

Object-oriented Programming and Software Engineering CITS1001

Multiple-choice Mid-semester Test

Semester 1, 2016

- **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(918273)` return?

```
public static String mystery(int x)
{
    String s = "";
    for (int k = x; k > 0; k = k / 10)
    {
        if (k % 2 == 0) s = s + k % 10;
        else           s = k % 10 + s;
    }
    return s;
}
```

- a) "372819"
- b) "823719"
- c) ""
- d) "917328" ***
- e) "918273"

2. Given `int` variables `x` and `y`, $y \neq 0$, what is the value of this expression?

`x % y / y`

- a) 0 ***
- b) 1
- c) x
- d) `x % y`
- e) `x / y`

3. Which of these expressions evaluates to `false` for all possible values of `a`?

- a) `!!a`
- b) `a || !a`
- c) `!a && a ***`
- d) `a == a`
- e) `(a || a) == !(a && a) ***`

**There were (accidentally) two
correct answers to this question**

4. Seven months of the year have 31 days: Months 1 (January), 3, 5, 7, 8, 10, and 12. `longMonth(m)` is meant to return `true` if and only if `m` denotes one of these months. However, the following definition contains a logical error. For which of these inputs does it give the wrong answer?

```
public static boolean longMonth(int m)
{
    return m % 2 != m / 9;
}
```

- a) 6
- b) 7
- c) 8 ***
- d) 9
- e) 10

5. Which of these uses the correct syntax to add an object `x` to an `ArrayList xs`?

- a) `xs.add(1, x)` ***
- b) `xs.add(x, 1)`
- c) `add(x, 1, xs)`
- d) `x.add(1, xs)`
- e) `x.add(xs, 1)`

6. What are the values of `m` and `n` after these statements?

```
int m, n;
m = 12;
n = n + m;
m = m - n;
n = n + m;
```

- a) 0, 12 ***
- b) 12, 0
- c) 12, 12
- d) 12, 24
- e) 24, 12

7. What value does `arraymethod()` return?

```
public static int arraymethod()
{
    int[] xs = new int[100];
    xs[0] = 4;
    xs[1] = 2;
    xs[2] = 0;
    for (int k = 3; k < 100; k++)
        xs[k] = - xs[k-3];
    return xs[99];
}
```

- a) -4 ***
- b) -2
- c) 0
- d) 2
- e) 4

8. What is the defining feature of a static variable in a class C?

- a) It can be assigned to only once.
- b) It is shared between all objects belonging to C. ***
- c) It is accessible only by objects belonging to C.
- d) It is stored on the heap.
- e) It exists only while an object belonging to C exists.

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

- a) different names.
- b) different visibility.
- c) different argument types. ***
- d) different return types.
- e) different bodies.

10. What value does `whileloop(2, -1)` return?

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

- a) -3
- b) 3
- c) 6
- d) 18
- e) 21 ***

11. Given an `int` variable `x`, which expression returns its tens digit?

For example, the tens digit of 9251 is 5.

- a) `x / 10 % 100`
- b) `x % 100 / 100`
- c) `x % 10 / 10`
- d) `x / 10 % 10 ***`
- e) `x / 100 % 10`

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 `zs` is initially a long list, how many elements does it lose (i.e. how much shorter is it) from the call `shorten(zs, n)`?

```
public static void shorten(ArrayList<String> xs, int n)
{
    for (int k = 0; k < n; k++)
        if (k % 2 == 0)
        {
            xs.remove(0);
            xs.remove(0);
        }
}
```

- a) 0
- b) $n/2$
- c) n^{***}
- d) $2n$
- e) n^2

14. What does this declaration create?

```
private ArrayList<Company> taxcheats;
```

- a) A variable `taxcheats` whose initial value is unspecified.
- b) A variable `taxcheats` with the initial value `null`.*******
- c) A variable `taxcheats` that points to an empty `ArrayList`.
- d) A variable `taxcheats` that points to an `ArrayList` with space for ten objects.
- e) A variable `taxcheats` that contains all `Company` objects known to the program.

15. Which best describes the effect of these statements on the `int` variables `x` and `y`?

```
x = x * y;
y = x / y;
x = x / y;
```

- a) The values of the variables are unchanged.
- b) The values of the variables are swapped.*******
- c) Both variables have the initial value of `x`.
- d) Both variables have the initial value of `y`.
- e) One variable has the product of their initial values, the other has the ratio.