

# Estructura de datos y algoritmos

Rodrigo Alvarez

[rodrigo.alvarez2@mail\\_udp.cl](mailto:rodrigo.alvarez2@mail_udp.cl)

# Que es java?

# Que es java?



# Que es java?

- Desarrollado por Sun Microsystems
- Lanzado en 1995
- Actualmente propiedad de Oracle
- Open Source



# Que es java?

- Lenguaje compilado a bytecode  
(corre encima de la jvm)
- Fuertemente orientado a objetos
- Sintaxis similar a C++
- Multiplataforma



Domina todos lenguajes de programación estudiando en EDteam

[ed.team/cursos](http://ed.team/cursos)



## MAJOR COMPANIES THAT USE



# Hello world

The screenshot shows a Java code editor interface. At the top, there's a header bar with tabs for "Main.java" and a "+" button, followed by the title "Java Hello World". On the right of the header are buttons for "NEW", "JAVA ▾", "RUN ►", and three vertical dots. The main area has a dark background. On the left, there's a vertical toolbar with a "1" icon. The main workspace shows the code for a Java application:

```
1 public class Main {  
2     public static void main(String[] args) {  
3         System.out.println("Hello World");  
4     }  
5 }
```

To the right of the code, there are sections for "STDIN" and "Output". The "STDIN" section contains placeholder text: "Input for the program ( Optional )". The "Output" section contains the instruction: "Click on RUN button to see the output".

Tipo dato	Tamaño	Descripción
byte	1 byte	números del -128 al 127
short	2 bytes	-32,768 al 32,767
int	4 bytes	-2,147,483,648 al 2,147,483,647
long	8 bytes	-9,223,372,036,854,775,808 al 9,223,372,036,854,775,807
float	4 bytes	números racionales, hasta 7 dígitos decimales
double	8 bytes	hasta 15 dígitos decimales
boolean	1 bit	true o false
char	2 bytes	un único carácter

# Operadores aritméticos

Operator	Name	Description	Example
+	Addition	Adds together two values	x + y
-	Subtraction	Subtracts one value from another	x - y
*	Multiplication	Multiplies two values	x * y
/	Division	Divides one value by another	x / y
%	Modulus	Returns the division remainder	x % y
++	Increment	Increases the value of a variable by 1	++x
--	Decrement	Decreases the value of a variable by 1	--x

# Operadores de asignación

Operator	Example	Same As
=	x = 5	x = 5
+=	x += 3	x = x + 3
-=	x -= 3	x = x - 3
*=	x *= 3	x = x * 3
/=	x /= 3	x = x / 3
%=	x %= 3	x = x % 3

# Operadores de comparación

Operator	Name	Example
<code>==</code>	Equal to	<code>x == y</code>
<code>!=</code>	Not equal	<code>x != y</code>
<code>&gt;</code>	Greater than	<code>x &gt; y</code>
<code>&lt;</code>	Less than	<code>x &lt; y</code>
<code>&gt;=</code>	Greater than or equal to	<code>x &gt;= y</code>
<code>&lt;=</code>	Less than or equal to	<code>x &lt;= y</code>

# Operadores lógicos

Operator	Name	Description	Example
&&	Logical and	true if both statements are true	<code>x &lt; 5 &amp;&amp; x &lt; 10</code>
	Logical or	true if one of the statements is true	<code>x &lt; 5    x &lt; 4</code>
!	Logical not	Reverse the result	<code>!(x &lt; 5 &amp;&amp; x &lt; 10)</code>

# I/O: Input/Output en java

The screenshot shows a Java code editor interface. The top bar includes tabs for "lo.java" and "+", a file identifier "427p45t7h", and buttons for "NEW", "JAVA ▾", "RUN ▶", and a three-dot menu. The code area contains a single line of code: "1". To the right, under "STDIN", the user has entered "23". Below a horizontal line, the "Output:" section displays the program's response:

```
Output:  
Ingresa dos ints:  
el primer numero es: 2  
el segundo numero es: 3  
La suma de los numeros es: 5
```

# Scanner class

La clase `Scanner` se utiliza para obtener la entrada del usuario, y es parte del paquete `java.util`.

Method	Description
<code>nextBoolean()</code>	Reads a <code>boolean</code> value from the user
<code>nextByte()</code>	Reads a <code>byte</code> value from the user
<code>nextDouble()</code>	Reads a <code>double</code> value from the user
<code>nextFloat()</code>	Reads a <code>float</code> value from the user
<code>nextInt()</code>	Reads a <code>int</code> value from the user
<code>nextLine()</code>	Reads a <code>String</code> value from the user
<code>nextLong()</code>	Reads a <code>long</code> value from the user

# Scanner

The screenshot shows a Java code editor interface with the following details:

- Title Bar:** The title bar displays "ScannerEx.java" and "427nv54rs".
- Toolbar:** The toolbar includes buttons for "NEW", "JAVA ▾", "RUN ▶", and a three-dot menu.
- Code Area:** The code area contains a single line of code: "1".
- stdin Area:** The "STDIN" section shows the input provided to the program: "hola", "3", and "3.14".
- Output Area:** The "Output" section shows the program's response to the inputs:
  - "Ingrese una palabra"
  - "La palabra ingresada es: hola"
  - "Ingrese un numero"
  - "El numero ingresado es: 3"
  - "Ingrese un numero flotante"
  - "El numero flotante ingresado es: 3.14"

# if, else, while, for

The screenshot shows a Java code editor interface. On the left, there is a dark sidebar with a file icon and a search bar containing the text "IfElseWhileForExample.java". Below the search bar is a list of recent files: "427nvkqmd" (selected), "427nvkqmd", "427nvkqmd", "427nvkqmd", and "427nvkqmd". To the right of the sidebar is a toolbar with buttons for "NEW", "JAVA ▾", "RUN ▶", and a three-dot menu. The main workspace contains the following code:

```
1
```

The code consists of a single line of Java code that prints the number 17 to the standard output.

On the right side of the editor, there are two sections: "STDIN" and "Output". The "STDIN" section shows the input "17". The "Output" section shows the following text:  
Output:  
the number is odd  
numeros pares:  
2  
4  
6  
8  
10  
12  
14  
16  
divisibles por 3:  
3

# Strings

The screenshot shows a Java code editor interface. The top bar includes tabs for "StringExample.java" and "+", a file identifier "427nu2xbm", and buttons for "NEW", "JAVA ▾", "RUN ▶", and a menu icon. The main area displays the following code:

```
1
```

The output window shows the following results:

STDIN  
23

---

Output:  
H  
e  
l  
l  
o  
  
W  
o  
r  
l  
d  
Hello World. Goodbye

## String methods

# Arrays

The screenshot shows a Java code editor interface. At the top, there are tabs for "ArrayExample.java" and a plus sign, with the identifier "427p4c9xn" next to it. On the right side, there are buttons for "NEW", "JAVA ▾", "RUN ▶", and three vertical dots. The main area has a dark background. On the left, a vertical bar has the number "1" at its top. The central area contains the following code:

```
public class ArrayExample {  
    public static void main(String[] args) {  
        int[] arr = {1, 2, 3, 4};  
        System.out.println(arr[3]);  
    }  
}
```

To the right of the code, under the heading "STDIN", is the placeholder text "Input for the program ( Optional )". Below the code, under the heading "Output:", is the number "4".

# Métodos

```
[modificador de acceso] [tipo_retorno] nombre_funcion(tipo_1 parametro_1, tipo_2 parametro_2, ...){  
    // instrucciones  
    return valor;  
}
```

# Métodos

Main.java      Greeter.java      +      427p5fbvj      NEW      JAVA ▾      RUN ►      :

1

```
public class Main {  
    public static void main(String[] args) {  
        System.out.println("hi!");  
    }  
}
```

STDIN  
Input for the program ( Optional )

---

Output:  
hi!

# Clases

The screenshot shows a Java code editor interface. At the top, there's a header with the file name "ClassExample.java", a "+" button, the user ID "427pmavjh", and buttons for "NEW", "JAVA ▾", "RUN ►", and three vertical dots. The main area has a dark background. On the left, a vertical toolbar has the number "1". The main code area is empty. To the right, there's a "STDIN" section with placeholder text "Input for the program ( Optional )" and a green horizontal line. Below it is an "Output:" section containing the text "miauuuu".

# Herencia

The screenshot shows a Java code editor interface. At the top, there's a header with "Car.java" and a "+" button on the left, and "427pqr5m" in the center. On the right, there are buttons for "NEW", "JAVA ▾", "RUN ►", and three vertical dots. The main area has a dark background. On the left, a code editor window shows the number "1" at the top. On the right, there are two sections: "STDIN" which contains placeholder text "Input for the program ( Optional )", and "Output:" followed by the text "Tuut, tuut!" and "Ford 2023 4".

```
1
Tuut, tuut!
Ford 2023 4
```

## Interfaces

Las interfaces en Java son una colección de métodos abstractos y constantes que pueden ser implementados por cualquier clase que las implemente.

Una interfaz define un conjunto de métodos y su firma, pero no proporciona implementaciones de los métodos.

# Interfaces

The screenshot shows a Java code editor interface. On the left, there's a dark sidebar with a file icon and a number '1'. The main area has tabs for 'Main.java' and '+'. The title bar shows '427pruj44' and includes buttons for 'NEW', 'JAVA ▾', 'RUN ▶', and three dots. The code editor area contains the following code:Main.java
+
427pruj44
NEW JAVA ▾ RUN ▶ ...
1
public class Main {
 public static void main(String[] args) {
 System.out.println("The pig says: wee wee");
 System.out.println("Zzz");
 }
}

To the right of the code editor is a results panel. It starts with 'STDIN' and a placeholder 'Input for the program ( Optional )'. Below that is a horizontal line. Underneath the line is the word 'Output:' followed by the program's output:

```
Output:
The pig says: wee wee
Zzz
```

# Generics

The screenshot shows a Java code editor interface. On the left, there is a file tab labeled "Main.java". To its right is a "+" button. In the center, the code editor displays the following Java code:

```
427psdcfw
1
public class Main {
    public static void main(String[] args) {
        System.out.println("Hello, World!");
    }
}
```

At the top right of the editor, there are several buttons: "NEW", "JAVA ▾", "RUN ►", and a three-dot menu icon.

To the right of the code editor, there is a "STDIN" section with the placeholder text "Input for the program ( Optional )". Below it, there is an "Output:" section containing the number "3".

- `ArrayList`: Implementa un **TDA List** en array manipulando el tamaño de forma dinámica.
- `LinkedList`: Implementa un **TDA List** sobre una lista de nodos.
- `Queue`: Implementa un **TDA FIFO** en una lista de nodos.
- `Stack`: Implementa un **TDA LIFO** en una lista de nodos.
- `Map`: Implementa una estructura **TDA key-value** en un árbol o una tabla hash.
- `Set`: Implementa una estructura **TDA unique value** en un árbol o una tabla hash.

