Test No. 1
Programming in Java, Summer 2022

21/06/2022

Q1. What is the the result after execution of following expressions in Java?

(a)
```
int n = 4, m = 6, p = 5;
n += m % p + 2;
```

(b)
```
int p = 2, n = 4;
int k = n << p;
```

(a)
n = 4 + 6 % 5 + 2
n = 4 + 1 + 2
n = 5+2
n = 7

(b)
k = 4 << 2
Left shift 4 (0100) 2 times
k = 16 (10000)

Q2. What will be the output of the following code

```
class A{
      static { System.out.println("Third"); }
}
class B extends A{
      static { System.out.println("Second"); }
}
class C extends B{
      static { System.out.println("First");  }
}
public class X{
      public static void main(String args[]){
            C obj = new C( );
      }
}
```

Third
Second
First

Q3. Rewrite the following statements using ternary operator

```
if (num != 0){
    result = 100 / num;
else
    result = 0;
```

```
result = ((num != 0) ? 100/num : 0);
```

Q4. Given the following hierarchy of classes

```
class Alpha{....}
class Beta extends Alpha{....}
class Gamma extends Beta{....}
```

In what order are the constructors called when "Gamma" object is instantiated?

In a class hierarchy, constructors complete their execution in order of derivation, from superclass to subclass. In this hierarchy the order will be **Alpha –> Beta -> Gamma**

Q5. Write a method called sum() that takes a variable number of integer arguments and returns sum of arguments as integer value.

```
public int sum(int ... args){
        int sumOfArgs = 0;
         for(int x: args){
               sumOfArgs += x;
        }
         return sumOfArgs;
}
```

Please see **Example: Working of varargs** from https://www.programiz.com/java-programming/varargs

Q6. How can a protected member of a class can be accessed by its subclasses in a different package? Illustrate with an example?

```
// ProtectedSuper.java
package p1;
public class ProtectedSuper{
        protected int x = 10;
        public ProtectedSuper(){
             System.out.println("x in same class " +x);
        }
}
```

Q6. How can a protected member of a class can be accessed by its subclasses in a different package? Illustrate with an example?

```
// ProtectedSub.java
package p2;
import p1.ProtectedSuper;
public class ProtectedSub extends ProtectedSuper{
        public ProtectedSub(){
             System.out.println("x in Different Package sub-class " +x);

        }
}
```

Q6. How can a protected member of a class can be accessed by its subclasses in a different package? Illustrate with an example?

```
// ProtectedDemo.java
package p3;
import p1.ProtectedSuper;
import p2.ProtectedSub;
class ProtectedDemo{
        public static void main(String args[]){
             ProtectedSub ps = new ProtectedSub();
        }
}
```

Q7. Given a superclass shape as shown below:

```
class shape{
        void show(){
                System.out.println(“Superclass show”);
        }
}
```

Create two subclasses rectangle and triangle. Override method show() and Illustrate dynamic method dispatch.

```
class shape{
        void show(){
            System.out.println("Superclass show");
        }
}
class rectangle extends shape{
        void show(){
            System.out.println("Rectangle show");
        }
}
class triangle extends shape{
        void show(){
            System.out.println("Triangle show");
        }
}
```

```
class shapeDemo{
        public static void main(String args[]){
                shape s = new shape();
                rectangle r = new rectangle();
                triangle t = new triangle();
                s = r;
                s.show();
                s = t;
                s.show();
        }
}
```