

# Object-Oriented Programming

## academic year 2010-11

### Rules

- This is a closed books exam.
- The operation of any electronic device is prohibited (e.g. no calculator, phone or PDA).
- Answer the questions being *precise*, *complete*, and *formal*.
- Write as *clearly* as possible, both in terms of handwriting and wording.

### Questions

1. What is the performance effect of a large number of import statements which are not used?
2. How will you write an immutable class?
3. What will be the output of the following program:

---

```
1 public class A extends B {
2     public A() {
3         System.out.println("A()");
4     }
5
6     public static void main(String[] args) {
7         new A();
8     }
9 }
10 class B extends D {
11     public B(D d) {
12         System.out.println("B(D)");
13     }
14
15     public B() {
16         super(new C());
17         System.out.println("B()");
18     }
19 }
20 class C extends D {}
21 class D {
22     public D(D a) {
23         new B(null);
24         System.out.println("D(D)");
25     }
26
27     public D() {
28         super();
29         System.out.println("D()");
30     }
31 }
```

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4. What will be the output of the following program:

---

```
1 public class X {
2     void dosmth(Object obj) { System.out.println("X:Object"); }
3     void dosmth(Double obj) { System.out.println("X:Double"); }
4     void dosmth(byte obj) { System.out.println("X:byte"); }
5     void dosmth(float obj) { System.out.println("X:float"); }
6
7     public static void main(String[] args) {
8         X x = new X();
9         Y y = new Y();
10        X z = new Y();

```

```

11
12     byte b = 0;
13     System.out.println("1:");
14     x.dosmth(b);
15     y.dosmth(b);
16     z.dosmth(b);
17
18     System.out.println("2:");
19     x.dosmth(b + b);
20     y.dosmth(b - b);
21     z.dosmth(b * b);
22
23     System.out.println("3:");
24     x.dosmth((Integer)0);
25     y.dosmth((Integer)0);
26     z.dosmth((Integer)0);
27
28     System.out.println("4:");
29     x.dosmth(0.0);
30     y.dosmth(0.0);
31     z.dosmth(0.0);
32
33     System.out.println("5:");
34     x.dosmth(null);
35     z.dosmth(null);
36 }
37 }
38 class Y extends X {
39     void dosmth(Object obj) { System.out.println("Y:Object"); }
40     void dosmth(Integer obj) { System.out.println("Y:Integer"); }
41     void dosmth(float obj) { System.out.println("Y:float"); }
42 }

```

5. There are compilation errors in 6 lines in the following code. Provide numbers of these lines with a description of corresponding errors as an answer.

```

1 interface F {
2     private void x();
3 }
4 public class Q {
5     final byte doIt(byte x) {
6         return x * x;
7     }
8 }
9 class G extends Q extends F {
10     transient int doIt(int y) {
11         this(y);
12         return 2;
13     }
14
15     int x = 0;
16     int y = {
17         x + x
18     }
19 }

```

6. What is the difference between == and equals method?  
7. Describe the *Singleton* pattern. Why and when it is used? What examples of Singleton do you know within Java API?

8. Describe the default lifecycle in Maven. What phases will be executed and what will be produced if you type command 'mvn package'?
9. Describe the *GI* garbage collector. When is it recommended to use it?