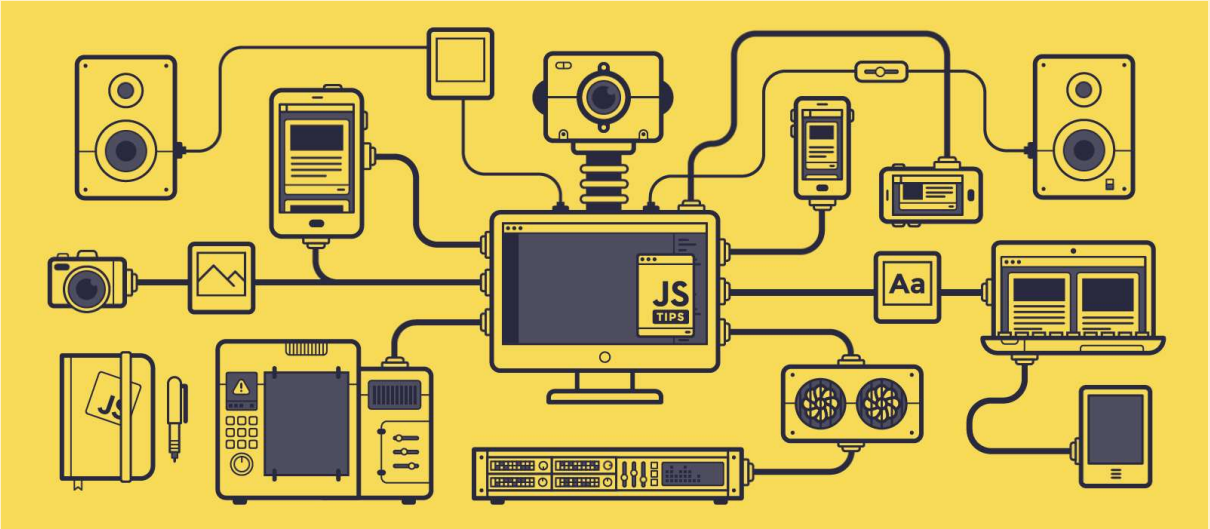
DAY 1

Introduction to programming language and Operators



Notes / Reference material:

- Video for set up and installation: Click here
- Interesting links
  - https://en.wikipedia.org/wiki/The_Imitation_Game
  - Coding is not difficult by Bill Gates, Mark Zuckerberg
  - Real life examples of algorithms used

What and why?

How humans interact using languages, we can interact with computers using its language.

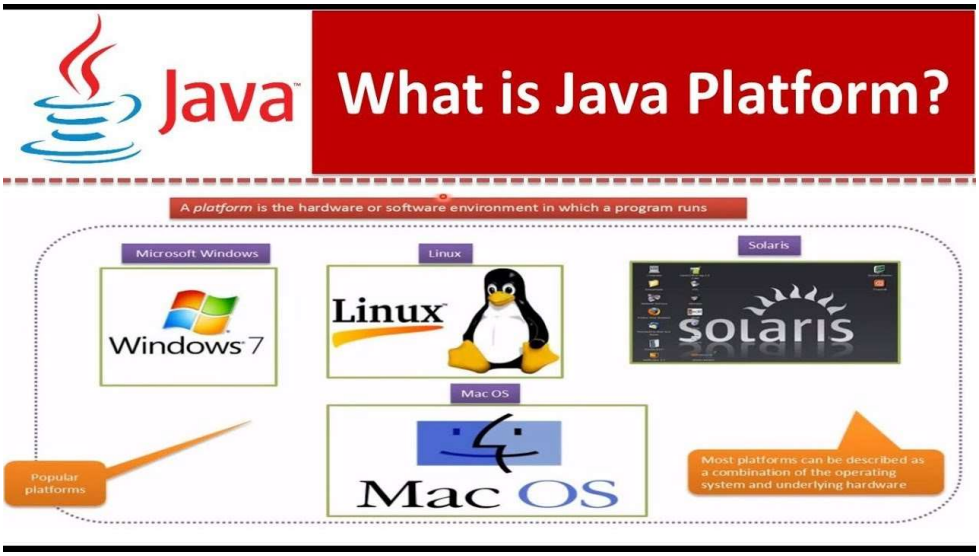
About Java

Click here

What is Java?

Java is an object-oriented, general-purpose programming language built on classes that was intended to have fewer implementation dependencies. It is an application development computing platform. Java is consequently quick, secure, and dependable. It is frequently used to create Java applications for smartphones, game consoles, supercomputers for science, laptops, data centres, etc.

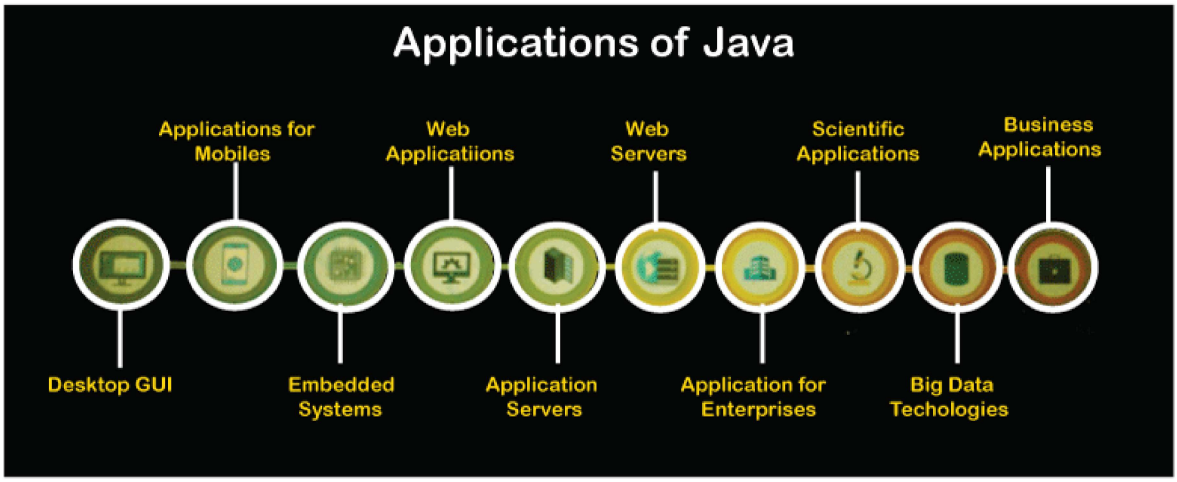
- **What is Java Platform?**



Java Platform is a collection of programs that help programmers to develop and run Java programming applications efficiently. It includes an execution engine, a compiler, and a set of libraries in it. It is a set of computer software and specifications. James Gosling developed the

Java platform at Sun Microsystems, and the Oracle Corporation later acquired it.

- **What is Java used for?**



Here are some important Java applications:

- It is used for developing Android Apps (Example of calculator app)
- Helps you to create Enterprise Software
- Wide range of Mobile java Applications
- Scientific Computing Applications
- Use for Big Data Analytics
- Java Programming of Hardware devices
- Used for Server-Side Technologies like Apache, JBoss, GlassFish, etc.

- **History of Java Programming Language**

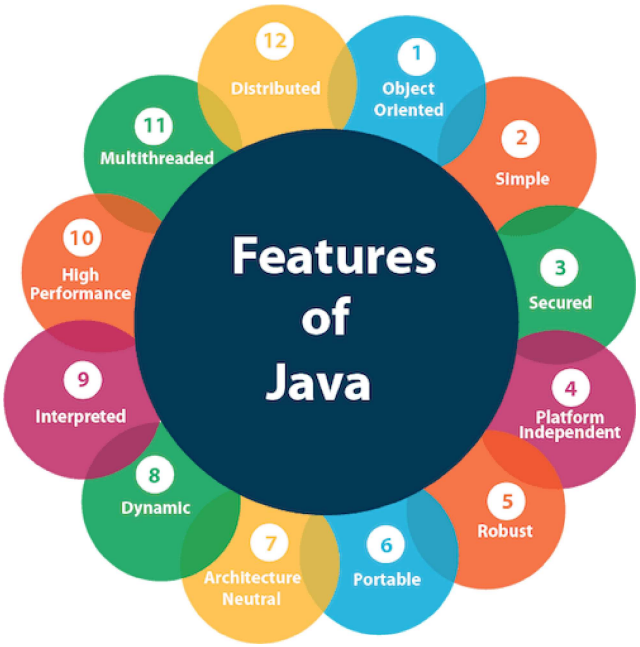
History of Java

Year	Development
1990	Sun Microsystems decided to develop a special software for consumer electronics devices. A Team has been formed to undertake this task. James Gosling was the head of that team.
1991	The team announce a new language called "Oak"
1992	The team known as "Green Project" team, have demonstrated the use of language on a list of home appliances.
1993	World Wide Web (WWW) has given support to Green Project Team and they have started thinking for development of Web Applets
1994	A new Web browser called HotJava has been developed by the Team to run applets.
1995	Oak was rename to Java due to some legal problems.
1996	Sun release Java Development Kit 1.0 (JDK 1.0)

❖ Here are important landmarks from the history of the Java language:

➢ The Java language was initially called OAK.
➢ Originally, it was developed for handling portable devices and set-top boxes. Oak was a massive failure.
➢ In 1995, Sun changed the name to "Java" and modified the language to take advantage of the burgeoning www (World Wide Web) development business.
➢ Later, in 2009, Oracle Corporation acquired Sun Microsystems and took ownership of three key Sun software assets: Java, MySQL, and Solaris.

- **Java Features**

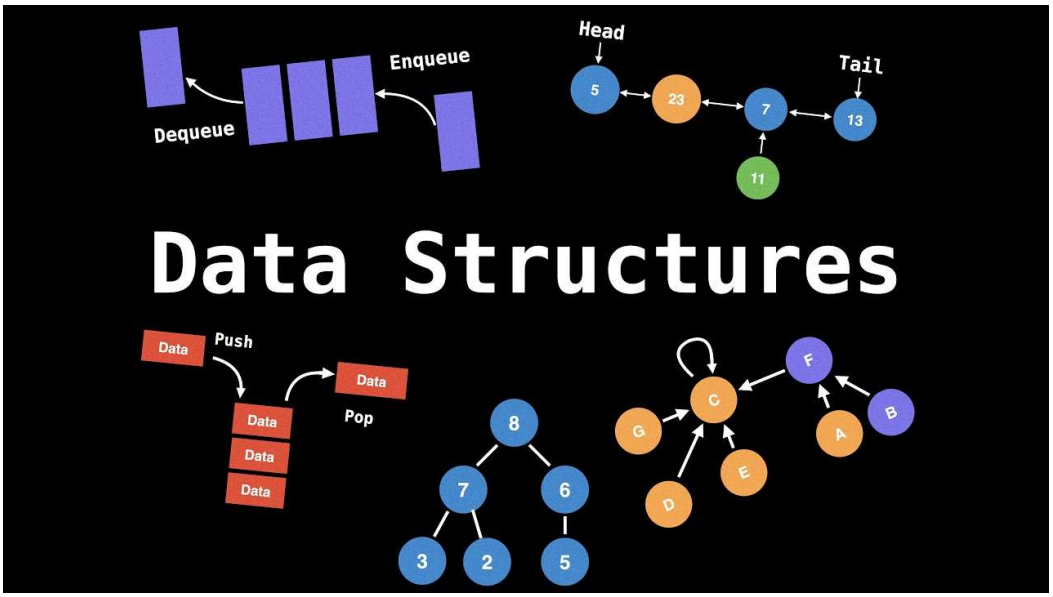


❖ Here are some important Java features:
- ➢ It is one of the easy-to-use programming languages to learn.
- ➢ Write code once and run it on almost any computing platform.
- ➢ Java is platform-independent. Some programs developed in one machine can be executed in another machine.
- ➢ It is designed for building object-oriented applications.
- ➢ It is a multithreaded language with automatic memory management.

- **What is data?**

Data can be defined as a representation of facts, concepts, or instructions in a formalised manner, which should be suitable for communication, interpretation, or processing by human or electronic machine.

❖ Why do we need data structures?



- ➢ Data Structure is used for organising the data in memory. There are various ways of organising the data in the memory for eg. array, list, stack, queue and many more.
- ➢ The data structure isn't a programming language like C, C++, Java, etc. It is a set of algorithms that can be used in any programming language to organise the data in the memory.
- ➢ As applications are becoming more complex and the amount of data is increasing day by day, which may cause problems with processing speed, searching data, handling multiple requests etc.
- ➢ Data structure provides a way of organising, managing, and storing data efficiently. With the help of data structure, the data items can be traversed easily.
- ➢ Data structure provides efficiency, reusability and abstraction. It plays an important role in enhancing the performance of a program because the main function of the program is to store and retrieve the user's data as fast as possible.

● What is an algorithm?

➢ In computer programming terms, an algorithm is a set of well-defined instructions to solve a particular problem. It takes a set of input and produces a desired output. For example,

➢ An algorithm to add two numbers:
  - Take two number inputs
  - Add numbers using the + operator
  - Display the result.

- **Variables**

```
int x = 79;
x = x + 1;


START
```

Variables are containers for storing data values.

Note - Variables will be more discussed in the upcoming classes too.

In Java, there are different types of variables, for example:

- `String` - stores text, such as "Hello". String values are surrounded by double quotes
- `int` - stores integers (whole numbers), without decimals, such as 123 or -123
- `float` - stores floating point numbers, with decimals, such as 19.99 or -19.99
- `char` - stores single characters, such as 'a' or 'B'. Char values are surrounded by single quotes
- `boolean` - stores values with two states: true or false

- **Operators**

```
public class Javaapp {

    public static void main(String[] args) {

        int a,b,c,d;
        a=b=c=d=10;
        System.out.println("a = "+a);
        System.out.println("b = "+b);
        System.out.println("c = "+c);
        System.out.println("d = "+d);
    }
}
```

+	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

- **Other operators**

=	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

❖ **Note-**

In Java, we have the following functions to print anything in the console.

System.out.print() and

System.out.println()

But there is a slight difference between both of them, i.e.

System.out.print() only prints the content without switching to the next line after executing this statement whereas **System.out.println()** prints the content and switches to the next line after execution of the statement.

Questions Covered In The Class:

1) **Print "Hello World. I am here."**

```
Step 1. Start
Step 2. Print/Display ("Hello World. I am here.")
Step 3. Stop
```

2) **Print the below pattern**

Hello
World.
I
am
here.

```
Step 1. Start
Step 2. Print/Display ("Hello")
Step 3. Print/Display ("World.")
Step 4. Print/Display ("I")
Step 5. Print/Display ("am")
```

```
Step 6. Print/Display ("here")
Step 7. Stop
```

3) Print *****

```
Step 1. Start
Step 2. Print/Display ("*****")
Step 3. Stop
```

4) Print the below pattern

*****

*****

*****

```
Step 1. Start
Step 2. Print/Display ("*****")
Step 3. Print/Display ("*****")
Step 4. Print/Display ("*****")
Step 5. Stop
```

5) Print the below pattern

*****

*

*

*

*****

```
Step 1. Start
Step 2. Print/Display ("*****")
Step 3. Print/Display ("*")
Step 4. Print/Display ("*")
Step 5. Print/Display ("*")
Step 6. Print/Display ("*****")
Step 7. Stop
```

6) Add two numbers 10,20.

```
Step 1. Start
Step 2. Print/Display (10 + 20).
Step 3. Stop
```

-Multiply three numbers 10,20,30.

```
Step 1. Start
Step 2. Print/Display (10 * 20 * 30).
Step 3. Stop
```

-Subtract two numbers 40-20.

```
Step 1. Start
Step 2. Print/Display (40 - 20).
Step 3. Stop
```

7) Find the sum and product of 20, 30, 50.

```
Step 1. Start
Step 2. Print/Display (20 + 30 + 50).
Step 3. Print/Display (20 * 30 * 50).
Step 4. Stop
```

8) Divide two numbers 25/10.

```
Step 1. Start
Step 2. Print/Display (25 / 10).
Step 3. Stop
```

9) Find the remainder when 438 is divided by 9.

```
Step 1. Start
Step 2.Print/Display (438 % 9).
Step 3. Stop
```

10) Find the remainder when 4596 is divided by 10.

```
Step 1. Start
Step 2.Print/Display (4596 % 10).
Step 3. Stop
```

11) Store the value 100 in x variable of int data type and then print x.

```
Step 1. Start
Step 2. Declare Variable names x with ‘int data type’.
Step 3. Assign Values of x as 100.
Step 4. Print/Display x.
Step 5. Stop
```

12) Store the value 235 in y variable of int data type and then print y+10

```
Step 1. Start
Step 2. Declare Variable names y with ‘int data type’.
Step 3. Assign Values of y as 235.
Step 4. Print/Display (y + 10).
Step 5. Stop
```

13) Store values 165, 84 in x and y variable of int data type and print x+y, x-y, x*y, x/y.

```
Step 1. Start
Step 2. Declare Variable names x and y with ‘int data type’.
Step 3. Assign Values of x , y as 165 and 84 respectively.
Step 4. Print/Display (x+y).
Step 5. Print/Display (x-y).
Step 6. Print/Display (x*y).
Step 7. Print/Display (x/y).
Step 8. Stop
```

14) Store values 20, 30, 40 in the variable x, y, z each of int data type and print x+y-z.

```
Step 1. Start
Step 2. Declare Variable names x , y , z with ‘int data type’.
Step 3. Assign Values of x,y,z as 20 , 30 , 40 respectively.
Step 4. Print/Display (x+y+z).
Step 5. Stop
```

15) Remove the last digit of a given number. Say 45983

```
Step 1. Start
Step 2. Print/Display (45983 / 10).
Step 3. Stop
```

16) Find the last digit of a given number. Say 45983

```
Step 1. Start
Step 2. Print/Display (45983 % 10).
Step 3. Stop
```

Homework Questions/Assignment Questions:

1) **Print "Hello I am enjoying coding"**
2) **Print the below pattern:**

   Hello
   I
   am
   enjoying
   coding
3) **Find the sum, product of 100,8,3**
4) **Find the difference between 100 and 40.**
5) **Print the below pattern**

   *****
   *****
   *****
   *****
   *****
   *****
6) **Print the below pattern**

   * *
   * *
   * *
   * *
   * *
   ****
7) **Find the last digit of the number 987653.**
8) **Store values 15, 4 in m and n variable of int data type then**
   Print value of m+n in the first line,
   Print value of m-n in the second line,
   Print value of m*n in the second line.