Programming Languages - ST0244

Partial Exam 1

Computer Science and Systems Department

EAFIT University

February , 2024

PARTIAL I - value: 15% of the final grade of the course.

Student's full name: _____

Instruccions:
All answers must be recorded in this document, which you must attach via the Interactive platform at the end of the exam (see note at the end of this document).
You can use **replit**, **BlueJ** or the IDE authorized by the teacher if you bring your own PC.

Important information: cannot access any other website, or search for solutions on Google. You may not use any AI aids such as ChatGP, Copilot. The only thing you should use to solve the exam will be the IDE authorized by the teacher during the presentation of the midterm and this Word document to record your answers.
Please put your cell phone on airplane mode and refrain from using it while taking this exam. You should only use it when you wish to scan your pencil and paper answers to include them in this document, after notifying the teacher before doing so.

1. **Conceptual Domain (*value 10 % of this exam*)**

   Mating exercise. Place the letters corresponding to the concepts on the right between the brackets accompanying the definitions on the left.

- Method in charge of initializing the attributes of the objects at the moment of being instantiated. ( )
- Allows to have several methods with the same name and even the same number of parameters as long as one of them is different in terms of data type from any other method with the same name. ( )
- Consists of overwriting the body of an existing method in a class or interface. ( )
- Access modifier that allows only packet-level reach or visibility. ( )
- It is the superclass from which all Java classes inherit. ( )
- Method that allows querying the value of the attributes of an object by means of a text representation. ( )

A. Method overloading

B. Constructor

C. toString()

D. Overriding

E. Object

F. Default

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1. BNF - *Value of this item (5%).*

1.1. Please describe each of the rules provided by the BNF notation for the following Java programming language instructions. Try to explain your answer as detailed as possible.

<do statement> ::= do <statement> while (<expression>) ;

<while statement>::= while (<expression>) <statement>

<for statement> ::= for (<for init>? ;<expression>?; <for update>?) <statement>

2. Context-free grammars *Value of this item (15%).*

2.1. Perform a left-hand derivation for the following infixed expression **(9/b)+z** in which it is shown that it is derived from the following context-free grammar:

G = (N,T ,P,E)
donde
N= {E,T,F}
T= {identifierr, number, +, -,,/,(,)}*
P is defined by the set of production
E → E + T | E - T | T
T → T∗F| T / F | F
F → (E) | identifier| number

2.2. **Plot the syntax tree and the AST for the above expression**.

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3. POO in Java (*value 40 % of this exam*)

3.1 Choose the correct statement:

( ) **a**. "A extends B" is correct if and only if A is a Class and B is an Interface.

( ) **b**. "A extends B" is correct if A and B are both interfaces

( ) **c**. "A extends B" is correct if A and B are either both classes or both interfaces.

( ) **d**. "A extends B" is correct for all combinations of A and B being clases or interfaces

Please explain your choice below

3.2 Choose and justify the correct answer given the following code:

```
1.  package com.narvasoft;
2.   class A{
3.   int a = 7;
4.   protected int b = 8;
5.   public int c = 9;
6.  }
7.   public class B {
8.    public static void main(String[] args){
9.      A a = new A ();
10.   System.out.print(“ “ + a.a);
11.   System.out.print(“ “ + a.b);
12.   System.out.println(“ “ + a.c);
13.  }
14. }
```

What is the result?

( ) **a**. 7 8 9

( ) **b**. 7 followed by an exception

( ) **c**. Compilation fails with an error on line 11

( ) **d**. Compilation fails with an error on line 12

Please explain your choice below

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3.3 Choose and justify the correct answer given the following code:

```
1.  package com.narvasoft;
2.   public class A extends B{
3.      public static void main(String[] args){
4.       Short a = 8;
5.      System.out.println(add(a, 8));
6.     }
7.   }
8.   class B {
9.    int add(int a, int b) { return a + b;}
10. }
```

What is the result?

( ) **a**. 16

( ) **b**. Compilation fails due to multiple errors

( ) **c**. Compilation fails due to error on line 5

( ) **d**. Compilation fails due to error on line 9

Please explain your choice below

3.4 Find the given file:

```
1.  package com.narvasoft;
2.   public class Iphone implements Device{
3.     public void doIt(){}
4.  }
5.   abstract class Iphone12 extends Iphone{}
6.   abstract class Iphone15 extends Iphone{
7.      public void doIt(int x){}
8.  }
9.   class Iphone16 extends Iphone implements Device{
10.   public void doCall(){}
11. }
12.  interface Device{
13.     public void doIt();
14.  }
```

What is the result?

( ) **a**. Compilation succeeds

( ) **b**. Compilation with an error on line 3

( ) **c**. Compilation with an error on line 6

( ) **d**. Compilation with an error on line 10

Please explain your choice below

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4. **POO in Java auditing errors – *value (30%) of this item***
   Explain what errors the IDE is indicating and how to correct them.

```
1   package primerageneracion;
    1 usage  2 implementations
2   interface Mamifero {
        no usages
3       void amamantar();
4   }
    1 usage  1 implementation
5   interface Murcielago extends Mamifero {
        1 usage  1 implementation
6       void volar();
7   }
    4 usages  1 inheritor
    CodiumAI: Test this class.
8   public class Vampiro implements Murcielago {
        4 usages
9       private String nombre;  private int edad;
        no usages
10      @Override
        CodiumAI: Test this method.
11      public void amamantar(String x) {}
        1 usage
12      @Override
        CodiumAI: Test this method.
13      public void volar() {
14          System.out.println("Volando con Ecolocalización ..");
15      }
```

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Note: once you have finished your exam. Attach it through the platform **Interactiva**. Before attaching the file, save it with your name, e.g.: **Parcial_1_Miguel_Zapata.docx**

	Asignación	Nuevos envíos	Completado	Evaluado	Comentarios publicados
	Ninguna categoría				
☐	Entrega de Solución al Parcial de		0/25	0/25	0/25

Please note that the university's **Interactiva** platform is programmed to receive submissions during class time, so it is highly recommended that you upload this document 5 to 10 minutes before the end of the stipulated time for the presentation of the midterm.

Cheer up, you have studied and reviewed a lot!... or so I hope!

"Talk is cheap. Show me the code."
- Linus Torvalds