MID-SEMESTER TEST 2014

CITS1001 Object-Oriented Programming and Software Engineering
School of Computer Science and Software Engineering
The University of Western Australia

First Name	
Family Name	
Student Number	TEST SOLUTIONS

This Paper Contains 11 Pages and 15 Questions

Time allowed : **THIRTY FIVE (35) MINUTES**

Marks for this paper total 15.

Candidates should answer **ALL** questions on the machine readable answer sheet provided. At the end of the test, hand in both this question book and the answer sheet. Make sure your name and student number are written clearly on both.

FECM 2014

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

   In the statement `roof.changeColor("green");` what does `changeColor` refer to?

   ***[a.]** It is a method belonging to the class `Triangle`.

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

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

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

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

2. What is an object and how is an object different from a class?

   a. Objects are used in object-oriented programming and classes are used in class-oriented programming.

   b. An object is a kind of class that does not contain any behaviour (methods).

   c. A class is an instance of an object. One object can be used to create many classes.

   ***[d.]** An object is an instance of a class. One class can be used to create many objects.

   e. An object is not encapsulated and a class is encapsulated, making classes more powerful and reusable than objects.

3. How many of these statements about the Java keywords public and private are true?

   (a) Items declared public may be seen and used from any class, while items declared private may be seen and used only from within their own class.

   (b) A class can be public, private, or both, depending on the situation.

   (c) Fields and constructors should both always be private, but methods should always be public.

   (d) All instance methods should be private to keep them from being called by malicious clients, for better security.

   a. 0

   ***[b.]** 1

   c. 2

   d. 3

   e. 4

4. Which of the following is the correct Java syntax to output a message?

   a. `System.println.out('Hello, world!');`

   b. `System.println(Hello, world!);`

   c. `Out.system.println"(Hello, world!)";`

   ***[d.]** `System.out.println("Hello, world!");`

   e. `System.println("Hello, world!");`

5. How many of the following can be used in a Java program as a variable, parameter or field name?

```
42
R2D2
first-name
_average
sum_of_data
private
println
AnnualSalary
"hello"
boolean
```

There are actually 5 legal variable names here:
`AnnualSalary, sum_of_data, R2D2, println, _average`.
The closest answer is 4, since there are 4 correct names, and there are not 6.

a. 10

b. 8

c. 6

***[d.] 4

e. 2

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

***[a.]** `true`.

b. `false`.

c. It contains a syntax error.

d. It causes a type error.

e. It causes a run-time error.

7. What are the values of the following three expressions?

```
(double) (4 * 7 / 5)
4 * (double) (7 / 2)
4 * 7 / 2
```

*[a.] 5.0, 12.0 and 14

b. 5.0, 14.0 and 12.0

c. 5.6, 14.0 and 14.0

d. 6, 12 and 14

e. 5, 12.0 and 12

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

*[b.] `return ((temp>=20) && ((temp<=30) || (isSummer && temp<=35)));`

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

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

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

9. Consider the following method:

```
public int aMystery( int i, int j )
{
int k = 15;
     k = i;
     i = j;
     j = k;
     return j;
}
```

What does `aMystery(20,25)` return?

a. 25

***[b.]** 20

c. 15

d. 10

e. 5

10. What are the values in each i, j and k (respectively) after the following code has been executed?

```
int i = 5;
int j = 7;
int k = 13;
int x = i + j + k;
i = x - i - j;
j = x - j - k;
k = x - i - k;
```

a. 13, 7, 5

b. 13, 5, 2

c. 5, 7, 13

***[d.]** 13, 5, -1

e. None of the above.

11. What does `bMystery(false, false)` return ?

```
public int bMystery(boolean b1, boolean b2)
{
          if (b1 && b2) {
               return 100;
          } else if (b1 || b2) {
               return 200;
          } else {
           return 300;
          }
}
```

*[a.] 300

b. 200

c. 100

d. false

e. true

12. Which of the following is the correct syntax to construct an `ArrayList` to store objects of the class Student ?

a. `ArrayList list<Student>;`

b. `ArrayList list = new ArrayList();`

*[c.] `ArrayList<Student> list = new ArrayList<Student>();`

d. `ArrayList[Student] list = new ArrayList[Student]();`

e. `ArrayList list = new ArrayList(Student);`

13. Consider the following method.

```
public void ifElseMystery(int a, int b) {
    if (a * 2 < b) {
        a = a * 3;
    }
    if (b < a) {
        b = b+1;
    } else {
        a = a-1;
    }
    System.out.println("a = " + a + " b = " + b);
}
```

Indicate what output is produced for the method call `ifElseMystery(4, 4);`

a. a = 12 b = 5

b. a = 12 b = 4

c. a = 2 b = 5

d. a = 3 b = 5

***[e.]** a = 3 b = 4

14. The following implementation of the discount method of the `TicketMachine` class studied in lectures and labs contains an error.

```
public void discount(int amount)
{
    if ((0 < amount) && (amount > price)) {
        price = price - amount;
    } else {
        System.out.println("Discount is too large");
    }
}
```

Supposing you have set up a JUnit test object `ticket200 = new TicketMachine(200);` Which of the following JUnit test cases will *fail*, so alerting you to the error.

There were (mistakenly) two correct answers to this question: b and e. Both those tests will fail when they would pass if the code were implemented correctly. I will check for papers where an additional mark is due and update the marks when I get the marking spreadsheet back. My apologies. Rachel

a.
```
ticket200.discount(200);
assertEquals(200,ticket200.getPrice());
```

*[b.]

```
ticket200.discount(250);
assertEquals(200,ticket200.getPrice());
```

c.
```
ticket200.discount(-10);
assertEquals(200,ticket200.getPrice());
```

*[d.]

```
ticket200.discount(50);
assertEquals(150,ticket200.getPrice());
```

e.
```
ticket200.discount(0);
assertEquals(200,ticket200.getPrice());
```

15. The following method, which is intended to find the length of the shortest String in the collection songNames, is incorrect.

```
public int shortestName (ArrayList<String> songNames)
{
       int min = 0;
       for (String name : songNames) {
           if ( name.length() < min) {
               min = name.length();
           }
       }
       return min;
}
```

Which of the following statements best describes when shortestName fails (by returning the wrong result) ?

a. It fails whenever the first element of the collection songNames is the shortest.

b. It fails whenever the last element of the collection songNames is the shortest.

c. It fails whenever the collection songNames contains a zero-length string.

d. It fails whenever more than one element of the collection songNames has the same length.

***[e.]** It fails whenever the collection songNames does not contain any zero-length strings.