University College Dublin
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Professional Java Programming (COMP41200/COMP41600) Exam 1, 11 January 2012

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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 = (-10)/(-2);`

A. -5

B. 5

C. -10

D. 0

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

```
1. package mail;
2.
3. interface Box {
4.    int var = 1;
5.    abstract void open();
6.    public abstract void close();
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 explicit 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;
3.  luckyNumber = luckyNumber + 1;
4.  System.out.println ("The value of unluckyNumber: " + unluckyNumber);
```

What is the result?

A. 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. Consider the following piece of code:

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

Which one of the following would be *part of* the output?

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

B. i = 1 j = 1

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

6. Consider the following code:

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

7. Which *one* of these statements is the correct way to create an array with three `int` elements?

A. `int intArray = new int[3];`

B. `int intArray[] = new int(3);`

C. `int[] intArray = new int[3];`

D. None of the above

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

A. -2^7 to 2^7-1

B. 0 to $2^{16}-1$

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

D. -2^{31} to $2^{31}-1$

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

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

A. 0

B. i

C. no output – compiler error

10. What statement is true about the following program? (Choose all that apply)

```
class Q10 {
public static void main(String[] args) {
int j = 1;
switch (j) {
       case 1: System.out.println("value is one");
       case 1 + 1: System.out.println("value is two");
                   break;
       default: System.out.println("value is " + j);
                   break;
 }}}
```

A. The program would not compile because of the expression **`case 1 + 1`**

B. The legal types for the variable **`j`**, as the argument to the **`switch()`** block, could be any of **`byte`**, **`short`**, **`char`**, **`int`**, or **`long`**

C. The output would be ***value is one***

D. The output would be ***value is one***
value is two

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

A. _float

B. float-1

C. whatavariable!

D. a123var$

12. After execution of the following code fragment, what is the value of the variable `x`?

```
int x, a = 4, b = 1; x = (a++) - (++b);
```

A. 2

B. 3

C. 4

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 = b;
    }
}
```

A. Compile and run without error

B. Compile time error

C. Runtime error

14. Consider the following class definition:

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

Which of the following must exist *explicitly* in the definition of the Base class? (Choose all that apply)

A. Base() { }

B. Base(int i) { }

C. Base(int i, int j) { }

D. Base(int i, int j, int k) { }

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

A. An enum is instantiated with the **`new`** operator.

B. An enum may have methods.

C. An enum cannot be extended.

D. An enum cannot be declared inside a class.

16. Consider the following code:

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

Which *one* of the following is a correct statement to instantiate MyNestedClass from a class outside of MyOuterClass?

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

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

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

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

17. The non-static variables or methods of an outer class cannot be directly accessed from inside a static nested class of the outer class.

A. True

B. False

18. Which of the following modifiers can be applied to a class declared inside a method? (Choose all that apply)

A. static

B. public

C. private

D. None of the above

19. What is the output of the following code?

```
class Q19 {
  static int counter = 1;
  Q19() {
      System.out.println("Constructor: counter = " + counter);
  }
  static {
      System.out.println("inside a block");
  }
}
public class TestQ19 {
  public static void main(String[] args) {
      Q19 q19 = new Q19();
      System.out.println("main: counter = " + q19.counter);
      }
}
```

A.

Constructor: counter = 1

inside a block

main: counter = 1

B.

inside a block

Constructor: counter = 1

main: counter = 1

C.

Constructor: counter = 1

main: counter = 1

D.

No output – compiler error

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. int, long, float, double

C. long, float, double

D. None of the above

21. Class X contains the following method: `void xyz(int a, float b) { … }`
Which of the following methods may appear in class Y which extends X? (Choose all that apply)

A. `public void xyz(int a, float b) { … }`

B. `private void xyz(int a, float b) { … }`

C. `public void xyz(int a, float b) throws java.io.IOException { … }`

D. `private void xyz(int a, float b) throws java.io.IOException { … }`

22. How can you force garbage collection of an object which is eligible for garbage collection? (Choose all that apply)

A. Call `System.gc()`

B. Call `System.gc()`, passing in a reference to the object to be garbage-collected

C. Call `Runtime.gc()`

D. None of the above

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(double b, int j) { 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 a, int j){ return 1; }

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

A. extends

B. this

C. super

D. import

25. Which of the following modifiers may be applied to a method in Java? (Choose all that apply)

A. public

B. abstract

C. volatile

D. native

26. Which *one* of the following statements about constructors in Java is false?

A. A constructor has no explicit return type.

B. A constructor of a superclass is not inherited in any of its subclasses.

C. A class always has a default constructor.

D. A class may have more than one constructor.

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

D. message four

28. Which of the following are legal in Java? (Choose all that apply)

A.
```
int j=0;
for (int k=0, j+k != 5; j++,k++) {
      System.out.println("j=" + j + ", k=" + k);
}
```

B.
```
int i, j;
for (i=0, j=1; i<5; i++, j++){
      System.out.println("i=" + i + ", j=" + j);
}
```

C.
```
while (int i<7) {i++; System.out.println("i is " + i);}
```

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

29. Which of the following may be statically imported in Java? (Choose all that apply)

A. package

B. static method

C. static variable

D. instance variable

30. In Java, an interface can extend a class and one or more other interfaces.

A. True

B. False