



FIRST NAME:

LAST NAME:

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GROUP:

Exam resit

First Part: Test (3 points out of 10)

Duration: 30 minutes

Highest score possible: 3 points

Date: June 25, 2021

Overall instructions for the exam:

- Books, notes, mobile phones, as well as other electronic devices are not allowed during the exam. Breaking this rule may result in expulsion from the examination
- Complete your personal information before starting the exam.
- There is only one correct option for each question. Each correct answer adds 0.2 points. Each incorrect answer subtracts 0.066 points. Unanswered questions do not add or subtract points.

Question 1

If the following method receives an array with values 10,21,43,52,67,0,32 what does this method return?

```
public static int method(int[] data) {  
    int b = 0;  
    if(data.length>=1){  
        b = data[0];  
        for (int i=1; i <= data.length; i++){  
            if (b < data[i]){  
                b = data[i];  
            }  
        }  
    }  
    return b;  
}
```

Select one:

- ☐ a. 32
- ☐ b. An `ArrayIndexOutOfBoundsException` is thrown
- ☐ c. 67
- ☐ d. 0



Question 2

Given the following statement for the creation of an array, which of the following sentences is correct?

```
Integer[] integers = {Integer.parseInt(new String("6")), new Integer(2021)};
```

Select one:

- ☐ a. The method `parseInt` from class `Integer` is not necessary, as `String` is a subclass from `Integer`
- ☐ b. This is a case of upcasting
- ☐ c. Objects of class `Integer` cannot be created using the reserved word `new`.
- ☐ d. The method `parseInt` of class `Integer` is declared as static

Question 3

Method overriding consists of:

Select one:

- ☐ a. Programming in the same class two methods with the same name, but that receive a different number or type of parameters.
- ☐ b. Programming in the same class two methods with the same name, and same number and type of parameters.
- ☐ c. Programming in the same class two methods with the same name, one declared as static and the other one as non-static.
- ☐ d. Programming in a child class a method with the same name, same number and type of parameters, and return type as another method in the parent class.

Question 4

Given the following class and interface declarations, which of the following assignments would cause a compilation error?

```
public interface Identifiable{...}
public interface Recrutable{...}
public class Person implements Identifiable{...}
public class Student extends Person{...}
public class GradStudent extends Student implements Recrutable{...}
```

Select one:

- ☐ a. `Recrutable r = new Student();`
- ☐ b. `Person p = new Student();`
- ☐ c. `Identifiable i = new Student();`
- ☐ d. `Identifiable i = new GradStudent();`

**Question 5**

The protected modifier applied to a method...

Select one:

- ☐ a. indicates that the method can only be called from the class in which it is implemented.
- ☐ b. indicates that the method can only be called from the class in which it is implemented, from the derived classes, and from the classes that belong to the same package.
- ☐ c. indicates that the method can be called from any part of the programme.
- ☐ d. indicates that the method can only be called from the class in which it is implemented, and from the classes that belong to the same package.

Question 6

The reserved word this refers to

Select one:

- ☐ a. the constructor with no parameters of the class that contains the this.
- ☐ b. the method that contains the this so that the this can be used to make recursive calls.
- ☐ c. an attribute whose name is the same as a parameter received in the method that contains the this.
- ☐ d. the current object on which the method that contains the this was invoked.

Question 7

Which of these options is NOT a usual metric of coverage in unit testing?

Select one:

- ☐ a. Line coverage
- ☐ b. Branch coverage
- ☐ c. Interface coverage
- ☐ d. Method coverage

**Question 8**

Given the following recursive method:

```
public static int m(int x) {  
    if (x<=1) {  
        return 0;  
    }  
    else {  
        return m(x-1) + m(x+1);  
    }  
}
```

Select one:

- ☐ a. It is not a recursive method.
- ☐ b. It is a cascade recursion.
- ☐ c. It is a nested recursion.
- ☐ d. It is a linear non-tail recursion.

**Question 9**

Given the following recursive method, which statement is correct if this method is called with a equals to 4 and b equals to 2.

```
public static int method(int a, int b){  
    if(a < b){  
        return 2;  
    }else{  
        return 2+method(a--, b++);  
    }  
}
```

Select one:

- ☐ a. The call to method(4,2) leads to a StackOverflowError.
- ☐ b. This is a case of cascade recursion.
- ☐ c. The call to method(4,2) returns 4 as result.
- ☐ d. The call to method(4,2) returns 6 as result.

**Question 10**

Given an empty linked list, and in which these String are inserted one by one in the order indicated a,d,g,h,b,p,e, what would the call to the next method return considering that head points to the first node of the linked list?

```
public void method(){  
    if(head != null){  
        Node aux = head;  
        while(aux!=null){  
            aux = aux.getNext();  
        }  
        System.out.println(aux.getInfo());  
    }  
}
```

Select one:

- ☐ a. a
- ☐ b. A NullPointerException will be thrown
- ☐ c. e
- ☐ d. p

**Question 11**

We have the next set of statements:

```
Stack stack = new Stack();  
Queue queue = new Queue();  
queue.enqueue("A");  
queue.enqueue("B");  
queue.enqueue("C");  
stack.push(queue.dequeue());  
stack.push(queue.dequeue());  
queue.enqueue("D");  
stack.push(queue.dequeue());  
stack.push(queue.dequeue());
```

Going from the top element in the stack to the element at the bottom of the stack, what are the elements of the stack after executing the above mentioned set of statements?

Select one:

- ☐ a. C,B,D,A
- ☐ b. D,C,B,A
- ☐ c. A,B,C,D
- ☐ d. C,D,B,A

**Question 12**

We run a travel agency (agency) and we create a binary search tree to organize the possible destinations, where the parameter of the method that inserts is the destination, which is used both as information and key (considering alphabetical order). What is height of the resulting tree after running the following statements?

```
agency.insert("Madrid");  
agency.insert("Rome");  
agency.insert("Paris");  
agency.insert("New York");  
agency.insert("Buenos Aires");  
agency.insert("Cape Town");  
agency.insert("Sydney");  
agency.insert("Amsterdam");  
agency.insert("Vienna");  
agency.insert("Tehran");
```

Select one:

- ☐ a. 5
- ☐ b. 6
- ☐ c. 3
- ☐ d. 4

**Question 13**

Given the heap represented by the array {1, 4, 6, 8, 9, 10}, which would be the resulting array that would represent the resulting heap after executing the following statements, and where the method extract extracts the root of the heap?

```
insert(2);  
extract();  
insert(7);  
extract();
```

Select one:

- ☐ a. {4, 7, 6, 8, 9, 10}
- ☐ b. {2, 4, 6, 7, 8, 10}
- ☐ c. {2, 6, 7, 8, 9, 10}
- ☐ d. {4, 6, 7, 8, 9, 10}

Question 14

How many swaps does the Bubble Sort algorithm needs to sort this array of String from the highest to the lowest?

```
{"France", "Bulgaria", "Denmark", "Estonia", "Austria", "Croatia", "Germany"}
```

Select one:

- ☐ a. 12
- ☐ b. 11
- ☐ c. 9
- ☐ d. 10

**Question 15**

What is the complexity of the HeapSort algorithm?

Select one:

- ☐ a. $O(n^2)$
- ☐ b. $O(\log n)$
- ☐ c. $O(n \log n)$
- ☐ d. $O(n)$

ANSWER KEY

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
B	D	D	A	B	D	C	B	A	B	B	D	A	B	C