University College Dublin
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Professional Java Programming (COMP41200) Exam 2, 02 December 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. Consider the following code fragment:

```
public class Q1{
  public static void main(String[] args) {
      int[] x = {0, 1, 2, 3, 4};
      try{
        System.out.println("x[6]: " + x[6]);
        System.out.println("x[3]: " + x[3]);
      } catch (IndexOutOfBoundsException ie) {
          System.out.println("Some kind of index out of bound!");
        }
        catch (ArrayIndexOutOfBoundsException oe) {
          System.out.println("Array index out of bound!" );
        }
        finally {
          System.out.println("finally block must be executed!");
        }
   }
}
```

Which *one* of the following is the output of this code?

A. Array index out of bound!
finally block must be executed!

B. Some kind of index out of bound!
finally block must be executed!

C. Some kind of index out of bound!
Array index out of bound!
finally block must be executed!

D. No output – a compiler error occurs

2. Suppose a method called `methodTest()` consists of a `try` block, followed by a `catch` block, followed by a `finally` block. Assuming the JVM does not crash and the code does not execute a `System.exit()` call, under what circumstances will the `finally` block *not* begin to execute? (Choose all that apply)

A. The `try` block throws an exception, and the `catch` block also throws an exception.

B. The `try` block throws an exception, and the `catch` block calls `methodTest()` in a way that causes another exception to be thrown.

C. Under the above conditions, the `finally` block will **always** execute.

3. Which *one* of the following is the most appropriate way to handle invalid arguments in a public method?

A. Throw `java.lang.InvalidArgumentException`.

B. Throw `java.lang.IllegalArgumentException`.

C. Check for argument validity in an assert statement, which throws `AssertionError` if the arguments are invalid.

D. Use non-assertion code to check for argument validity. If invalid arguments are detected, explicitly throw `AssertionError`.

4. Consider the following code fragment:

```
1. public class FinallyTest{
2. public static void main(String[] args) {
3. try{
4. System.out.println ("I was in try");
5. }
6. finally {
7. System.out.println("I was in finally");
8. } } }
```

What is the result of executing this code? (Select the correct answer)

A. I was in try

B. I was in finally

C. I was in try

I was in finally

D. A compiler error occurs at line 6.

E. The program compiles, but throws an exception during execution.

5. Assume that the variable `x` is already properly declared, has some value, and is in scope. Which *one* of the following code fragments is the most appropriate way of throwing an exception?

A.
```
if ( x > 10) {
  throws new IndexOutOfBoundsException("Index is out of bound!");
}
```

B.
```
if ( x > 10) {
  throw new IndexOutOfBoundsException("The value of index x=" + x + " is out of bound!" );
}
```

C.
```
IndexOutOfBoundsException iob = new IndexOutOfBoundsException("Index out of bound!");
if ( x > 10) {
  throw iob;
}
```

D.
```
if ( x > 10) {
  throw "Index is out of bound!";
}
```

6. Which of the following is an appropriate situation for assertions? (Choose all that apply)

A. Preconditions of a private method

B. Postconditions of a private method

C. Preconditions of a public method

D. Postconditions of a public method

7. Which of the following is true about assertions in Java? (Choose all that apply)

A. Assertions are mostly used during testing to uncover internal program errors.

B. Assertions are used to report recoverable problems from one part of an application to another part of the application.

C. An assertion error is thrown if the *condition* specified in assert <*condition*> is true.

D. An assertion error is thrown if the *condition* specified in assert <*condition*> is false.

8. Which of the following is true about file handling in Java? (Choose all that apply)

A. When you construct an instance of `File`, if you do not use the file-naming semantics of your machine, the constructor will throw an `IOException`.

B. When you construct an instance of `File`, if the corresponding file does not exist on your file system, one will be created.

C. When an instance of `File` is garbage collected, the corresponding file on the local file system is deleted.

D. None of the above.

9. What is the output of the following code fragment? (Select the correct answer)

```
1:    String str = "Welcome";
2:    str.concat(" to Java!");
3:    System.out.println(str);
```

A. Prints "Welcome"

B. Prints " to Java!"

C. Prints "Welcome to Java!"

D. Strings are immutable, so compiler error at line 2 and therefore no output.

10. How many 8-bit bytes does the following Java code successfully write to file *tester*?

```
try {
  FileOutputStream fos = new FileOutputStream("tester");
  DataOutputStream dos = new DataOutputStream(fos);
  dos.writeInt(-3);
  dos.writeDouble(1.0001);
  dos.close();
  fos.close();
}
catch (IOException e) { }
```

A. 4

B. 8

C. 12

D. The number of bytes written depends on the underlying system.

E. Compiler error, so no bytes written to the file.

11. What is output when this code is compiled & run? Select the <u>two</u> correct answers.

```
public class test {
public static void main(String args[]) {
    String s1 = "abc";
    String s2 = new String ("abC");
    if(s1 == s2)
        System.out.println(1);
    else
        System.out.println(2);
    if(s1.equals(s2))
        System.out.println(3);
    else
        System.out.println(4);
    }
}
```

A. 1

B. 2

C. 3

D. 4

12. Consider the following code:

```
1. import java.io.*;
2. public class Q12 {
3.   public static void main(String[] args) throws IOException {
4.     File inputFile = new File("scjp.txt");
5.     File outputFile = new File("scjpcopy.txt");
6.     BufferedReader in = new BufferedReader(inputFile);
7.     BufferedWriter out = new BufferedWriter(new FileWriter(outputFile));
8.     String lineOut;
9.     while ((lineOut = in.readLine()) != null){
10.      out.write(lineOut);
11.      out.newLine();
12.    }
13.  in.close();
14.  out.close();
15.  }
16. }
```

What is the output of this code? (Choose the correct answer)

A. A compiler error occurs at line 6.

B. The code compiles fine but throws an exception during execution at line 6.

C. A compiler error occurs at line 7.

D. The code compiles and executes without any error or exception.

13. In the following code fragment, after execution of line 1, `s` references an instance of the `String` class. True or False: after execution of line 2, `s` no longer references the *same* instance.

```
1. String s = new String("abcde");
2. s = s + "xyz";
```

A. True

B. False

14. Consider the following code fragment:

```
1. public class MyStringClass extends String {
2.   public static void main(String[] args) {
3.     String str = "Me" + " too";
4.     System.out.println(str);
5.   }
6. }
```

Which *one* of the following is true about this code fragment?

A. The code compiles and executes fine, and generates the output "Me too".

B. No output – a compiler error occurs.

C. Compiles fine, but there is no output and an exception is thrown at runtime.

15. In the following code fragment, after execution of line 1, `sb` references an instance of the `StringBuffer` class. True or False: after execution of line 2, `sb` still references the *same* instance.

```
1. StringBuffer sb = new StringBuffer("abcde");
2. sb.insert(3, "xyz");
```

A. True

B. False

16. Consider the following code:

```
class Mutate {
  public static void main(String [] args) {
    StringBuilder s = new StringBuilder("0123456789");
    if (s.length() == 10)
      s.insert(10, "abcdef");
    s.delete(3,7);
    System.out.println(s.indexOf("b"));
  }
}
```

What is the output?

A. 7

B. 6

C. 5

D. -1

17. Given the following code, what is the expected result?

```
import java.util.Scanner;
public class QTest17 {

      public static void main(String[] args) {

            Scanner scanner = new Scanner("hello 1 2.00 false");
            scanner.useDelimiter(" ");

            String str = scanner.next();
            int anInt = scanner.nextInt();
            float aFloat = scanner.nextFloat();
            boolean bValue = scanner.nextBoolean();

            System.out.println(anInt + ":" + aFloat + ":" + bValue);
      }
}
```

A. The program will throw an InputMismatch exception at run-time.

B. Compiler error, so the program will produce no output.

C. The program will output 'hello:1:2.0:false'

D. The program will output '1:2.0:false'

E. None of the above.

18. What happens when you try to compile and run the following application?

```
1. import java.util.*;
2.
3. public class Q18 {
4.   public static void main(String[] args) {
5.     Set<Q18> set = new TreeSet<Q18>();
6.     set.add(new Q18());
7.     set.add(new Q18());
8.   }
9. }
```

A. Compiler error.

B. An exception is thrown at line 5.

C. An exception is thrown at line 6.

D. An exception is thrown at line 7.

E. No exception is thrown.

19. Which of the following are *illegal* lines of code in Java? (Choose all that apply)

A. HashMap<Integer, String> hmap = new HashMap<Integer, String>();

B. ArrayList<int> list1 = new ArrayList<int>();

C. List<String> list2 = new ArrayList<String>();

D. HashSet<String> mySet = new HashSet<String>;

20. Given the following code:

```
class ThreadBoth extends Thread implements Runnable {
  public void run(){ System.out.print("hi "); }
  public static void main(String [] args){
     Thread t1 = new ThreadBoth();
     Thread t2 = new Thread(t1);
     t1.run();
     t2.run();
     t1.run();
  }
}
```

What is the result?

A. Prints 'hi hi '

B. Prints 'hi hi hi '

C. Compiler error.

D. Compiles ok, but an exception is thrown at runtime.

21. Which of the following are methods of the `Object` class? (Choose all that apply)

A. `hashCode()`

B. `sleep()`

C. `start()`

D. `notify()`

22. The `Vector` class is used to directly implement which collection interface?

A. `Set`

B. `SortedSet`

C. `List`

D. `Tree`

23. Which *one* of the following statements is true about the `wait()` method?

A. A thread calls the `wait()` method to temporarily stop another thread from running.

B. When a thread executes a call to the `wait()` method, it itself temporarily stops executing.

C. A call to `wait()` stops the application from executing.

24. Given the code:

```
1. class Synch {
2. synchronized int i;
3. synchronized void go() {
4.   Synch s = new Synch();
5.   synchronized(this) { }
6.   synchronized(s) { }
7.  }
8. }
```

Which line will cause a compiler error? (Choose <u>one</u>)

A. line 2

B. line 3

C. line 5

D. line 6

25. When does an exception's stack trace get recorded in the exception object?

A. When the exception is caught.

B. When the exception is thrown.

C. When the exception is constructed.

D. Depends on the underlying platform.

26. Consider the following code:

```
1. import java.util.*;
2. public class Q26{
3.   public static void main(String[] args) {
4.     Integer x = 1;
5.     x++;
6.     Integer y = 2;
7.     if(x==y){
8.       System.out.println("Area: " + areaOfASquare(4.0d));
9.     }
10.  }
11.  public static Double areaOfASquare(Double side){
12.    return side*side;
13.  }
14. }
```

What is the result when you attempt to compile this code?

A. compiler error at line 4

B. compiler error at line 5

C. compiler error at line 7

D. compiler error at line 8

E. compiles fine (no errors)

27. How many locks does a class have?

A. One for each object of the class that has been instantiated

B. One for each constructor defined in the class

C. One for each method defined in the class

D. One

28. What is the output from this code fragment?

```
1. ArrayList<Integer> list = new ArrayList<Integer>();
2. list.add(new Integer(1));
3. list.add(new Integer(2));
4. Iterator<Integer> itr = list.iterator();
5. for(Integer j:list){
6.   System.out.println("number: " + j);
7. }
```

A. Compiler error at line 4.

B. Compiler error at line 5.

C. number: 1
number: 2

D. Runtime error.

29. True or false: it is legal to write Java code that will execute only if the current thread owns *multiple* locks.

A. True

B. False

30. Which of the following collections is thread-safe and can be used to store key-value pairs?

A. LinkedList

B. HashTable

C. HashMap

D. TreeMap

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1. D.
2. C.
3. B.
4. C.
5. B.
6. A. B. D.
7. A. D.
8. D.
9. A.
10. C.
11. B. D.
12. A.
13. A.
14. B.
15. A.
16. A.
17. D.
18. D.
19. B. D.
20. B.
21. A. D.
22. C.
23. B.
24. A.
25. C.
26. E.
27. D.
28. C.
29. A.
30. B.