

Object-oriented Programming and Software Engineering CITS1001

Multiple-choice Mid-semester Test

Semester 1, 2015

- **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(12345678)` return?

```
public String mystery(int n)
{
    String soln = "";
    while (n > 0)
    {
        soln = n % 10 + soln;
        n = n / 100;
    }
    return soln;
}
```

- a) "1357"
- b) "2468" ***
- c) "7531"
- d) "8642"
- e) It causes a run-time error.

2. What is the value of this expression?

`75.6 / 4 % 6`

- a) 0.0
- b) 0.9 ***
- c) 18.0
- d) 18.9
- e) It causes a type error.

3. Which of these expressions evaluates to `true` for all possible values of `a` and `b`?

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

4. `either7or9(n)` is meant to return `true` if `n` is a multiple of exactly one of 7 or 9, and `false` otherwise. However, the following attempted definition contains a logical error. Which of these inputs does it give the wrong answer for?

```
public boolean either7or9(int n)
{
    return n % 7 != 0 || n % 9 != 0;
}
```

- a) 0
- b) 79 ***
- c) 81
- d) 84
- e) 126

5. What does `Building` refer to in this line of code?

```
b = new Building(area, code);
```

- a) It is a constructor belonging to the class `Building`. ***
- b) It is an instance variable belonging to the object `b`.
- c) It is an instance variable belonging to the class `Building`.
- d) It is a method belonging to the object `b`.
- e) It is a method belonging to the class `Building`.

6. What sort of variable has the widest scope in a Java program?

- a) Loop-control variable
- b) Local variable
- c) Parameter variable
- d) Instance variable
- e) Class variable ***

7. What value does `arraymethod({6, 7, 8, 9, 10})` return?

```
public int arraymethod(int[] xs)
{
    int[] ys = xs;
    ys[ys.length - 1] = 100;
    ys = new int[] {4, 3, 2, 1};
    ys[ys.length - 1] = 1000;
    return xs[xs.length - 1];
}
```

- a) 1
- b) 10
- c) 100 ***
- d) 1000
- e) It causes an array-indexing error.

8. What are the legal values for indexing an `ArrayList` containing k elements?

- a) $-k$ to $k-1$ inclusive
- b) 0 to $k-1$ inclusive ***
- c) 1 to k inclusive
- d) $k-1$ or smaller
- e) k or smaller

9. If x is a double, which of these expressions returns its third most-significant decimal digit? (e.g. if $x = 35.47871$, it should return 8.) The method `Math.round` takes a double n and returns the closest int to n .

- a) `(int) (x * 1000 % 10)` ***
- b) `Math.round(x * 1000 % 10)`
- c) `x * 1000 % 10`
- d) `(int) (x % 10 * 1000)`
- e) `Math.round(x % 10 * 1000)`

10. 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 void shorten(ArrayList<String> xs, int n)
{
    for (int k = 0; k < n; k++)
    {
        xs.remove(0);
        xs.remove(xs.size() - 1);
    }
}
```

- a) 0
- b) n
- c) $2n$ ***
- d) n^2
- e) It crashes with an indexing error.

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

```
x = x + y;
y = x - y;
x = x - y;
```

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

12. What is the defining feature of a static method in a Java class?

- a) It doesn't change the state of any object.
- b) Its body has no loops.
- c) It doesn't take any formal parameters.
- d) Its return value is independent of any object's state. ***
- e) It doesn't return a result.

13. What value does `forloop(5)` return?

```
public int forloop(int b)
{
    for (int a = 10; a > -10; a = a - 5)
        if (a % 2 == 0)
            b = b + a;
        else b = b * 2;
    return b;
}
```

- a) 5
- b) 15
- c) 40
- d) 50
- e) 60 ***

14. What does this declaration create?

```
private Rectangle square;
```

- a) A variable `square` whose initial value is unspecified.
- b) A variable `square` with the initial value `null`. ***
- c) A variable `square` that points to a `Rectangle` object on the screen.
- d) A variable `square` that points initially to a `Rectangle` object with both sides 0.
- e) A variable `square` that points to a `Rectangle` object whose sides must be equal.

15. How many constructors is a class allowed to have in Java?

- a) Exactly 0
- b) 0 or 1
- c) 0 or more ***
- d) Exactly 1
- e) 1 or more