University College Dublin
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Professional Java Programming (COMP41200/COMP41600) Exam 1, 29 November 2011

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Instructions:

Answer ALL 30 questions. Clearly mark your choice(s) for each question on this exam paper. If you want to change your answer, please ensure that your final choice(s) is/are clearly marked.

Do NOT detach pages from this exam, and do NOT add anything - only your indicated choices will be marked, there is no need to provide any explanation.

This is a closed-book exam. You may bring some blank sheets into the exam (for rough work) but you should NOT submit them with your exam answers.

Time allowed: 90 minutes.

1. What is the value of x after the following operation is performed: `x = (-20)%(-4);`

A. 5

B. -5

C. -20

D. 0

2. Given the following code, what is the expected outcome?

```
1. package mail;
2.
3. interface Box {
4.    abstract void open();
5.    void close();
6.    protected abstract void empty();
7. }
```

A. The code will not compile because of line 4.

B. The code will not compile because of line 5.

C. The code will not compile because of line 6.

D. The code will compile.

3. With implicit conversion of primitive data types, you can lose precision and get incorrect results.

A. True

B. False

4. Consider the following piece of code:

```
1.  short unluckyNumber = 9;

2.  float luckyNumber = 1.25;

3.  luckyNumber = luckyNumber + 1;

4.  System.out.println ("The value of luckyNumber: " + luckyNumber);

5.  System.out.println ("The value of unluckyNumber: " + unluckyNumber);
```

What is the result?

A. The value of luckyNumber: 2.25
The value of unluckyNumber: 9

B. This piece of code would not compile because of line 1

C. This piece of code would not compile because of line 2

D. This piece of code would not compile because of line 3

5. Java arrays always start at index 1.

A. True

B. False

6. Consider the following code:

```
1.  class MySuperClass {
2.  MySuperClass(){
3.    System.out.println("Superclass!");
4.  }
5.  protected void message() {
6.    System.out.println("From the superclass!");
7.  }
8.  }
9.  public class MySubClass extends MySuperClass {
10. MySubClass(){
11. }
12. void message() {
13.   System.out.println("From the subclass!");
14. }
15. public static void main(String args[]) {
16.   MySubClass mysub = new MySubClass();
17.   mysub.message();
18. }
19. }
```

Which one of the following statements is true about this code?

A. The code would compile and execute, and generate the output:

Superclass!

From the superclass!

B. The code would compile and execute, and generate the output:

Superclass!

From the subclass!

C. Line 12 would generate a compiler error.

D. Line 17 would generate a compiler error.

7. Consider the following piece of code:

```
1. for (int i = 0; i < 3; i++) {
2. InnerLoop: for ( int j = 1; j < 4; j++) {
3. if ( i == j ) {
4. continue InnerLoop;
5. }
6. System.out.println ( " i = " + i + " j = " + j );
7. }
8. }
```

Which of the following would be *part of* the output? (Choose all that apply)

A. i = 0 j = 1
i = 0 j = 2
i = 0 j = 3
i = 2 j = 1

B. i = 1 j = 1

C. i = 0 j = 1
i = 0 j = 2
i = 0 j = 3
i = 1 j = 2

8. What range of values is represented by a `char`?

A. 0 to 2^8-1

B. 0 to 2^{16}-1

C. -2^{15} to 2^{15}-1

D. Range is platform-dependent, since it depends on the particular implementation of the Java Virtual Machine being used

9. What is the output when you try to compile and run the following code?

```
public class MyClass{
 int i;
 public static void main(String[] args){
   System.out.println(i);
 }
}
```

A. 0

B. i

C. no output – compiler error

10. What is the output of the following program?

```
class Q10 {
public static void main(String[] args) {
int i = -1;
switch(i){
case 1:
System.out.println("one");
case 2:
System.out.println("two");
case 3:
System.out.println("three");
}}}
```

A. one
two
three

B. compiles, but produces no output when executed

C. compiler error

11. Which of the following are valid variable names in Java? (Choose all that apply)

A. 2variable

B. variable

C. _whatavariable

D. another-var

12. After execution of the following code fragment, what are the values of the variables `x`, `a`, and `b`?

```
int x, a = 8, b = 7;
x = (a++) + (--b);
```

A. x = 16, a = 9, b = 6

B. x = 15, a = 9, b = 6

C. x = 14, a = 9, b = 6

13. What will happen if you attempt to compile and run the following code?

```
class Base {}
class Sub extends Base {}
public class ConvExample{
    public static void main(String args[]){
       Base b = new Base();
       Sub s = (Sub) b;
    }
}
```

A. Compile and run without error

B. Compile time error

C. Runtime error

14. Consider the following class definition:

```
public class Test extends BaseClass {
  public Test() {
  }
  public Test(int i, int j, int k) {
    super(i, j, k);
  }
}
```

Which of the following are legal calls to construct instances of the Test class? (Choose all that apply)

A. Test t = new Test();

B. Test t = new Test(1, 2, 3.0);

C. Test t = new Test(1, 2, 3, 4);

15. Which of the following statements are true? (Choose all that apply)

A. An enum may be extended.

B. An enum may have a constructor.

C. An enum may contain private data.

16. Consider the following code:

```
public class MyOuterClass {
      public class MyNestedClass { }
}
```

Which of the following is a correct statement to instantiate MyNestedClass from a class outside of MyOuterClass? (Choose all that apply)

A. MyNestedClass mn = new MyOuterClass.MyNestedClass();

B. MyOuterClass.MyNestedClass mn = new MyOuterClass.MyNestedClass();

C. MyOuterClass.MyNestedClass mn = new MyNestedClass();

D. MyOuterClass mo = new MyOuterClass();
   MyOuterClass.MyNestedClass mn = mo.new MyNestedClass();

17. For the following code:

```
1. class Q17 {
2. public static void main(String args[]) {
3. double d = 10.4;
4. Decrementer dec = new Decrementer();
5. dec.decrement(d);
6. dec.decrement(d);
7. System.out.println(d);
8. } }
9. class Decrementer {
10. public void decrement(double decMe) {
11. decMe = decMe - 3.0;
12. } }
```

What value is printed out at line 7?

A. 4.4

B. 16.4

C. 10.4

D. 7.4

18. Which of the following modifiers can be applied to a class that is not a nested class? (choose all that apply)

A. static

B. protected

C. final

D. none of the above

19. What is the output of the following code?

```
1.class StaticExample {
2.   static int staticCounter=5;
3.   int counter=5;
4.    StaticExample() {
5.         staticCounter++;
6.         counter++;
7.    }
8. }
9. class RunStaticExample {
10.  public static void main(String[] args) {
11.  StaticExample se1 = new StaticExample();
12.  StaticExample se2 = new StaticExample();
13.  System.out.println("Value of staticCounter for se1: " +
se1.staticCounter);
14.  System.out.println("Value of counter for se1: " + se1.counter);
15.  }
16. }
```

A.

Value of staticCounter for se1: 6

Value of counter for se1: 6

B.

Value of staticCounter for se1: 7

Value of counter for se1: 6

C.

Value of staticCounter for se1: 7

Value of counter for se1: 7

D.

Value of staticCounter for se1: 6

Value of counter for se1: 7

20. Given that the following code works correctly, what are the possible types of variable `c`?

```
long a = 10;
short b = 2;
c = a * ++b;
```

A. short, int, long, float, double

B. byte, short, int, long, float, double

C. int, long, float, double

D. None of the above

21. Which of the following may *override* a method whose signature is `void overUnderUnderOver(float f)`? (Choose all that apply)

A. void overUnderUnderOver(float f)

B. public void overUnderUnderOver(float f)

C. private void overUnderUnderOver(float f)

D. public int overUnderUnderOver(float f)

22. A Java developer can force garbage collection to occur by calling `System.gc()`

A. True

B. False

23. Consider the following class:

```
1. class MyClass {
2. public int myMethod (double a, int i) {
3. return 1; }
4.
5. }
```

Which of the following methods, if added at line 4 <u>independently</u>, would be valid? (Choose all that apply)

A. public int myMethod(int i, double a) { return 1; }

B. public double myMethod(double b, int j, int k){ return 1.0; }

C. public int myMethod(double a, double b, int i){ return 1; }

D. public int myMethod(double b, int j){ return 1; }

24. Which *one* of the following keywords is used in a subclass to invoke a method in the superclass?

A. this

B. super

C. final

D. static

25. Select the order of access modifiers from *least* restrictive to *most* restrictive. (*default* means no modifier is used)

A. public, protected, private, default

B. public, protected, default, private

C. public, default, protected, private

D. private, default, protected, public

26. You have been given a design document for implementation in Java. It states: "A Car has an engine and wheels. A SportsCar is a Car that has a spoiler and alloy wheels". You can assume that the `Car` class has already been defined.

Which of the following data members would be appropriate to include in the class `SportsCar`? (Choose all that apply)

A. Spoiler aSpoiler;

B. Engine anEngine;

C. Wheels theWheels;

D. AlloyWheels alloyWheels;

27. What would be the output from this code fragment?

```
1. int x = 0, y = 9, z = 5;
2. if (x < 3) {
3. if (y > -10) {
4. System.out.println("message one");
5. }
6. else {
7. System.out.println("message two");
8. }
9. }
10. else if (z >= 5) {
11. System.out.println("message three");
12. }
13. else {
14. System.out.println("message four");
15. }
```

A. message one

B. message two

C. message three

28. Consider the following code fragment:

```
1.    int i=5;
2.    do {
3.          --i;
4.          System.out.println("i is "+ i);
5.    } while (i>4);
```

What would be the output from this code fragment?

A. i is 4

B. No output – a compiler error occurs at line 5.

C. It compiles and runs but produces no output.

29. Only one instance of a static variable will exist for any amount of class instances.

A. True

B. False

30. The `transient` modifier can be applied to classes and methods but not to instance variables.

A. True

B. False