Object-oriented Programming and Software Engineering CITS1001

Multiple-choice Mid-semester Test

Semester 1, 2018

- Mark your solutions on the provided answer page, by filling in the appropriate circles.

- Write your name and student number on the answer sheet, and also fill in the circles for both.

- The papers will be marked by an automatic scanner, so make sure that your selections are clear.

- There are fifteen questions: ignore options 16–125 on the answer sheet.

- Use the blank pages at the end for rough work.

- Feel free to separate the answer sheet from the question sheets, but hand in both at the end of the test.

- The time allowed is forty minutes.
1. What value does mystery(12) return?

```java
public int mystery(int x)
{
    int n = 0;
    for (int k = x; k > 0; k = k / 2)
        if (k % 2 != 0) n++;
    return n;
}
```

a) 0  
b) 1  
c) 2 ***  
d) 3  
e) 4

2. Given int variables \( x > 0 \) and \( y > 0 \), which of these statements is true?

a) \( x \mod y \) is 0 only when \( x == y \)  
b) \( x \mod y \) is always less than \( x / y \)  
c) \( x \mod y \) is always less than \( y \) ***  
d) \( x \mod y \) is always equal to \( y \mod x \)  
e) \( x \mod y \) is always greater than 0

3. What is the value of the expression `false == false == false == false`?

a) It contains a syntax error  
b) It contains a type error  
c) It contains a run-time error  
d) `false`  
e) `true` ***
4. A String is represented in a Java program as
   a) an object. ***
   b) a primitive value.
   c) an array.
   d) an ArrayList.
   e) a binary number.

5. Which of these statements uses the correct syntax to copy the first element of the array xs into its last element?
   a) xs[0] = xs[xs.length - 1];
   b) xs[xs.length - 1] = xs[0]; ***
   c) xs.add(xs.get(0));
   d) xs[xs.length] = xs[0];
   e) xs[0] = xs[xs.size() - 1];

6. What are the values of m and n after these statements?
   
   ```java
   int m = 10;
   int n = 1;
   n = n * m;
   m = n / m;
   n = n / m;
   ```
   
   a) 1, 1
   b) 1, 10 ***
   c) 10, 1
   d) 10, 10
   e) 100, 100
7. What value does mystery(29) return?

```java
public int mystery(int n)
{
    int[] xs = new int[n+1];
    xs[1] = 33;
    for (int k = 2; k <= n; k++)
        xs[k] = xs[k-1] - xs[k-2];
    return xs[n];
}
```

a) -66
b) -33 ***
c) 0
d) 33
e) 66

8. A method that has return type `void` and that assigns values to an object’s instance variables is known as

a) an accessor method.
b) a class method.
c) a constructor method.
d) a general method.
e) a mutator method. ***

9. If a class has multiple constructors, they must all have

a) different argument types. ***
b) different names.
c) different return types.
d) different statements.
e) different visibility.
10. What value does mystery(4, -2) return?

```java
public int mystery(int a, int b) {
    while (a > b) {
        a = a + b;
        b = a * b;
    }
    return b;
}
```

a) -4  
b) -2  
c) 2  
d) 8 ***  
e) 16

11. What sort of variable should be used to store data that is important throughout an object’s lifespan?

a) A constructor variable  
b) A heap variable  
c) A field variable ***  
d) A method variable  
e) A parameter variable

12. Which of these evaluates to the same result as the expression 88 - 66 / 5 - 3?

a) 88 - ((66 / 5) - 3)  
b) (88 - (66 / 5)) - 3 ***  
c) (88 - 66) / (5 - 3)  
d) ((88 - 66) / 5) - 3  
e) 88 - (66 / (5 - 3))
13. If $k$ is a big number, what does $\text{mystery}(k)$ return?

```java
public int mystery(int k)
{
    int z = k % 10;
    while (k >= 10)
    {
        z = k % 10;
        k = k / 10;
    }
    return z;
}
```

a) $k$’s least significant digit  
b) $k$’s second least significant digit  
c) $k$’s middle digit  
d) $k$’s second most significant digit ***  
e) $k$’s most significant digit

14. Given this statement, how many Strings can `names` store?

```java
String[][] names = new String[5][6];
```

a) 5  
b) 6  
c) 11  
d) 30 ***  
e) 56

15. How many times does this for-loop execute?

```java
for (int k = 53; k > 6; k = k / 2)
```

a) 1  
b) 2  
c) 3 ***  
d) 4  
e) 5

_CITS1001 mid-semester test, Semester 1 2018_