new Protec();
        protec.display();

    }

}
```

```
package com.company;

public class OtherClass {

    protected void display()
{
    System.out.println("Hello World! Protected");
}

}
```

Q3. a. What is inheritance and why it is used, discuss in detail?

ANSWER

INHERITANCE

Inheritance is a mechanism in which one class inherits the other class is known as inheritance.

.In other we can say when one class access the property of another class is called inheritance .

There are four types of inheritance

1 ) Single inheritance

2 ) Hiererachical inheritance

2) Multiple inheritance

3) Multi -level inheritance

Base class ;

Whose properties are inherited by another class
Super class or parent class

Derived class

Inherites the properties from base class

Sub class or child class .

b. Write a program using Inheritance class on Animal in java.

```
ckage com.company;

port java.util.Scanner;

blic class Main {

  public static void main(String[] args) {
      Scanner cin= new Scanner(System.in);
      System.out.println("1. Bird\n2. Turtle\n3. Shepherd\n4. Haskey");
      System.out.println("Please Enter a Number");
      int choice= cin.nextInt();
      bird Bird= new bird( color: "golden", legs: 2);
      turtle Turtle = new turtle( color: "green", legs: 4);
      Shepherd shepherd= new Shepherd( color: "brown", legs: 4);
      Huskey huskey= new Huskey( color: "white",  legs: 4);

      switch (choice){
          case 1:
              Bird.movement();
              Bird.getDetails();
              break;
          case 2:
              Turtle.movement();
              Turtle.getDetails();
              break;

          case 3:
              shepherd.movement();
              shepherd.getDetails();
              break;
          case 4:
              huskey.movement();
              huskey.getDetails();
              break;
              default:
                  System.out.println(" Entered wrong Number  ");
                  break;
      }


  // write your code here
  }
```

```
package com.company;

public class Animal {
    private String color;
    private int legs;

    public Animal(String color, int legs) {
        this.color = color;
        this.legs = legs;
    }
    public void movement(){
        System.out.println("movement begins ");
    }
    public void getDetails(){
        System.out.println("Legs: "+this.legs );
        System.out.println("Color: "+this.color );
    }
}
```

```java
package com.company;

public class turtle extends Animal  {

    public turtle(String color, int legs) {
        super(color, legs);
    }

    @Override
    public void movement() {
        super.movement();
        System.out.println(" waking ");
    }
}
```

```java
package com.company;

public class Dog  extends Animal{
    public Dog(String color, int legs) {
        super(color, legs);
    }

    @Override
    public void movement() {
        super.movement();
    }
}
```

```java
package com.company;

public class Shepherd extends Dog {
    public Shepherd(String color, int legs) {
        super(color, legs);
    }

    @Override
    public void movement() {
        super.movement();
        System.out.println(" running ");
    }
}
```

```java
package com.company;

public class Huskey extends Dog {
    public Huskey(String color, int legs) {
        super(color, legs);
    }

    @Override
    public void movement() {
        super.movement();
        System.out.println(" Running ");

    }
}
```

```
1. Bird
2. Turtle
3. Shepherd
4. Haskey
Please Enter a Number
2
movement begins
 waking
Legs: 4
Color: green

Process finished with exit code 0
```

Q4. a. What is polymorphism and why it is used, discuss in detail?

ANSWER

## .POLYORPHISM

Polyorphism is the combination of two of two greek word one is poly means many and another is merphism means Multiple forms

There are two types of Polyorphism

1)Compile time polhorphism
2) Run time polyoerphism

1 )Compile time polyorphism

Compile time polyoerphism acheived by compile time is known as static polyoerphism .

Static mean the compile time poly hence when function is involved and there are multiple function are same name then the compiler decides which function is to be called based on the parameter .

EX - Method overloading

.

## 3) Run time

A polyoerphism which is achived by run time called dynamic polyoerphism

EX- method overloading

b. Write a program using polymorphism in a class on Employee in java.

Ans:

```java
package com.company;

public class Polymorphysim {
    public static void main(String[] args) {
        Animal animal;
        animal= new Dog();
        animal.eat();
        animal=new Cat();
        animal.eat();
        animal=new Lion();
        animal.eat();
    }
}
```

```java
package com.company;

public class Animal {
    void eat(){System.out.println("eating...");}
}
```

```java
package com.company;

public class Cat extends Animal  {
    void eat(){System.out.println("eating rat...");}
}
```

```java
package com.company;

public class Lion  extends Animal  {
    void eat(){System.out.println("eating meat...");}
}
```

```java
package com.company;

public class Dog extends Animal {
    void eat(){System.out.println("eating bread...");}
}
```

```
eating bread...
eating rat...
eating meat...

Process finished with exit code 0
```

Q5. a. Why abstraction is used in OOP, discuss in detail?

ANSWER

# Abstraction

Abstraction is the one of the most important features 0f OOPs which is showing only tje essential information to the to the outside world .and hiding the internal details .

Its hides implementation detail while just presenting the features to the outsides world .
Reduce the code complexity

Hiding detail and exposing the essential parts

In OOPs abstrection is achieved through inheritance .

In java you can use interface and abstract classes to achieve abstraction .

Abstract ideas as the top of the hierarchy and more concrete ideas are at the bottom.

b. Write a program on abstraction in java.

```java
package com.company;

public class Cat extends Animal {

    public void animalSound() {
        System.out.println("The Cat says: meow meow");
    }
}
```

```java
package com.company;

public class Main {
    public static void main(String[] args) {
        Cat cat= new Cat();
        cat.animalSound();
        cat.sleep();
    }
}
```

```java
package com.company;

public class Main {
    public static void main(String[] args) {
        Cat cat= new Cat();
        cat.animalSound();
        cat.sleep();
    }
}
```

```java
package com.company;

public class Main {
    public static void main(String[] args) {
        Cat cat= new Cat();
        cat.animalSound();
        cat.sleep();
    }
}
```

```
"C:\Program Files\Java\jdk-9.0.1\b
The Cat says: meow meow
Zzz

Process finished with exit code 0
```