

# Mock Exam



This is a mock exam for Sun Certified Programmer for the Java Platform Standard Edition 6 (SCJP 1.6). It comprises brand new questions, which are similar to the questions that can be expected on the real exam.

## Questions

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- Q1 Given the following class, which statements can be inserted at (1) without causing a compilation error?

```
public class Q6db8 {
    int a;
    int b = 0;
    static int c;

    public void m() {
        int d;
        int e = 0;

        // (1) INSERT CODE HERE.
    }
}
```

Select the four correct answers.

- (a) a++;
  - (b) b++;
  - (c) c++;
  - (d) d++;
  - (e) e++;
- Q2 What is wrong with the following code?

```
class MyException extends Exception {}

public class Qb4ab {
    public void foo() {
        try {
```

```

        bar();
    } finally {
        baz();
    } catch (MyException e) {}
}

public void bar() throws MyException {
    throw new MyException();
}

public void baz() throws RuntimeException {
    throw new RuntimeException();
}
}

```

Select the one correct answer.

- (a) Since the method `foo()` does not catch the exception generated by the method `baz()`, it must declare the `RuntimeException` in a `throws` clause.
- (b) A `try` block cannot be followed by both a `catch` and a `finally` block.
- (c) An empty `catch` block is not allowed.
- (d) A `catch` block cannot follow a `finally` block.
- (e) A `finally` block must always follow one or more `catch` blocks.

Q3 What will be written to the standard output when the following program is run?

```

public class Qd803 {
    public static void main(String[] args) {
        String word = "restructure";
        System.out.println(word.substring(2, 3));
    }
}

```

Select the one correct answer.

- (a) est
- (b) es
- (c) str
- (d) st
- (e) s

Q4 Given that a static method `doIt()` in the class `Work` represents work to be done, which block of code will succeed in starting a new thread that will do the work?

Select the one correct answer.

- (a) 

```
Runnable r = new Runnable() {
    public void run() {
        Work.doIt();
    }
};
Thread t = new Thread(r);
t.start();
```
- (b) 

```
Thread t = new Thread() {
    public void start() {
        Work.doIt();
    }
};
t.start();
```

- (c) `Runnable r = new Runnable() {  
 public void run() {  
 Work.doIt();  
 }  
};  
r.start();`
- (d) `Thread t = new Thread(new Work());  
t.start();`
- (e) `Runnable t = new Runnable() {  
 public void run() {  
 Work.doIt();  
 }  
};  
t.run();`

Q5 Which import statements, when inserted at (4) in package p3, will result in a program that can be compiled and run?

```
package p2;
enum March {LEFT, RIGHT;                // (1)
    public String toString() {
        return "Top-level enum";
    }
}
public class DefenceInDepth {
    public enum March {LEFT, RIGHT;      // (2)
        public String toString() {
            return "Static enum";
        }
    }
    public enum Military { INFANTRY, AIRFORCE;
        public static enum March {LEFT, RIGHT; // (3)
            public String toString() {
                return "Statically nested enum";
            }
        }
    }
}
```

---

```
package p3;
// (4) INSERT IMPORTS HERE
public class MarchingOrders {
    public static void main(String[] args) {
        System.out.println(March.LEFT);
        System.out.println(DefenceInDepth.March.LEFT);
        System.out.println(p2.DefenceInDepth.March.LEFT);
        System.out.println(Military.March.LEFT);
        System.out.println(DefenceInDepth.Military.March.LEFT);
        System.out.println(p2.DefenceInDepth.Military.March.LEFT);
        System.out.println(LEFT);
    }
}
```

Select the three correct answers.

- (a) `import p2.*;`  
`import p2.DefenceInDepth.*;`  
`import static p2.DefenceInDepth.Military.March.LEFT;`
- (b) `import p2.*;`  
`import static p2.DefenceInDepth.*;`  
`import static p2.DefenceInDepth.Military.March.LEFT;`
- (c) `import p2.DefenceInDepth;`  
`import static p2.DefenceInDepth.*;`  
`import static p2.DefenceInDepth.Military.March.LEFT;`
- (d) `import static p2.DefenceInDepth;`  
`import static p2.DefenceInDepth.*;`  
`import static p2.DefenceInDepth.Military.March.LEFT;`
- (e) `import p2.*;`  
`import static p2.DefenceInDepth.*;`  
`import static p2.DefenceInDepth.Military.*;`
- (f) `import p2.*;`  
`import static p2.DefenceInDepth.*;`  
`import static p2.DefenceInDepth.Military.March;`

Q6 What will be printed when the following program is run?

```
public class Q8929 {
    public static void main(String[] args) {
        for (int i = 12; i > 0; i -= 3)
            System.out.print(i);
            System.out.println("");
        }
    }
```

Select the one correct answer.

- (a) 12
- (b) 129630
- (c) 12963
- (d) 36912
- (e) None of the above.

Q7 What will be the result of compiling and running the following program?

```
public class Q275d {
    static int a;
    int b;

    public Q275d() {
        int c;
        c = a;
        a++;
        b += c;
    }

    public static void main(String[] args) {
        new Q275d();
    }
}
```

Select the one correct answer.

- (a) The code will fail to compile, since the constructor is trying to access the static members.
- (b) The code will fail to compile, since the constructor is trying to use the static field a before it has been initialized.
- (c) The code will fail to compile, since the constructor is trying to use the field b before it has been initialized.
- (d) The code will fail to compile, since the constructor is trying to use the local variable c before it has been initialized.
- (e) The code will compile and run without any problems.

Q8 Which statement is true about the compilation and execution of the following program with assertions enabled?

```
public class Qf1e3 {
    String s1;
    String s2 = "hello";
    String s3;

    Qf1e3() {
        s1 = "hello";
    }

    public static void main(String[] args) {
        (new Qf1e3()).f();
    }

    {
        s3 = "hello";
    }

    void f() {
        String s4 = "hello";
        String s5 = new String("hello");
        assert(s1.equals(s2)); // (1)
        assert(s2.equals(s3)); // (2)
        assert(s3 == s4);      // (3)
        assert(s4 == s5);      // (4)
    }
}
```

Select the one correct answer.

- (a) The compilation will fail.
- (b) The assertion on the line marked (1) will fail.
- (c) The assertion on the line marked (2) will fail.
- (d) The assertion on the line marked (3) will fail.
- (e) The assertion on the line marked (4) will fail.
- (f) The program will run without any errors.

Q9 Under which circumstance will a thread stop?

Select the one correct answer.

- (a) The run() method that the thread is executing ends.
- (b) When the call to the start() method of the Thread object returns.
- (c) The suspend() method is called on the Thread object.
- (d) The wait() method is called on the Thread object.

Q10 Which statements are true about the following program?

```
public class Q100_82 {
    public static void main(String[] args) {
        Object o = choose(991, "800");           // (1)
        Number n1 = choose(991, 3.14);          // (2)
        Number n2 = Q100_82.<Double>choose((double)991, 3.14); // (3)
        int k = (int) choose(1.3, 3.14);        // (4)
        int l = (int) (double) choose(1.3, 3.14); // (5)
    }

    public static <T extends Comparable<T>> T choose(T t1, T t2) {
        return t1.compareTo(t2) >= 0 ? t1 : t2;
    }
}
```

Select the two correct answers.

- (a) The class must be declared as a generic type:  
`public class Q100_82<T extends Comparable<T>> { ... }`
- (b) The compiler reports errors in (1).
- (c) The compiler reports no errors in (2).
- (d) The compiler reports no errors in (3).
- (e) The compiler reports no errors in (4).
- (f) The compiler reports errors in (5).

Q11 What will be written to the standard output when the following program is run?

```
class Base {
    int i;
    Base() { add(1); }
    void add(int v) { i += v; }
    void print() { System.out.println(i); }
}

class Extension extends Base {
    Extension() { add(2); }
    void add(int v) { i += v*2; }
}

public class Qd073 {
    public static void main(String[] args) {
        bogo(new Extension());
    }

    static void bogo(Base b) {
        b.add(8);
        b.print();
    }
}
```

Select the one correct answer.

- (a) 9
- (b) 18
- (c) 20
- (d) 21
- (e) 22

Q12 Which collection implementation is suitable for maintaining an ordered sequence of objects, when objects are frequently inserted in and removed from the middle of the sequence?

Select the one correct answer.

- (a) TreeMap
- (b) HashSet
- (c) Vector
- (d) LinkedList
- (e) ArrayList

Q13 Which statements, when inserted at (1), will make the program print 1 on the standard output when executed?

```
public class Q4a39 {
    int a = 1;
    int b = 1;
    int c = 1;

    class Inner {
        int a = 2;

        int get() {
            int c = 3;
            // (1) INSERT CODE HERE.
            return c;
        }
    }

    Q4a39() {
        Inner i = new Inner();
        System.out.println(i.get());
    }

    public static void main(String[] args) {
        new Q4a39();
    }
}
```

Select the two correct answers.

- (a) `c = b;`
- (b) `c = this.a;`
- (c) `c = this.b;`
- (d) `c = Q4a39.this.a;`
- (e) `c = c;`

Q14 Given the following code:

```
import java.io.*;
public class Q800_110 {

    public static void main(String[] args)
    throws IOException, ClassNotFoundException {
        String[] dirNames = {
            "." + File.separator + "dir1",
            "." + File.separator + "dir2",
            "." + File.separator + "dir1" + File.separator + "dir2"
        };
        for(String dir : dirNames) {
            File file = new File(dir, "myFile.txt");
            System.out.print(/* INSERT EXPRESSION HERE */); // (1)
        }
    }
}
```

Assume that each directory named in the array `dirNames` has a file named "myFile.txt".

Which expressions, when inserted at (1), will result in the output "truetrue"?

Select the three correct answers.

- (a) `file.found()`
- (b) `file.isFile()`
- (c) `!file.isDirectory()`
- (d) `file.exists()`
- (e) `file.isFile()`
- (f) `!file.isDirectory()`

Q15 Which is the first line in the following code after which the object created in the line marked (0) will be a candidate for garbage collection, assuming no compiler optimizations are done?

```
public class Q76a9 {
    static String f() {
        String a = "hello";
        String b = "bye"; // (0)
        String c = b + "!"; // (1)
        String d = b; // (2)

        b = a; // (3)
        d = a; // (4)
        return c; // (5)
    }

    public static void main(String[] args) {
        String msg = f();
        System.out.println(msg); // (6)
    }
}
```



Select the one correct answer.

- (a) The line marked (1).
- (b) The line marked (2).
- (c) The line marked (3).
- (d) The line marked (4).
- (e) The line marked (5).
- (f) The line marked (6).

Q16 Which string, when inserted at (1), will not result in the same output as the other three strings?

```
import java.util.regex.Pattern;
import java.util.regex.Matcher;
public class Q500_50 {
    public static void main(String[] args) {
        String index = "0123456789012345678";
        String target = "JAVA JaVa java jaVA";
        Pattern pattern = Pattern.compile(_____); // (1)
        Matcher matcher = pattern.matcher(target);
        while(matcher.find()) {
            int startIndex = matcher.start();
            int endIndex = matcher.end();
            int lastIndex = startIndex == endIndex ? endIndex : endIndex-1;
            String matchedStr = matcher.group();
            System.out.print("(" + startIndex + "," + lastIndex + ":" +
                matchedStr + ")");
        }
        System.out.println();
    }
}
```

Select the one correct answer.

- (a) "[A-Za-z]+"
- (b) "[a-zA-Z]+"
- (c) "[A-Z]+[a-z]+"
- (d) "[A-Z[a-z]]+"

Q17 Which method from the String or StringBuilder classes modifies the object on which it is invoked?

Select the one correct answer.

- (a) The charAt() method of the String class.
- (b) The toUpperCase() method of the String class.
- (c) The replace() method of the String class.
- (d) The reverse() method of the StringBuilder class.
- (e) The length() method of the StringBuilder class.

Q18 Which statements are true, given the code new FileOutputStream("data", true) for creating an object of class FileOutputStream?

Select the two correct answers.

- (a) FileOutputStream has no constructors matching the given arguments.
- (b) An IOException will be thrown if a file named "data" already exists.
- (c) An IOException will be thrown if a file named "data" does not already exist.
- (d) If a file named "data" exists, its contents will be reset and overwritten.
- (e) If a file named "data" exists, output will be appended to its current contents.

Q19 Which statement, when inserted at (1), will raise a runtime exception?

```
class A {}  
class B extends A {}  
class C extends A {}  
public class Q3ae4 {  
    public static void main(String[] args) {  
        A x = new A();  
        B y = new B();  
        C z = new C();  
  
        // (1) INSERT CODE HERE.  
    }  
}
```

Select the one correct answer.

- (a) x = y;
- (b) z = x;
- (c) y = (B) x;
- (d) z = (C) y;
- (e) y = (A) y;

Q20 Given the following program:

```
public class Q400_60 {  
    public static void main(String[] args) {  
        String str = "loop or not to loop";  
        String[] strs = {"loop", "or", "not", "to", "loop"};  
        // (1) INSERT LOOP HERE.  
    }  
}
```

Which code, when inserted at (1), will compile without errors?

Select the four correct answers.

- (a) for (char ch : str)  
 System.out.print(ch);
- (b) for (char ch : str.toCharArray())  
 System.out.print(ch);
- (c) for (Character ch : str.toCharArray())  
 System.out.print(ch);
- (d) for (Character ch : str.toCharArray())  
 System.out.print(ch.charValue());

- (e) for (String str : strs)  
    System.out.print(str);
- (f) for (String elt : strs[])  
    System.out.print(elt);
- (g) for (String elt : strs)  
    System.out.print(elt);
- (h) for (Character ch : strs[str.length-1].toArray())  
    System.out.print(ch);

Q21 A method within a class is only accessible by classes that are defined within the same package as the class of the method. How can such a restriction be enforced?

Select the one correct answer.

- (a) Declare the method with the keyword `public`.
- (b) Declare the method with the keyword `protected`.
- (c) Declare the method with the keyword `private`.
- (d) Declare the method with the keyword `package`.
- (e) Do not declare the method with any accessibility modifiers.

Q22 Which code initializes the two-dimensional array `matrix` so that `matrix[3][2]` is a valid element?

Select the two correct answers.

- (a) `int[][] matrix = {  
    { 0, 0, 0 },  
    { 0, 0, 0 }  
};`
- (b) `int matrix[][] = new int[4][];  
for (int i = 0; i < matrix.length; i++) matrix[i] = new int[3];`
- (c) `int matrix[][] = {  
    0, 0, 0, 0,  
    0, 0, 0, 0,  
    0, 0, 0, 0,  
    0, 0, 0, 0  
};`
- (d) `int matrix[3][2];`
- (e) `int[] matrix[] = { {0, 0, 0}, {0, 0, 0}, {0, 0, 0}, {0, 0, 0} };`

Q23 Given the following directory structure:

```

/proj
|--- lib
|    |--- supercharge.jar
|
|--- src
|    |--- top
|        |--- sub
|            |--- A.java

```

Assume that the current directory is `/proj/src`, and that the class A declared in the file `A.java` uses reference types from the JAR file `supercharge.jar`.

Which commands will succeed without compile-time errors?

Select the two correct answers.

- (a) `javac -cp ../lib top/sub/A.java`
- (b) `javac -cp ../lib/supercharge top/sub/A.java`
- (c) `javac -cp ../lib/supercharge.jar top/sub/A.java`
- (d) `javac -cp /proj/lib/supercharge.jar top/sub/A.java`
- (e) `javac -cp /proj/lib top/sub/A.java`

Q24 What will be the result of attempting to run the following program?

```
public class Qaa75 {
    public static void main(String[] args) {
        String[][][] arr = {
            { {}, null },
            { { "1", "2" }, { "1", null, "3" } },
            {},
            { { "1", null } }
        };

        System.out.println(arr.length + arr[1][2].length);
    }
}
```

Select the one correct answer.

- (a) The program will terminate with an `ArrayIndexOutOfBoundsException`.
- (b) The program will terminate with a `NullPointerException`.
- (c) 4 will be written to standard output.
- (d) 6 will be written to standard output.
- (e) 7 will be written to standard output.

Q25 Which expressions will evaluate to true if preceded by the following code?

```
String a = "hello";
String b = new String(a);
String c = a;
char[] d = { 'h', 'e', '\l', '\l', 'o' };
```

Select the two correct answers.

- (a) `(a == "Hello")`
- (b) `(a == b)`
- (c) `(a == c)`
- (d) `a.equals(b)`
- (e) `a.equals(d)`

Q26 Which statements are true about the following code?

```
class A {
    public A() {}

    public A(int i) { this(); }
}

class B extends A {
    public boolean B(String msg) { return false; }
}

class C extends B {
    private C() { super(); }

    public C(String msg) { this(); }

    public C(int i) {}
}
```

Select the two correct answers.

- (a) The code will fail to compile.
- (b) The constructor in A that takes an int as an argument will never be called as a result of constructing an object of class B or C.
- (c) Class C defines three constructors.
- (d) Objects of class B cannot be constructed.
- (e) At most one of the constructors of each class is called as a result of constructing an object of class C.

Q27 Given two collection objects referenced by col1 and col2, which statements are true?

Select the two correct answers.

- (a) The operation col1.retainAll(col2) will not modify the col1 object.
- (b) The operation col1.removeAll(col2) will not modify the col2 object.
- (c) The operation col1.addAll(col2) will return a new collection object, containing elements from both col1 and col2.
- (d) The operation col1.containsAll(col2) will not modify the col1 object.

Q28 Which statements are true about the relationships between the following classes?

```
class Foo {
    int num;
    Baz comp = new Baz();
}

class Bar {
    boolean flag;
}

class Baz extends Foo {
    Bar thing = new Bar();
    double limit;
}
```

Select the three correct answers.

- (a) A Bar is a Baz.
- (b) A Foo has a Bar.
- (c) A Baz is a Foo.
- (d) A Foo is a Baz.
- (e) A Baz has a Bar.

Q29 Which statements are true about the value of a field, when no explicit assignments have been made?

Select the two correct answers.

- (a) The value of a field of type `int` is undetermined.
- (b) The value of a field of any numeric type is zero.
- (c) The compiler may issue an error if the field is used in a method before it is initialized.
- (d) A field of type `String` will denote the empty string (`""`).
- (e) The value of all fields which are references is `null`.

Q30 Which statement is not true about the following two statements?

```
FileInputStream inputFile = new FileInputStream("myfile"); // (1)
FileOutputStream outputFile = new FileOutputStream("myfile"); // (2)
```

Select the one correct answer.

- (a) Statement (1) throws a `FileNotFoundException` if the file cannot be found, or is a directory or cannot be opened for some reason.
- (b) Statement (1) throws an `IOException` if the file cannot be found, or is a directory or cannot be opened for some reason.
- (c) Statement (2) throws a `FileNotFoundException` if the file is a directory or cannot be opened for some reason.
- (d) Statement (2) throws an `IOException` if the file is a directory or cannot be opened for some reason.
- (e) Statement (2) creates a new file if one does not exist and appropriate permissions are granted.
- (f) If the file opened by statement (2) already exists, its contents will be overwritten.

Q31 Which statements describe guaranteed behavior of the garbage collection and finalization mechanisms?

Select the two correct answers.

- (a) An object is deleted as soon as there are no more references that denote the object.
- (b) The `finalize()` method will eventually be called on every object.
- (c) The `finalize()` method will never be called more than once on an object.
- (d) An object will not be garbage collected as long as it is possible for a live thread to access it through a reference.
- (e) The garbage collector will use a mark and sweep algorithm.

Q32 Which main() method will succeed in printing the last program argument to the standard output and exit gracefully with no output if no program arguments are specified?

Select the one correct answer.

- (a) 

```
public static void main(String[] args) {
    if (args.length != 0)
        System.out.println(args[args.length-1]);
}
```
- (b) 

```
public static void main(String[] args) {
    try { System.out.println(args[args.length]); }
    catch (ArrayIndexOutOfBoundsException e) {}
}
```
- (c) 

```
public static void main(String[] args) {
    int ix = args.length;
    String last = args[ix];
    if (ix != 0) System.out.println(last);
}
```
- (d) 

```
public static void main(String[] args) {
    int ix = args.length-1;
    if (ix > 0) System.out.println(args[ix]);
}
```
- (e) 

```
public static void main(String[] args) {
    try { System.out.println(args[args.length-1]); }
    catch (NullPointerException e) {}
}
```

Q33 Which statements are true about the interfaces in the Java Collections Framework?

Select the three correct answers.

- (a) Set extends Collection.
- (b) All methods defined in Set are also defined in Collection.
- (c) List extends Collection.
- (d) All methods defined in List are also defined in Collection.
- (e) Map extends Collection.

Q34 What will be the result of compiling and running the following code?

```
public enum FrequentFlyer {
    PLATINUM(20), GOLD(10), SILVER(5), BASIC(0);
    private double extra;

    FrequentFlyer(double extra) {
        this.extra = extra;
    }

    public static void main (String[] args) {
        System.out.println(GOLD.ordinal() > SILVER.ordinal());
        System.out.println(max(GOLD, SILVER));
    }
}
```

```

        System.out.println(max2(GOLD,SILVER));
    }

    public static FrequentFlyer max(FrequentFlyer c1, FrequentFlyer c2) {
        FrequentFlyer maxFlyer = c1;
        if (c1.compareTo(c2) < 0)
            maxFlyer = c2;
        return maxFlyer;
    }

    public static FrequentFlyer max2(FrequentFlyer c1, FrequentFlyer c2) {
        FrequentFlyer maxFlyer = c1;
        if (c1.extra < c2.extra)
            maxFlyer = c2;
        return maxFlyer;
    }
}

```

Select the one correct answer.

- (a) The program will compile and print:  
false  
SILVER  
GOLD
- (b) The program will compile and print:  
true  
GOLD  
SILVER
- (c) The program will compile and print:  
true  
GOLD  
GOLD
- (d) The program will not compile, since the enum type FrequentFlyer does not implement the Comparable interface.

Q35 Given the following class declarations, which expression identifies whether the object referenced by obj was created by instantiating class B rather than classes A, C, and D?

```

class A {}
class B extends A {}
class C extends B {}
class D extends A {}

```

Select the one correct answer.

- (a) obj instanceof B
- (b) obj instanceof A && !(obj instanceof C)
- (c) obj instanceof B && !(obj instanceof C)
- (d) !(obj instanceof C || obj instanceof D)
- (e) !(obj instanceof A) && !(obj instanceof C) && !(obj instanceof D)



Q36 What will be written to the standard output when the following program is executed?

```
public class Qcb90 {
    int a;
    int b;
    public void f() {
        a = 0;
        b = 0;
        int[] c = { 0 };
        g(b, c);
        System.out.println(a + " " + b + " " + c[0] + " ");
    }

    public void g(int b, int[] c) {
        a = 1;
        b = 1;
        c[0] = 1;
    }

    public static void main(String[] args) {
        Qcb90 obj = new Qcb90();

        obj.f();
    }
}
```

Select the one correct answer.

- (a) 0 0 0
- (b) 0 0 1
- (c) 0 1 0
- (d) 1 0 0
- (e) 1 0 1

Q37 Given the following class, which statements are correct implementations of the hashCode() method?

```
class ValuePair {
    public int a, b;
    public boolean equals(Object other) {
        try {
            ValuePair o = (ValuePair) other;
            return (a == o.a && b == o.b)
                || (a == o.b && b == o.a);
        } catch (ClassCastException cce) {
            return false;
        }
    }
    public int hashCode() {
        // (1) INSERT CODE HERE.
    }
}
```

Select the three correct answers.

- (a) return 0;
- (b) return a;
- (c) return a + b;
- (d) return a - b;
- (e) return a ^ b;

Q38 Given the following code:

```
class Interval<_____> { // (1) INSERT TYPE CONSTRAINT HERE
    private N lower, upper;
    public void update(N value) {
        if (lower == null || value.compareTo(lower) < 0)
            lower = value;
        if (upper == null || value.compareTo(upper) > 0)
            upper = value;
    }
}
```

Which type constraints, when inserted at (1), will allow the class to compile?

Select the four correct answers.

- (a) N extends Object
- (b) N extends Comparable<N>
- (c) N extends Object & Comparable<N>
- (d) N extends Number
- (e) N extends Number & Comparable<N>
- (f) N extends Comparable<N> & Number
- (g) N extends Integer
- (h) N extends Integer & Comparable<N>

Q39 Which statements are true regarding the execution of the following code?

```
public class Q3a0a {
    public static void main(String[] args) {
        int j = 5;

        for (int i = 0; i < j; i++) {
            assert i < j-- : i > 0;
            System.out.println(i * j);
        }
    }
}
```

Select the two correct answers.

- (a) An AssertionError will be thrown if assertions are enabled at runtime.
- (b) The last number printed is 4, if assertions are disabled at runtime.
- (c) The last number printed is 20, if assertions are disabled at runtime.
- (d) The last number printed is 4, if assertions are enabled at runtime.
- (e) The last number printed is 20, if assertions are enabled at runtime.

Q40 Which of the following method names are overloaded?

Select the three correct answers.

- (a) The method name `yield` in `java.lang.Thread`
- (b) The method name `sleep` in `java.lang.Thread`
- (c) The method name `wait` in `java.lang.Object`
- (d) The method name `notify` in `java.lang.Object`

Q41 What will be the result of attempting to compile and run the following program?

```
public class Q28fd {
    public static void main(String[] args) {
        int counter = 0;
        l1:
        for (int i=0; i<10; i++) {
            l2:
            int j = 0;
            while (j++ < 10) {
                if (j > i) break l2;
                if (j == i) {
                    counter++;
                    continue l1;
                }
            }
        }
        System.out.println(counter);
    }
}
```

Select the one correct answer.

- (a) The program will fail to compile.
- (b) The program will not terminate normally.
- (c) The program will write 10 to the standard output.
- (d) The program will write 0 to the standard output.
- (e) The program will write 9 to the standard output.

Q42 Given the following interface declaration, which declaration is valid?

```
interface I {
    void setValue(int val);
    int getValue();
}
```

Select the one correct answer.

- (a) 

```
class A extends I {
    int value;
    void setValue(int val) { value = val; }
    int getValue() { return value; }
}
```
- (b) 

```
interface B extends I {
    void increment();
}
```

- (c) abstract class C implements I {  
     int getValue() { return 0; }  
     abstract void increment();  
 }
- (d) interface D implements I {  
     void increment();  
 }
- (e) class E implements I {  
     int value;  
     public void setValue(int val) { value = val; }  
 }

Q43 Which statements are true about the methods notify() and notifyAll()?

Select the two correct answers.

- (a) An instance of the class Thread has a method named notify that can be invoked.
- (b) A call to the method notify() will wake the thread that currently owns the lock of the object.
- (c) The method notify() is synchronized.
- (d) The method notifyAll() is defined in the class Thread.
- (e) When there is more than one thread waiting to obtain the lock of an object, there is no way to be sure which thread will be notified by the notify() method.

Q44 Which statements are true about the correlation between the inner and outer instances of member classes?

Select the two correct answers.

- (a) Fields of the outer instance are always accessible to inner instances, regardless of their accessibility modifiers.
- (b) Fields of the outer instance can never be accessed using only the variable name within the inner instance.
- (c) More than one inner instance can be associated with the same outer instance.
- (d) All variables from the outer instance that should be accessible in the inner instance must be declared final.
- (e) A class that is declared final cannot have any member classes.

Q45 What will be the result of attempting to compile and run the following code?

```
public class Q6b0c {
    public static void main(String[] args) {
        int i = 4;
        float f = 4.3;
        double d = 1.8;
        int c = 0;
        if (i == f) c++;
        if (((int) (f + d)) == ((int) f + (int) d)) c += 2;
        System.out.println(c);
    }
}
```

Select the one correct answer.

- (a) The code will fail to compile.
- (b) The value 0 will be written to the standard output.
- (c) The value 1 will be written to the standard output.
- (d) The value 2 will be written to the standard output.
- (e) The value 3 will be written to the standard output.

Q46 Which operators will always evaluate all the operands?

Select the two correct answers.

- (a) ||
- (b) +
- (c) &&
- (d) ? :
- (e) %

Q47 Which statement concerning the switch construct is true?

Select the one correct answer.

- (a) All switch statements must have a default label.
- (b) There must be exactly one label for each code segment in a switch statement.
- (c) The keyword continue can never occur within the body of a switch statement.
- (d) No case label may follow a default label within a single switch statement.
- (e) A character literal can be used as a value for a case label.

Q48 Given the following code:

```
public class Q600_90 {
    public static void main(String[] args) {
        Scanner lexer = new Scanner("Treat!");
        if(lexer.hasNext("\\w+")) {
            // (1)
        } else
            lexer.next();
        // (2)
        lexer.close();
        // (3)
    }
}
```

Where in the program can we independently insert the following print statement:

```
System.out.print(lexer.next());
```

in order for the program to compile and print the following output when run:

```
Treat!
```

Select the one correct answer.

- (a) Insert the print statement at (1) only.
- (b) Insert the print statement at (2) only.
- (c) Insert the print statement at (3) only.
- (d) None of the above.

Q49 Which of the following expressions are valid?

Select the three correct answers.

- (a) `System.out.hashCode()`
- (b) `"".hashCode()`
- (c) `42.hashCode()`
- (d) `("4"+2).equals(42)`
- (e) `(new java.util.ArrayList<String>()).hashCode()`

Q50 Which statement regarding the following method definition is true?

```
boolean e() {
    try {
        assert false;
    } catch (AssertionError ae) {
        return true;
    }
    return false;    // (1)
}
```

Select the one correct answer.

- (a) The code will fail to compile, since catching an `AssertionError` is illegal.
- (b) The code will fail to compile, since the return statement at (1) is unreachable.
- (c) The method will return `true`, regardless of whether assertions are enabled at runtime or not.
- (d) The method will return `false`, regardless of whether assertions are enabled at runtime or not.
- (e) The method will return `true` if and only if assertions are enabled at runtime.

Q51 Which statement, when inserted at (1), will call the `print()` method in the `Base` class.

```
class Base {
    public void print() {
        System.out.println("base");
    }
}

class Extension extends Base {
    public void print() {
        System.out.println("extension");

        // (1) INSERT CODE HERE.
    }
}

public class Q294d {
    public static void main(String[] args) {
        Extension ext = new Extension();
        ext.print();
    }
}
```

Select the one correct answer.

- (a) Base.print();
- (b) Base.this.print();
- (c) print();
- (d) super.print();
- (e) this.print();

Q52 Which statements are true about the following code?

```
public class Vertical {
    private int alt;
    public synchronized void up() {
        ++alt;
    }
    public void down() {
        --alt;
    }
    public synchronized void jump() {
        int a = alt;
        up();
        down();
        assert(a == alt);
    }
}
```

Select the two correct answers.

- (a) The code will fail to compile.
- (b) Separate threads can execute the up() method concurrently.
- (c) Separate threads can execute the down() method concurrently.
- (d) Separate threads can execute both the up() and the down() methods concurrently.
- (e) The assertion in the jump() method will not fail under any circumstances.

Q53 Which parameter declarations can be inserted at (1) so that the program compiles without warnings?

```
interface Wagger{}
class Pet implements Wagger{}
class Dog extends Pet {}
class Cat extends Pet {}

public class Q100_51 {
    public static void main(String[] args) {
        List<Pet> p = new ArrayList<Pet>();
        List<Dog> d = new ArrayList<Dog>();
        List<Cat> c = new ArrayList<Cat>();
        examine(p);
        examine(d);
        examine(c);
    }

    static void examine(_____ pets) { // (1)
        System.out.print("Your pets need urgent attention.");
    }
}
```

Select the three correct answers.

- (a) List<? extends Pet>
- (b) List<? super Pet>
- (c) List<? extends Wagger>
- (d) List<? super Wagger>
- (e) List<?>
- (f) All of the above

Q54 What will be written to the standard output when the following program is run?

```
public class Q03e4 {
    public static void main(String[] args) {
        String space = " ";

        String composite = space + "hello" + space + space;
        composite.concat("world");

        String trimmed = composite.trim();

        System.out.println(trimmed.length());
    }
}
```

Select the one correct answer.

- (a) 5
- (b) 6
- (c) 7
- (d) 12
- (e) 13

Q55 Given the following code, which statements are true about the objects referenced by the fields i, j, and k, given that any thread may call the methods a(), b(), and c() at any time?

```
class Counter {
    int v = 0;
    synchronized void inc() { v++; }
    synchronized void dec() { v--; }
}

public class Q7ed5 {
    Counter i;
    Counter j;
    Counter k;
    public synchronized void a() {
        i.inc();
        System.out.println("a");
        i.dec();
    }

    public synchronized void b() {
        i.inc(); j.inc(); k.inc();
        System.out.println("b");
        i.dec(); j.dec(); k.dec();
    }
}
```



```

public void c() {
    k.inc();
    System.out.println("c");
    k.dec();
}
}

```

Select the two correct answers.

- (a) i.v is always guaranteed to be 0 or 1.
- (b) j.v is always guaranteed to be 0 or 1.
- (c) k.v is always guaranteed to be 0 or 1
- (d) j.v will always be greater than or equal to k.v at any given time.
- (e) k.v will always be greater than or equal to j.v at any given time.

Q56 Which method declarations, when inserted at (1), will not cause the program to fail during compilation?

```

public class Qdd1f {
    public long sum(long a, long b) { return a + b; }

    // (1) INSERT CODE HERE.

}

```

Select the two correct answers.

- (a) public int sum(int a, int b) { return a + b; }
- (b) public int sum(long a, long b) { return 0; }
- (c) abstract int sum();
- (d) private long sum(long a, long b) { return a + b; }
- (e) public long sum(long a, int b) { return a + b; }

Q57 What will be the result of executing the following program code with assertions enabled?

```

import java.util.LinkedList;

public class Q4d3f {
    public static void main(String[] args) {
        LinkedList<String> l1a = new LinkedList<String>();
        LinkedList<String> l1b = new LinkedList<String>();
        assert l1a.size() == l1b.size() : "empty";

        l1a.add("Hello");
        assert l1a.size() == 1 : "size";

        l1b.add("Hello");
        assert l1b.contains("Hello") : "contains";
        assert l1a.get(0).equals(l1b.get(0)) : "element";
        assert l1a.equals(l1b) : "collection";
    }
}

```

Select the one correct answer.

- (a) Execution proceeds normally and produces no output.
- (b) An AssertionError with the message "size" is thrown.
- (c) An AssertionError with the message "empty" is thrown.
- (d) An AssertionError with the message "element" is thrown
- (e) An IndexOutOfBoundsException is thrown.
- (f) An AssertionError with the message "container" is thrown.

Q58 What will be the result of compiling and running the following code?

```
public enum FrequentFlyerClass {
    PLATINUM(20), GOLD(10), SILVER(5), BASIC;
    private double extra;
    FrequentFlyerClass(double extra) {
        this.extra = extra;
    }

    public boolean equals(Object other) {
        if (this == other)
            return true;
        if (!(other instanceof FrequentFlyerClass))
            return false;
        return Math.abs(this.extra - ((FrequentFlyerClass) other).extra) < 0.1e-5;
    }

    public static void main (String[] args) {
        GOLD = SILVER;
        System.out.println(GOLD);
        System.out.println(GOLD.equals(SILVER));
    }
}
```

Select the one correct answer.

- (a) The program will compile and print:  
GOLD  
false
- (b) The program will compile and print:  
SILVER  
true
- (c) The program will not compile, because of 3 errors in the program.
- (d) The program will not compile, because of 2 errors in the program.
- (e) The program will not compile, because of 1 error in the program.

Q59 Which constraint can be inserted at (1) so that the program compiles without warnings?

```
class NumClass <_____> { // (1)
    T numVal;
}

public class Q100_54 {
    public static void main(String[] args) {
```

```

    NumClass<Number> n1 = new NumClass<Number>();
    NumClass<Integer> n2 = new NumClass<Integer>();
}
}

```

Select the one correct answer.

- (a) T extends Integer
- (b) T extends Number
- (c) ? extends Number
- (d) T super Number
- (e) T super Integer
- (f) ? super Integer
- (g) None of the above

Q60 What will be the result of compiling and running the following program?

```

public class Varargs {
    public static <E> void print(E e, E...src) {
        System.out.print("|");
        for (E elt : src) {
            System.out.print(elt + "|");
        }
        System.out.println();
    }

    public static void main(String[] args) {
        String[] sa = {"9", "6"};
        print("9", "6");           // (1)
        print(sa);                 // (2)
        print(sa, sa);             // (4)
        print(sa, sa, sa);         // (5)
        print(sa, "9", "6");       // (6)
    }
}

```

Select the one correct answer.

- (a) The program does not compile because of errors in one or more calls to the print() method.
- (b) The program compiles, but throws a NullPointerException when run.
- (c) The program compiles, and prints (where XXXXXXXX is some hash code for the String class):

```

|9|6|
|6|
|
|[Ljava.lang.String;@XXXXXXX|[Ljava.lang.String;@XXXXXXX|
|9|6|

```

- (d) The program compiles, and prints (where XXXXXXXX is some hash code for the String class):

```

|6|
|
|9|6|
|[Ljava.lang.String;@XXXXXXX|[Ljava.lang.String;@XXXXXXX|
|9|6|

```

Q61 Given the following code:

```
package p1;
public enum Constants {
    ONE, TWO, THREE;
}

package p2;
// (1) INSERT IMPORT STATEMENTS HERE.
public class Q700_30 {
    public static void main(String[] args) {
        int value = new Random().nextInt(4);
        Constants constant = null;
        switch (value) {
            case 1:
                constant = ONE;
                break;
            case 2:
                constant = TWO;
                break;
            default:
                constant = THREE;
                break;
        }
        out.println(constant);
    }
}
```

Which import statements, when inserted at (1), will result in a program that prints a constant of the enum type Constants, when compiled and run?

Select the two correct answers.

- (a) `import java.util.*;`  
`import p1.Constants;`  
`import static p1.Constants.*;`  
`import static java.lang.System.out;`
- (b) `import java.util.*;`  
`import static p1.Constants.*;`  
`import static java.lang.System.out;`
- (c) `import java.util.*;`  
`import p1.Constants.*;`  
`import java.lang.System.out;`
- (d) `import java.util.*;`  
`import p1.*;`  
`import static p1.Constants.*;`  
`import static java.lang.System.*;`
- (e) `import java.util.Random;`  
`import p1.*;`  
`import static p1.Constants.*;`  
`import System.out;`

Q62 Given the following directory structure:

```
/proj
 |--- bin
     |--- top
         |--- sub
```

Assume that the classpath has the value:

```
top:top/sub
```

Which of the following statements are true?

Select the three correct answers.

- (a) If the current directory is `/proj/bin`, the following directories are searched: `top` and `sub`.
- (b) If the current directory is `/proj/bin`, the following directories are searched: `bin`, `top` and `sub`.
- (c) If the current directory is `/proj`, the following directories are searched: `bin`, `top` and `sub`.
- (d) If the current directory is `/proj`, no directories are searched.
- (e) If the current directory is `/proj/top`, no directories are searched.

Q63 Given the following code:

```
package p1;
public enum Format {
    JPEG, GIF, TIFF;
}
```

---

```
package p1;
public class Util {
    public enum Format {
        JPEG { public String toString() {return "Jpeggy"; }},
        GIF { public String toString() {return "Giffy"; }},
        TIFF { public String toString() {return "Tiffy"; }};
    }
    public static <T> void print(T t) {
        System.out.print("|" + t + "|");
    }
}
```

---

```
import static p1.Format.*;
import static p1.Util.Format;
import static p1.Util.print;

public class Importing {
    static final int JPEG = 200;
    public static void main(String[] args) {
        final int JPEG = 100;
        print(JPEG);
        print(_____.JPEG);
        print(_____.JPEG);
        print(p1._____.JPEG);
    }
}
```

Which sequence of names, when used top down in the main() method, will print:

|100||200||Jpeggy||JPEG|

Select the one correct answer.

- (a) Format, Importing, Format
- (b) Format, Format, Format
- (c) Importing, Format, Format

Q64 Given the following code:

```
public class Q200_50 {
    public static void main(String[] args) {
        // (1) INSERT METHOD CALL HERE.
    }
    private static void widenAndBox(Long lValue){
        System.out.println("Widen and Box");
    }
}
```

Which method calls, when inserted at (1), will cause the program to print:

Widen and Box

Select the two correct answers.

- (a) widenAndBox((byte)10);
- (b) widenAndBox(10);
- (c) widenAndBox((Long)10);
- (d) widenAndBox(10L);

Q65 What will the program print when compiled and run?

```
public class Q200_80 {
    public static void main(String[] args) {
        callType(10);
    }

    private static void callType(Number num){
        System.out.println("Number passed");
    }

    private static void callType(Object obj){
        System.out.println("Object passed");
    }
}
```

Select the one correct answer.

- (a) The program compiles and prints: Object passed
- (b) The program compiles and prints: Number passed
- (c) The program fails to compile, because the call to the callType() method is ambiguous.
- (d) None of the above.

Q66 What will the program print when compiled and run?

```
import java.util.ArrayList;
import java.util.List;

public class Q400_70 {
    public static void main(String[] args) {
        List<Integer> list = new ArrayList<Integer>();
        list.add(2007); list.add(2008); list.add(2009);
        System.out.println("Before: " + list);
        for (int i : list) {
            int index = list.indexOf(i);
            list.set(index, ++i);
        }
        System.out.println("After: " + list);
    }
}
```

Select the one correct answer.

- (a) Before: [2007, 2008, 2009]  
After: [2008, 2009, 2010]
- (b) Before: [2007, 2008, 2009]  
After: [2010, 2008, 2009]
- (c) Before: [2007, 2008, 2009]  
After: [2007, 2008, 2009]
- (d) Before: [2007, 2008, 2009]  
After: [2008, 2009, 2007]
- (e) The program throws a `java.util.ConcurrentModificationException` when run.

Q67 Which method implementation will write the given string to a file named "file", using UTF8 encoding?

Select the one correct answer.

- (a) 

```
public void write(String msg) throws IOException {
    FileWriter fw = new FileWriter(new File("file"));
    fw.write(msg);
    fw.close();
}
```
- (b) 

```
public void write(String msg) throws IOException {
    OutputStreamWriter osw = new OutputStreamWriter(
        new FileOutputStream("file"), "UTF8");

    osw.write(msg);
    osw.close();
}
```
- (c) 

```
public void write(String msg) throws IOException {
    FileWriter fw = new FileWriter(new File("file"));
    fw.setEncoding("UTF8");
    fw.write(msg);
    fw.close();
}
```

- (d) 

```
public void write(String msg) throws IOException {
    FileWriter fw = new FileWriter(
        new FileWriter("file"), "UTF8");

    fw.write(msg);
    fw.close();
}
```
- (e) 

```
public void write(String msg) throws IOException {
    OutputStreamWriter osw = new OutputStreamWriter(
        new OutputStream(new File("file")), "UTF8");

    osw.write(msg);
    osw.close();
}
```

Q68 Given the following code:

```
public class Person {
    protected transient String name;
    Person() { this.name = "NoName"; }
    Person(String name) { this.name = name; }
}
```

---

```
public class Student extends Person {
    protected long studNum;
    Student() { }
    Student(String name, long studNum) {
        super(name);
        this.studNum = studNum;
    }
}
```

---

```
import java.io.Serializable;
public class GraduateStudent extends Student implements Serializable {
    private int year;
    GraduateStudent(String name, long studNum, int year) {
        super(name, studNum);
        this.year = year;
    }

    public String toString() {
        return "(" + name + ", " + studNum + ", " + year + ")";
    }
}
```

---

```
import java.io.*;
public class Q800_60 {

    public static void main(String args[])
        throws IOException, ClassNotFoundException {
        FileOutputStream outputFile = new FileOutputStream("storage.dat");
        ObjectOutputStream outputStream = new ObjectOutputStream(outputFile);
        GraduateStudent stud1 = new GraduateStudent("Aesop", 100, 1);
        System.out.print(stud1);
    }
}
```



```

        outputStream.writeObject(stud1);
        outputStream.flush();
        outputStream.close();

        FileInputStream inputFile = new FileInputStream("storage.dat");
        ObjectInputStream inputStream = new ObjectInputStream(inputFile);
        GraduateStudent stud2 = (GraduateStudent) inputStream.readObject();
        System.out.println(stud2);
        inputStream.close();
    }
}

```

Which statement is true about the program?

Select the one correct answer.

- (a) It fails to compile.
- (b) It compiles, but throws an exception at runtime.
- (c) It prints (Aesop, 100, 1)(NoName, 0, 1).
- (d) It prints (Aesop, 100, 1)(Aesop, 100, 1).
- (e) It prints (Aesop, 100, 1)(null, 0, 1).

Q69 The following program formats a double value in the US locale, and prints the result 1,234.567. Complete the program using the code snippets given below:

```

import _____;
import _____;

public class FormattingNumbers {
    public static void main(String[] args) {
        double d = 1234.567;
        _____ f = _____(_____);
        System.out.println(_____);
    }
}

```

Any snippet may be used multiple times.

```

java.text.NumberFormat
java.util.NumberFormat
java.text.Locale
java.util.Locale

```

```

NumberFormat
DateFormat
Format

```

```

NumberFormat.getNumberInstance
NumberFormat.getCurrencyInstance
DateFormat.getInstance
new NumberFormat

```

```

Locale.US
DateFormat.DOUBLE
NumberFormat.US

```

```

d.format(f)
f.format(d)

```

```

f.formatNumber(d)
NumberFormat.format(d)

```

Q70 Given the following program:

```
import java.util.Arrays;
public class Q500_100 {
    public static void main(String[] args) {
        String[] tokens = ____(1)____.split(____(2)____);
        System.out.println(Arrays.toString(tokens));
    }
}
```

Which pair of strings, when inserted at (1) and (2), respectively, will result in the following output:

```
[, mybook, mychapter, , mysection]
```

Select the two correct answers.

- (a) "\\mybook\\mychapter\\mysection", "\\\""
- (b) "\\mybook\\mychapter\\mysection", "\\\""
- (c) "\\mybook\\mychapter\\mysection\\", "\\\""
- (d) "\\mybook\\mychapter\\mysection\\\"", "\\\""
- (e) "\\mybook\\mychapter\\mysection", "\\\""
- (f) The program will not compile, regardless of which alternative from (a) to (e) is inserted.
- (g) The program will throw an exception when run, regardless of which alternative from (a) to (e) is inserted.

Q71 Given the following code:

```
public class Q600_30 {
    public static void main(String[] args) {
        // (1) INSERT STATEMENT HERE
    }
}
```

Which statements, when inserted at (1), will print the following:

```
|false|
```

Select the six correct answers.

- (a) System.out.printf("|%-4b|", false);
- (b) System.out.printf("|%5b|", false);
- (c) System.out.printf("|%.5b|", false);
- (d) System.out.printf("|%4b|", "false");
- (e) System.out.printf("|%3b|", 123);
- (f) System.out.printf("|%b|", 123.45);
- (g) System.out.printf("|%5b|", new Boolean("911"));
- (h) System.out.printf("|%2b|", new Integer(2007));
- (i) System.out.printf("|%1b|", (Object[])null);
- (j) System.out.printf("|%1b|", (Object)null);
- (k) System.out.printf("|%3\$b|", null, 123, true);

Q72 Which statements are true about the classes SupA, SubB and SubC?:

```
class SupA<T> {  
    public List<?> fuddle() { return null; }  
    public List scuddle(T t) { return null; }  
}  
  
class SubB<U> extends SupA<U> {  
    public List fuddle() { return null;}  
    public List<?> scuddle(U t) { return null; }  
}  
  
class SubC<V> extends SupA<V> {  
    public List<V> fuddle() { return null;}  
    public List<? extends Object> scuddle(V t) { return null; }  
}
```

Select the four correct answers.

- (a) Class SubB will not compile.
- (b) Class SubC will not compile.
- (c) Class SubB will compile.
- (d) Class SubC will compile.
- (e) Class SubB overloads the methods in class SupA.
- (f) Class SubC overloads the methods in class SupA.
- (g) Class SubB overrides the methods in class SupA.
- (h) Class SubC overrides the methods in class SupA.