Advanced Class Design Workbook

Answer the Following

1. What is 'this' in java?

2. What is the purpose of default constructor?

3. What is a package?

4. What is the impact of declaring a method as final?

5. What is the access scope of a protected method?

6. I want to print "Hello" even before main() is executed. How will you acheive that?

7. What is constructor?

8. Explain the purpose of Garbage collection.

State whether the following are True/False

1. Static variables can be serialized. [ ]
2. You use this() and super() both in a constructor. [ ]
3. We can override static methods. [ ]
4. We can make a constructor as final. [ ]
5. Constructor returns a value [ ]

Multiple Choice Questions

1. Which statement is true?
   (a) Programs will not run out of memory.
   (b) Objects that will never again be used are eligible for garbage collection.
   (c) Objects that are referred to by other objects will never be garbage collected.
   (d) Objects that can be reached from a live thread will never be garbage collected.
2. Which statement is true?
   (a) Calling Runtime.gc() will cause eligible objects to be garbage collected.
   (b) The garbage collector uses a mark and sweep algorithm.
   (c) If an object can be accessed from a live thread, it can't be garbage collected.
   (d) If object 1 refers to object 2, then object 2 can't be garbage collected.
3. Which operator is used by Java run time implementations to free the memory of an object when it is no longer needed?
   (a) delete
   (b) free
   (c) new

(d) none

4. Which of the folowing statements are incorrect?

   (a) Default constructor is called at the time of declaration of the object if a constructor has not been defined.

   (b) Constructor can be parameterized.

   (c) finalize() method is called when a object goes out of scope and is no longer needed.

   (d) finalize() method must be declared protected.

5. Which of these is used as default for a member of a class if no access specifier is used for it?

   (a) private

   (b) public

   (c) public, within its own package

   (d) protected

6. Which of the following is a method having same name as that of its class?

   (a) finalize

   (b) delete

   (c) class

   (d) constructor

7. Which method can be defined only once in a program?

   (a) main method

   (b) finalize method

   (c) static method

   (d) private method

Exercises

- Write the expected output, or compiler errors if any, for each of the following programs in the box provided below each program.
- Then execute the programs and check your answers.
- Then answer the questions given below.

Program 1

```
1  public class Test {
2      static {
3          print(10);
4      }
5      static void print(int x) {
6          System.out.println(x);
7          System.exit(0);
8      }
9  }
```

Q1: What will happen if you try to compile and run above code?

Program 2

```
1  package source;
2  class Test {
3      public static void main(String args[]) {
4          StringBuffer sb = new StringBuffer(``Hello World'');
5          sb.insert(6 , ``Good '');
6          System.out.println(sb);
7      }
8  }
```

Q1: What will be the output if Test class is not in source package?

Program 3

```
1  package source;
2  class Display {
3      int x;
4      void show() {
5          if (x > 1)
6              System.out.print(x + `` '');
7      }
8  }
9  class Test {
10     public static void main(String args[]) {
11         Display[] arr = new Display[3];
```

```
12            for(int i = 0; i < 3; i++)
13                arr[i] = new Display();
14            arr[0].x = 0;
15            arr[1].x = 1;
16            arr[2].x = 2;
17            for (int i = 0; i < 3; ++i)
18                arr[i].show();
19        }
20    }
```

Q1: What will be the output if Test class is in source package?

Program 4

```
1  void start() {
2      A a = new A();
3      B b = new B();
4      a.s(b);
5      b = null; /* Line 5 */
6      a = null;  /* Line 6 */
7      System.out.println(``start completed''); /* Line 7 */
8  }
```

Q1: When is the B object, created in line 3, eligible for garbage collection?

Program 5

```
1  public class X {
2      public static void main(String [] args) {
3          X x = new X();
4          X x2 = m1(x); /* Line 6 */
5          X x4 = new X();
6          x2 = x4; /* Line 8 */
7          doComplexStuff();
8      }
9      static X m1(X mx) {
10         mx = new X();
```

```
11          return mx;
12      }
13  }
```

Q1: After line 8 runs. how many objects are eligible for garbage collection?

Program 6

```
1  public class A {
2      void A() {  /* Line 3 */
3          System.out.println(``Class A'');
4      }
5      public static void main(String[] args) {
6          new A();
7      }
8  }
```

Q1: What will be the output of the above program?

Program 7

```
1  public class Profile {
2      private Profile(int w) { // line 1
3          System.out.println(w);
4      }
5      public static Profile() { // line 5
6          System.out.println(10);
7      }
8      public static void main(String args[]) {
9          Profile obj = new Profile(50);
10     }
11 }
```

Q1: What will be the output of the above program?

Program 8

```
1  public class Tester {
2      Tester() { } // line 1
3      static void Tester() { this(); } // line 2
4      public static void main(String[] args) { // line 3
5          Tester(); // line 4
6      }
7  }
```

Q1: The above code contains one compilation error, where could it be?

Program 9

```
1  public class Tester {
2      public static void main(String[] args) {
3          int x = 1;
4          int y;
5          while(++x<5) y++;
6          System.out.println(y);
7      }
8  }
```

Q1: What is the result of compiling and running the above program?

Program 10

```
1  public class Tester {
2      public static void main(String[] args) {
3          if(true) {
4              int x = 5;
5              System.out.print(x);
6          } else {
7              ++x;
8              System.out.print(x);
```

```
9                   }
10              }
11      }
```

Q1: What is the result of compiling and running the above code?