Object-Oriented Programming and Software Engineering

School of Computer Science & Software Engineering
The University of Western Australia

CITS1001 MID-SEMESTER TEST

Semester 1, 2013

CITS1001

This Paper Contains:
10 Pages
15 Questions

Time allowed : **FORTY (40) MINUTES**

Marks for this paper total 15.
Candidates should answer **ALL** questions on the machine readable answer sheet provided.

1. Consider the variable declaration:

   ```
   Customer ben;
   ```

   Which of the following best describes the effect of this code.

   a. It has created a `Customer` object called `ben`

   b. It has created a variable called `ben`, but not a `Customer` object

   c. It is invalid because you cannot declare an object type without initializing it

   d. It initializes the variable `ben` to the value 0

   e. It calls the `Customer` class constructor

2. In code that uses the term `Math.sqrt(x)`, what does `sqrt` refer to?

   a. It is a class variable belonging to the class `java.lang.Math`.

   b. It is a class method belonging to the class `java.lang.Math`.

   c. It is an instance variable belonging to an object of type `java.lang.Math`.

   d. It is a method belonging to an object of type `java.lang.Math`.

   e. It is an exception belonging to the class `java.lang.Exception`.

3. What sort of variables are used to store the state of an individual object?

   a. Local variables.

   b. Field variables.

   c. Reference variables.

   d. Parameter variables.

   e. Method variables.

4. The `Picture` class of the `shapes` project studied in lectures and labs includes the declaration `private Triangle roof;`

   In the statement `roof.moveHorizontal(20);` what does `moveHorizontal` refer to?

   a. It is a field belonging to the class `Triangle`.

   b. It is a field belonging to the object `roof`.

   c. It is a method belonging to the object `roof`.

   d. It is a method belonging to the class `Triangle`.

   e. It is a method belonging to the class `Picture`.

5. How many of these statements apply to a large program written in good object-oriented style?

   - The problem is decomposed into several classes.
   - Each class provides a narrow range of well-defined services.
   - Each class hides its implementation details as far as possible.
   - Objects communicate as little as possible at runtime.

   a. 0

   b. 1

   c. 2

   d. 3

   e. 4

6. Squirrels spend most of the day playing. In particular, they play if the temperature is between 20 and 30 degrees (inclusive). Unless it is summer, then the upper limit is 35 instead of 30. Given the parameters `int temp` and `boolean isSummer`, which of the following statements return `true` if the squirrels play and `false` otherwise.

   a. `return (!isSummer || temp < 35);`

   b. `return (temp > 20 && !isSummer);`

   c. `return ((temp >= 20) & ((temp <=35) | isSummer);`

   d. `return ((temp >= 20) || ((temp <=35) && isSummer);`

   e. `return ((temp >= 20) && ((temp <=30) || (isSummer && temp <= 35)));`

7. What is the value of the expression `3 < 5 == 5 > 3`?

   a. It contains a syntax error.

   b. It causes a type error.

   c. It causes a run-time error.

   d. `false`.

   e. `true`.

8. Consider the Java variable declarations:

   ```
   int x = 7 / 5;
   int y = (-7) / 5;
   int z = 7 % 5;
   ```

   What are the values of `x`, `y` and `z` (respectively) after these declarations.

   a. 1, -1, 1

   b. 1.4, -1.4, 2

   c. 1, -1, 2

   d. 1, -2, 2

   e. 1.4, 1.4, 2

9. Suppose that a class `ClassA` has a method with the signature `public void mymethod()` and that variable `a` is declared and created in another class, `ClassB`, using: `ClassA a = new ClassA();`

   Consider the following three Java statements that occur in a method belonging to `ClassB`. Which one(s) are valid Java statement(s)?

   1. `ClassA.mymethod();`
   2. `a.mymethod();`
   3. `mymethod();`

   a. 1 only

   b. Only 1 and 2

   c. 2 only

   d. Only 1 and 3

   e. All of them

10. Consider the following method (with line numbers):

```
1. public boolean justAMethod(String name, Int mark){
2.     boolean n = false;
3.     if ( name.equals("anon") {
4.        return n;
5.     }  else {
6.         return (mark*2);
7.     }
8.  }
```

Compiler errors would be reported for:

a. line 1

b. lines 1 and 6

c. lines 1, 4 and 6

d. lines 1, 3 and 6

e. lines 1 and 3

11. Consider the following method:

```
public int aMystery( int i, int j )
{
int k = 0;
     k = i;
     i = j;
     j = k;
     return j;
}
```

What does `aMystery(15,10)` return?

a. 0

b. 5

c. 10

d. 15

e. 25

12. Consider the following block of code, where variables `a`, `b` and `c` each store integer values:

```
if (a < b) {
    if (a < c) {
        System.out.println(a);
    } else {
        System.out.println(c);
    }
} else if (b < c) {
    System.out.println(b);
} else {
    System.out.println(c);
}
```

Which one of the following values for the variables `a`, `b` and `c` (respectively) will cause the value in variable `b` to be printed?

a. 1, 2, 3

b. 3, 2, 1

c. 1, 3, 2

d. 2, 1, 3

e. 2, 2, 1

13. The following method is intended to return true if the given non-negative number is a multiple of 3 or 5, but not both. However, the method has a logical error.

```
public boolean old35(int n) {
   return ((n % 3 != 0) || (n % 5 != 0));
}
```

Which of the following JUnit assertion tests will detect the error?

a. `assertEquals(true, old35(3));`

b. `assertEquals(false, old35(15));`

c. `assertEquals(false, old35(8));`

d. `assertEquals(true, old35(20));`

e. `assertEquals(false, old35(45));`

14. The `makeColorSelection` method is intended to create a collection containing all the Strokes in a Drawing object that are of a particular colour. The required colour is passed as a parameter. The Drawing class has an instance variable `private ArrayList<Stroke> drawing;`

    The `makeColorSelection` method is missing one line of code. What code should replace the comment line (`//missing line of code here`) so that the method returns the correct result ?

```
public ArrayList<Stroke> makeColorSelection(Color mycol)
{
ArrayList<Stroke>  selected = new ArrayList<Stroke>();
        //missing line of code here
        {
            if ( ss.getColor().equals(mycol) )
            {
                selected.add(ss);
            }
        }
        return selected;
}
```

a. `if (selected.size() > 0)`

b. `if ((selected.get(i).getColor)==mycol))`

c. `for (int i=0; i < drawing.size(); i++)`

d. `for (Stroke ss : drawing)`

e. `for (Color ss : drawing)`

15. What output will the method call `show(5)` produce on the terminal window if the method `show` is defined as follows:

```
public void show(int n) {
  int num = 0;
  for (int i=1; i<n; i++)  {
    for (int j=0; j<i; j++) {
      System.out.print(num++);
      System.out.print(" ");
    }
    System.out.println(" ");
  }
}
```

a.
```
1
2 3
4 5 6
7 8 9 10
```

b.
```
0
0 0
0 0 0
0 0 0 0
```

c.
```
0
0 1
0 1 2
0 1 2 3
```

d.
```
0
1 2
3 4 5
6 7 8 9
```

e.
```
0
 1 2
  3 4 5
    6 7 8 9
```