University College Dublin
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Professional Java Programming (COMP41200) Exam 1, 16 September 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 = (-15)%(-5);`

A. 3

B. 0

C. -3

D. 5

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

```
1. package mail;
2.
3. interface Box {
4.    abstract void open();
5.    public void close();
6.    public 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 for some other reason.

D. The code will compile.

3. When an array is created in Java, its elements are automatically initialized to their default values.

A. True

B. False

4. Consider the following piece of code:

```
1.  short unluckyNumber = 9;

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

A. public

B. protected

C. private

D. abstract

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. private 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 5 would generate a compiler error.

D. Line 12 would generate a compiler error.

7. Consider the following piece of code:

```
1. OuterLoop: for (int i = 1; i < 3; i++) {
2. for ( int j = 1; j < 4; j++) {
3.    if ( i < j ) {
4.          continue OuterLoop;
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 = 1 j = 1

B. i = 2 j = 2

C. i = 1 j = 2

D. i = 2 j = 1

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

A. 0 to 2^8-1

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

C. 0 to 2^{16}-1

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

A. compiler error

B. 0

C. i

10. What is the output of the following program?

```
class Q10 {
public static void main(String[] args) {
int i=0;
switch(i){
case 1:
System.out.println("one");
case 2:
System.out.println("two");
case 3:
System.out.println("three");
}}}
```

A. compiles, but produces no output when executed

B. compiler error

C. one
two
three

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

A. variable

B. variable2

C. _variable

D. %variable

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 = 15, a = 9, b = 8

B. x = 16, a = 9, b = 8

C. x = 17, a = 9, b = 8

13.

```
public class MyClass1 {
public static void main(String argv[]){ }
/*Modifier at XX */ class MyClass2 {}
}
```

What modifiers would be legal at XX in the above code? (Choose all that apply)

A. public

B. private

C. final

D. none of the above

14. Consider the following class definition:

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

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(1.0, 2.0, 3.0);

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

15. A class without a name can be defined within a method.

A. True

B. False

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. What is the output of the following program?

```
public class Test {
      public static void main(String[] args) {
            int [] b = {1,2,3,4,5,6,7,8,9,0};
            System.out.println("b[2]=" + b[2]);
      }
}
```

A. The code compiles but does not output anything.

B. "b[2]=3" is printed out to the console.

C. "b[2]=2" is printed out to the console.

D. The code does not compile.

18. Which one of the following statements is <u>false</u>?

A. If a class has at least one constructor defined, the Java compiler does not provide a default constructor.

B. From inside a constructor of a class, you can call a constructor of the superclass.

C. The constructor of a superclass is inherited by the subclass

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: 7

B.

Value of staticCounter for se1: 5

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: 7

Value of counter for se1: 6

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

```
int a = 10;
short b = 2;
c = a * b;
```

A. short, int, long, float, double

B. short, char, int, float, double

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

D. int, long, float, double

E. none of the above

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

A. void overUnderUnderOver(float f)

B. void overUnderUnderOver(double f)

C. float overUnderUnderOver(float f)

D. float overUnderUnderOver(float f, float g)

22. Why might you define an instance variable as `transient`?

A. So that this variable can be accessed by a method written in another programming language.

B. So that this variable can be used to control access to critical sections of the program when multi-threaded programming is in use.

C. So that the value of this variable will not be stored when the state of its object is saved.

23. Which of these are valid JavaBean method getter and setter signatures for the property: `private int number` ? (Choose all that apply)

A. public int getNumber (int number)

B. public int getNumber()

C. public void setNumber(int number)

D. public int setNumber(int number)

24. Which *one* of the following statements is true?

A. An interface represents an is-a relationship.

B. Inheritance represents an is-a relationship.

C. A class member represents an is-a relationship.

D. Polymorphism represents an is-a relationship.

25. Select the order of access modifiers from *most* restrictive to *least* restrictive.

A. private, protected, default, public

B. private, default, protected, public

C. public, default, protected, private

D. public, protected, default, private

26. You have been given a design document for implementation in Java. It states: "A Bank has employees and customers. A BadBank is a Bank that has a total amount of badDebts and a flag that indicates whether it is solvent or not". You can assume that the Bank class has already been defined.

Which of the following data members would be appropriate to include in the class BadBank?

A. `int badDebts;`

B. `Customer [] customer;`

C. `Employee [] employee;`

D. `boolean solvent;`

27. What is 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. Consider the following code fragment:

```
1     int i = 1;
2     do
3     {
4           i--;
5           System.out.println("I am in the do block.");
6     } while( i > 0);
```

What would be the output from this code fragment?

A. Infinite loop, with each iteration producing the output: I am in the do block.

B. Outputs: I am in the do block.

C. No output: a compiler error occurs at line 6.

D. It compiles and runs but produces no output.

29. The following construct is legal in Java:

```
for (int i=0, float j=0; ; i++, j++){}
```

A. True

B. False

30. Which of the following statements is true? (Choose all that apply)

A. Only primitive data types, and not object references, can be converted implicitly.

B. Only object references, and not primitive data types, can be converted explicitly.

C. Both object references and primitive data types may be converted implicitly and explicitly.

D. Casting primitive data types is checked only at execution time.