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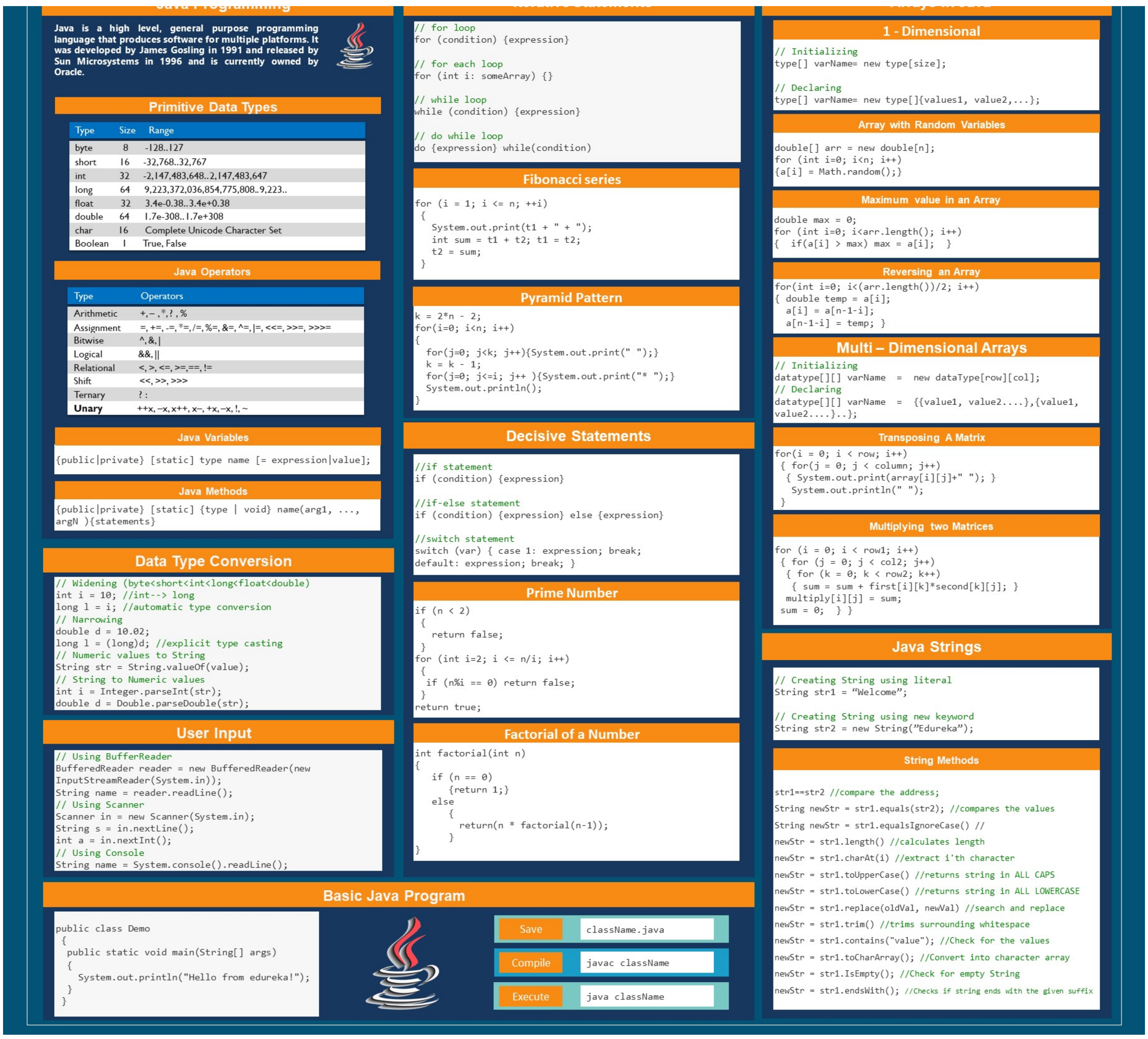

Java is a high level, general purpose programming language that produces software for multiple platforms. It was developed by James Gosling in 1991 and released by Sun Microsystems in 1996 and is currently owned by Oracle.

Primitive Data Types

Type	Size	Range
byte	8	-128..127
short	16	-32,768..32,767
int	32	-2,147,483,648..2,147,483,647
long	64	9,223,372,036,854,775,808..9,223..
float	32	3.4e-0.38..3.4e+0.38
double	64	1.7e-308..1.7e+308
char	16	Complete Unicode Character Set
Boolean	1	True, False

Java Operators

Type	Operators
Arithmetic	+,– ,*,? , %
Assignment	=, +=, -=, *=, /=, %=, &=, ^=, |=, <<=, >>=, >>>=
Bitwise	^, &, |
Logical	&&, ||
Relational	<, >, <=, >=,==, !=
Shift	<<, >>, >>>
Ternary	? :
Unary	++x, –x, x++, x–, +x, –x, !, ~

Java Variables

```
{public|private} [static] type name [= expression|value];
```

Java Methods

```
{public|private} [static] {type | void} name(arg1, ...,
argN ){statements}
```

Data Type Conversion

```
// Widening (byte<short<int<long<float<double)
int i = 10; //int--> long
long l = i; //automatic type conversion
// Narrowing
double d = 10.02;
long l = (long)d; //explicit type casting
// Numeric values to String
String str = String.valueOf(value);
// String to Numeric values
int i = Integer.parseInt(str);
double d = Double.parseDouble(str);
```

User Input

```
// Using BufferReader
BufferedReader reader = new BufferedReader(new
InputStreamReader(System.in));
String name = reader.readLine();
// Using Scanner
Scanner in = new Scanner(System.in);
String s = in.nextLine();
int a = in.nextInt();
// Using Console
String name = System.console().readLine();
```

```
// for loop
for (condition) {expression}

// for each loop
for (int i: someArray) {}

// while loop
while (condition) {expression}

// do while loop
do {expression} while(condition)
```

Fibonacci series

```
for (i = 1; i <= n; ++i)
 {
   System.out.print(t1 + " + ");
   int sum = t1 + t2; t1 = t2;
   t2 = sum;
 }
```

Pyramid Pattern

```
k = 2*n - 2;
for(i=0; i<n; i++)
{
  for(j=0; j<k; j++){System.out.print(" ");}
  k = k - 1;
  for(j=0; j<=i; j++ ){System.out.print("* ");}
  System.out.println();
}
```

Decisive Statements

```
//if statement
if (condition) {expression}

//if-else statement
if (condition) {expression} else {expression}

//switch statement
switch (var) { case 1: expression; break;
default: expression; break; }
```

Prime Number

```
if (n < 2)
 {
   return false;
 }
for (int i=2; i <= n/i; i++)
 {
  if (n%i == 0) return false;
 }
return true;
```

Factorial of a Number

```
int factorial(int n)
{
   if (n == 0)
      {return 1;}
   else
      {
        return(n * factorial(n-1));
      }
}
```

Basic Java Program

```
public class Demo
 {
  public static void main(String[] args)
  {
    System.out.println("Hello from edureka!");
  }
 }
```

Save	className.java
Compile	javac className
Execute	java className

1 - Dimensional

```
// Initializing
type[] varName= new type[size];

// Declaring
type[] varName= new type[]{values1, value2,...};
```

Array with Random Variables

```
double[] arr = new double[n];
for (int i=0; i<n; i++)
{a[i] = Math.random();}
```

Maximum value in an Array

```
double max = 0;
for (int i=0; i<arr.length(); i++)
{  if(a[i] > max) max = a[i];  }
```

Reversing an Array

```
for(int i=0; i<(arr.length())/2; i++)
{ double temp = a[i];
  a[i] = a[n-1-i];
  a[n-1-i] = temp; }
```

Multi – Dimensional Arrays

```
// Initializing
datatype[][] varName  =  new dataType[row][col];
// Declaring
datatype[][] varName  =  {{value1, value2....},{value1,
value2....}..};
```

Transposing A Matrix

```
for(i = 0; i < row; i++)
 { for(j = 0; j < column; j++)
  { System.out.print(array[i][j]+" "); }
   System.out.println(" ");
 }
```

Multiplying two Matrices

```
for (i = 0; i < row1; i++)
 { for (j = 0; j < col2; j++)
  { for (k = 0; k < row2; k++)
   { sum = sum + first[i][k]*second[k][j]; }
  multiply[i][j] = sum;
 sum = 0;   } }
```

Java Strings

```
// Creating String using literal
String str1 = “Welcome”;

// Creating String using new keyword
String str2 = new String(”Edureka”);
```

String Methods

```
str1==str2 //compare the address;
String newStr = str1.equals(str2); //compares the values
String newStr = str1.equalsIgnoreCase() //
newStr = str1.length() //calculates length
newStr = str1.charAt(i) //extract i'th character
newStr = str1.toUpperCase() //returns string in ALL CAPS
newStr = str1.toLowerCase() //returns string in ALL LOWERCASE
newStr = str1.replace(oldVal, newVal) //search and replace
newStr = str1.trim() //trims surrounding whitespace
newStr = str1.contains("value"); //Check for the values
newStr = str1.toCharArray(); //Convert into character array
newStr = str1.IsEmpty(); //Check for empty String
newStr = str1.endsWith(); //Checks if string ends with the given suffix
```

Primitive Data Types

Let’s start off by learning the primitive **data types** that Java offers:

Data Type	Size	Range
byte	8	-128..127
short	16	-32,768..32,767
int	32	-2,147,483,648.. 2,147,483,647
long	64	-9,223,372,036,854,775,808.. 9,223,372,036,854,775,807
float	32	3.4e-0.38.. 3.4e+0.38
double	64	1.7e-308.. 1.7e+308
char	16	Complete Unicode Character Set
Boolean	1	True, False

Java Operators

There are mainly 8 different types of **operators** available in Java:

Operator Type	Operators
Arithmetic	+, – , *, ? , %
Assignment	=, +=, -=, *=, /=, %=, &=, ^=, |=, <<=, >>=, >>>=
Bitwise	^, &, |
Logical	&&, | |
Relational	<, >, <=, >=,==, !=
Shift	<<, >>, >>>
Ternary	?:
Unary	++x, –x, x++, x–, +x, –x, !, ~

Java Variables

Java Methods

There are 3 types of variable in Java:

1. Local Variables
2. Instance Variables
3. Static Variables

```
{public | private} [static] type name [=
expression | value];
```

Data Conversion

The process of changing a value from one data type to another type is known as data type conversion. Data Type conversion is of two types:

1. *Widening:* The lower size datatype is converted into a higher size data type without loss of information.
2. *Narrowing:* The higher size datatype is converted into a lower size data type with a loss of information.

```
// Widening
(byte<short<int<long<float<double)
int i = 10; //int--> long
long l = i; //automatic type conversion
// Narrowing
double d = 10.02;
long l = (long)d; //explicit type casting
// Numeric values to String
String str = String.valueOf(value);
// String to Numeric values
int i = Integer.parseInt(str);
double d = Double.parseDouble(str);
```

Basic Java Program

A basic program in Java will consist of at least the following components:

1. Classes & Objects
2. Methods
3. Variables

```
public class Demo{
  public static void main(String[] args)
   { System.out.println("Hello from
edureka!");}
}
```

1. Method Initialization
2. Method Invocation

A method can be invoked either by calling it by reference or by value.

```
{public | private} [static] {type | void}
name(arg1, ..., argN ){statements}
```

User Input

Java provides three ways to take an input from the user/ console:

1. Using BufferReader class
2. Using Scanner class
3. Using Console class

```
// Using BufferReader
BufferedReader reader = new
BufferedReader(new
InputStreamReader(System.in));
String name = reader.readLine();

// Using Scanner
Scanner in = new Scanner(System.in);
String s = in.nextLine();
int a = in.nextInt();

// Using Console
String name = System.console().readLine();
```

Compile a Java Program

You need to save your Java Program by the name of the class containing main() method along with .java extension.

```
className.java
```

Call the compiler using javac command.

```
javac className
```

Finally, execute the program using below code:

```
java className
```

Flow Of Control

Iterative Statements

Iterative statements are used when you need to repeat a set of statements until the condition for termination is not met.

Decisive Statements

Selection statements used when you need to choose between alternative actions during execution of the program.

```
for (int i: someArray) {}
// while loop
while (condition) {expression}
// do while loop
do {expression} while(condition)
```

Generating a Fibonacci series.

```
for (i = 1; i <= n; ++i)
{System.out.print(t1 + " + ");
int sum = t1 + t2;
t1 = t2;
t2 = sum;}
```

Creating a pyramid pattern.

```
k = 2*n - 2;
for(i=0; i<n; i++)
{ for(j=0; j<k; j++){System.out.print(" ");}
k = k - 1;
for(j=0; j<=i; j++ ){System.out.print("* ");}
System.out.println(); }
```

```
if (condition) {expression} else {expression}
//switch statement
switch (var)
{ case 1: expression; break; default:
expression; break; }
```

Checking the given number is prime or not.

```
if (n < 2) { return false; }
for (int i=2; i <= n/i; i++)
{if (n%i == 0) return false;}
return true;
```

Finding the factorial using recursion function.

```
int factorial(int n)
 {
   if (n == 0)
       {return 1;}
   else
       {return(n * factorial(n-1));}
 }
```

Java Arrays

Single Dimensional (1-D)

Single Dimensional or 1-D array is a type of linear array in which elements are stored in a continuous row.

```
// Initializing
type[] varName= new type[size];

// Declaring
type[] varName= new type[]{values1,
value2,...};
```

Creating an array with random values.

```
double[] arr = new double[n];
for (int i=0; i<n; i++)
{a[i] = Math.random();}
```

Searching the max value in the array.

```
double max = 0;
for(int i=0; i<arr.length(); i++)
 { if(a[i] > max) max = a[i]; }
```

Reversing an array.

```
for(int i=0; i<(arr.length())/2; i++)
 { double temp = a[i];
   a[i] = a[n-1-i];
   a[n-1-i] = temp;
  }
```

Multi Dimensional (2-D)

Two Dimensional or 2-D array is an array of an array where elements are stored in rows and columns.

```
// Initializing
datatype[][] varName  =  new dataType[row]
[col];

// Declaring
datatype[][] varName  =  {{value1,
value2....},{value1, value2....}..};
```

Transposing a matrix.

```
for(i = 0; i < row; i++)
{ for(j = 0; j < column; j++)
  { System.out.print(array[i][j]+" "); }
  System.out.println(" ");
}
```

Multiplying two matrices.

```
for (i = 0; i < row1; i++)
{ for (j = 0; j < col2; j++)
  { for (k = 0; k < row2; k++)
    { sum = sum + first[i][k]*second[k][j];
}
   multiply[i][j] = sum;
   sum = 0;
  }
}
```

Java Strings

Creating a String

String Methods

1. Using a literal
2. Using 'new' keyword

```
String str1 = "Welcome"; // Using literal

String str2 = new String("Edureka"); // Using
new keyword
```

The java.lang.String class implements Serializable, Comparable and CharSequence interfaces. Since the String object is immutable in nature Java provides two utility classes:

1. *StringBuffer:* It is a mutable class that is thread-safe and synchronized.
2. *StringBuilder:* It is a mutable class that is not thread-safe but is faster and is used in a single threaded environment.

```
str1==str2 //compares address;
String newStr = str1.equals(str2); //compares
the values
String newStr = str1.equalsIgnoreCase()
//compares the values ignoring the case
newStr = str1.length() //calculates length
newStr = str1.charAt(i) //extract i'th
character
newStr = str1.toUpperCase() //returns string
in ALL CAPS
newStr = str1.toLowerCase() //returns string
in ALL LOWERvCASE
newStr = str1.replace(oldVal, newVal)
//search and replace
newStr = str1.trim() //trims surrounding
whitespace
newStr = str1.contains("value"); //check for
the values
newStr = str1.toCharArray(); // convert
String to character type array
newStr = str1.IsEmpty(); //Check for empty
String
newStr = str1.endsWith(); //Checks if string
ends with the given suffix
```

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