



Lecture 01: Introduction

Members



Watch later



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whatever it is required for you.



Additional resources

- Books

The Complete Reference Java 2 (10th Edition)

Hebert Schildt, Tata Mc Graw Hill

Object-Oriented Programming with C++ and Java

Debasis Samanta, Prentice Hall of India

- Website

<http://cse.iitkgp.ac.in/~dsamanta/java.html>

is given here.



Overview of the course

	Lecture	Topic									
Week 1	Lecture 1	Introduction	Week 5	Lecture 21	Interface-II	Week 9	Lecture 41	AWT Programming-III			
Week 2	Lecture 2	Java Programming Environment		Lecture 22	Demonstration-IX		Lecture 42	Demonstration-XV			
Week 3	Lecture 3	Java Tools and Resources		Lecture 23	Exception Handling-I		Lecture 43	Swing Programming-I			
Week 4	Lecture 4	Demonstration-I		Lecture 24	Exception Handling-II		Lecture 44	Swing Programming-II			
	Lecture 5	Java Applet Programming		Lecture 25	Exception Handling-III		Lecture 45	Demonstration-XVI			
Week 2	Lecture 6	Demonstration-II	Week 6	Lecture 26	Demonstration-X		Lecture 46	Demonstration-XVII			
	Lecture 7	Encapsulation		Lecture 27	Multithreading-I		Lecture 47	Demonstration-XVIII			
Week 3	Lecture 8	Demonstration-III		Lecture 28	Multithreading-II		Lecture 48	Java Networking			
	Lecture 9	Java Programming Insights		Lecture 29	Demonstration-XI		Lecture 49	Demonstration-XIX			
Week 4	Lecture 10	Java Scope Rule		Lecture 30	I-O Stream-I		Lecture 50	JDBC-I			
	Lecture 11	Demonstration-IV	Week 7	Lecture 31	I-O Stream-II		Lecture 51	JDBC-II			
	Lecture 12	Demonstration-V		Lecture 32	I-O Stream-III		Lecture 52	JDBC-III			
	Lecture 13	Inheritance		Lecture 33	Demonstration-XII		Lecture 53	Demonstration-XX			
	Lecture 14	Demonstration-VI		Lecture 34	Applet Programming-I		Lecture 54	Demonstration-XXI			
	Lecture 15	Information Hiding		Lecture 35	Applet Programming-II		Lecture 55	Demonstration-XXII			
Week 4	Lecture 16	Demonstration-VII	Week 8	Lecture 36	Applet Programming-III		Lecture 56	Case Study-I : Sorting Algorithms			
	Lecture 17	Packages-I		Lecture 37	Demonstration-XIII		Lecture 57	Case Study-II : Searching Algorithms			
	Lecture 18	Packages-II		Lecture 38	Demonstration-XIV		Lecture 58	Case Study-III: Calculator			
	Lecture 19	Demonstration-VIII		Lecture 39	AWT Programming-I		Lecture 59	Case Study-IV: Server Programming			
	Lecture 20	Interface-I		Lecture 40	AWT Programming-II		Lecture 60	Case Study-V: Database Access			



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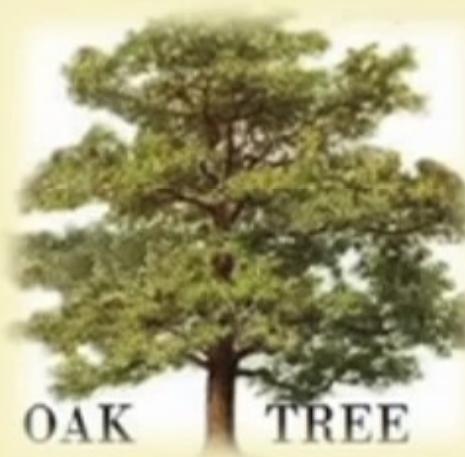
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History of Java



James Gosling



OAK TREE

- **James Gosling, Mike Sheridan, and Patrick Naughton** initiated the **Java** language project in June 1991. The small team of Sun engineers called **Green Team**.
- Firstly, it was called "**Greentalk**" by James Gosling, and file extension was **.gt**.
- Java was originally **designed for small, embedded systems in electronic appliances** like set-top boxes, but it was too advanced technology for the digital cable television industry at the time.
- After that, it was called **Oak** and was developed as a part of the **Green** project. Java team members initiated this project to develop a language for **networking services**.
- Later, **Java** technology was incorporated by **Netscape** and **Microsoft** to create a language suited for **networking**.

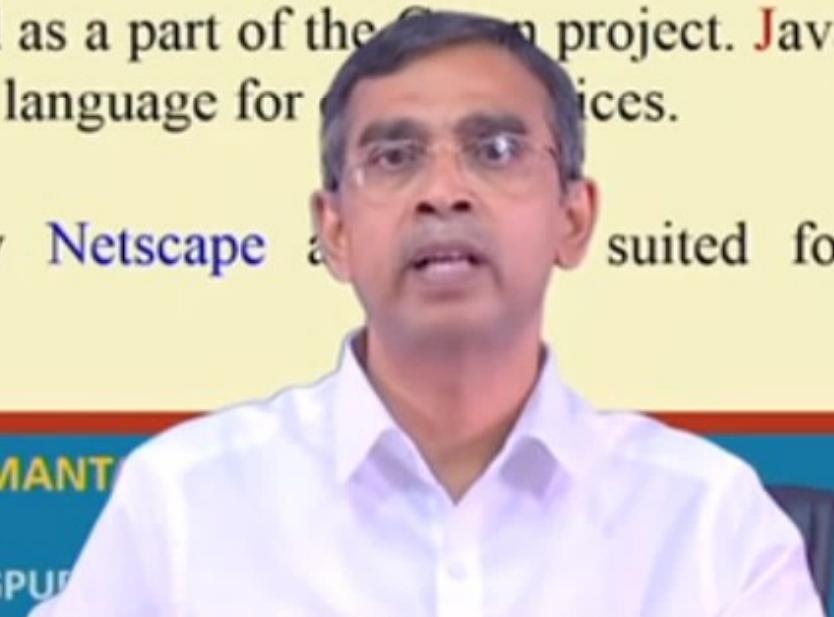


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Why Java is named Java?

- Java was called Oak as it is a symbol of strength and chosen as a national tree of many countries like U.S.A., France, Germany, Romania, etc.
- The team wanted something that reflected the essence of the technology: revolutionary, dynamic, lively, cool, unique, and easy to spell and fun to say.
- In 1995, Oak was renamed as **Java**
 - Java is an island of Indonesia where first coffee was produced (called java coffee).
- In 1995, Time magazine called **Java one of the Ten Best Products of 1995.**
- **JDK** (Java Development Kit) 1.0 released in January 23, 1996.



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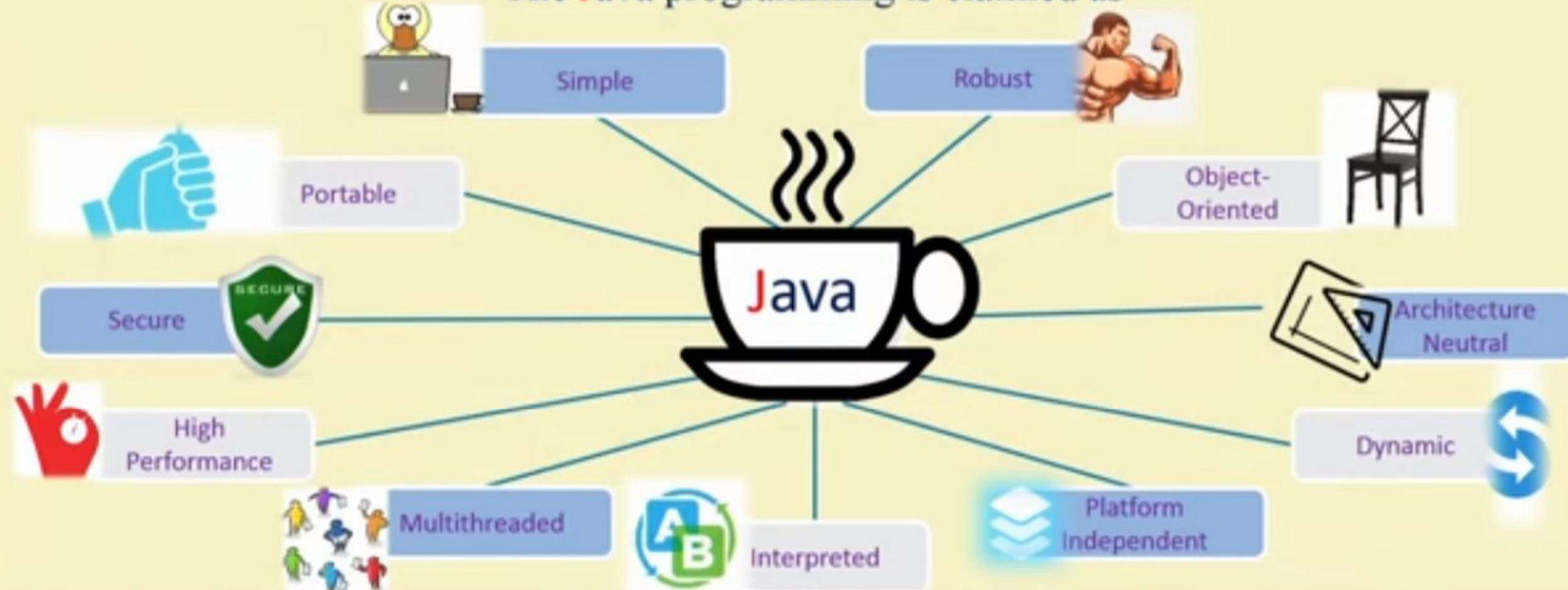
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Java !

The Java programming is claimed as



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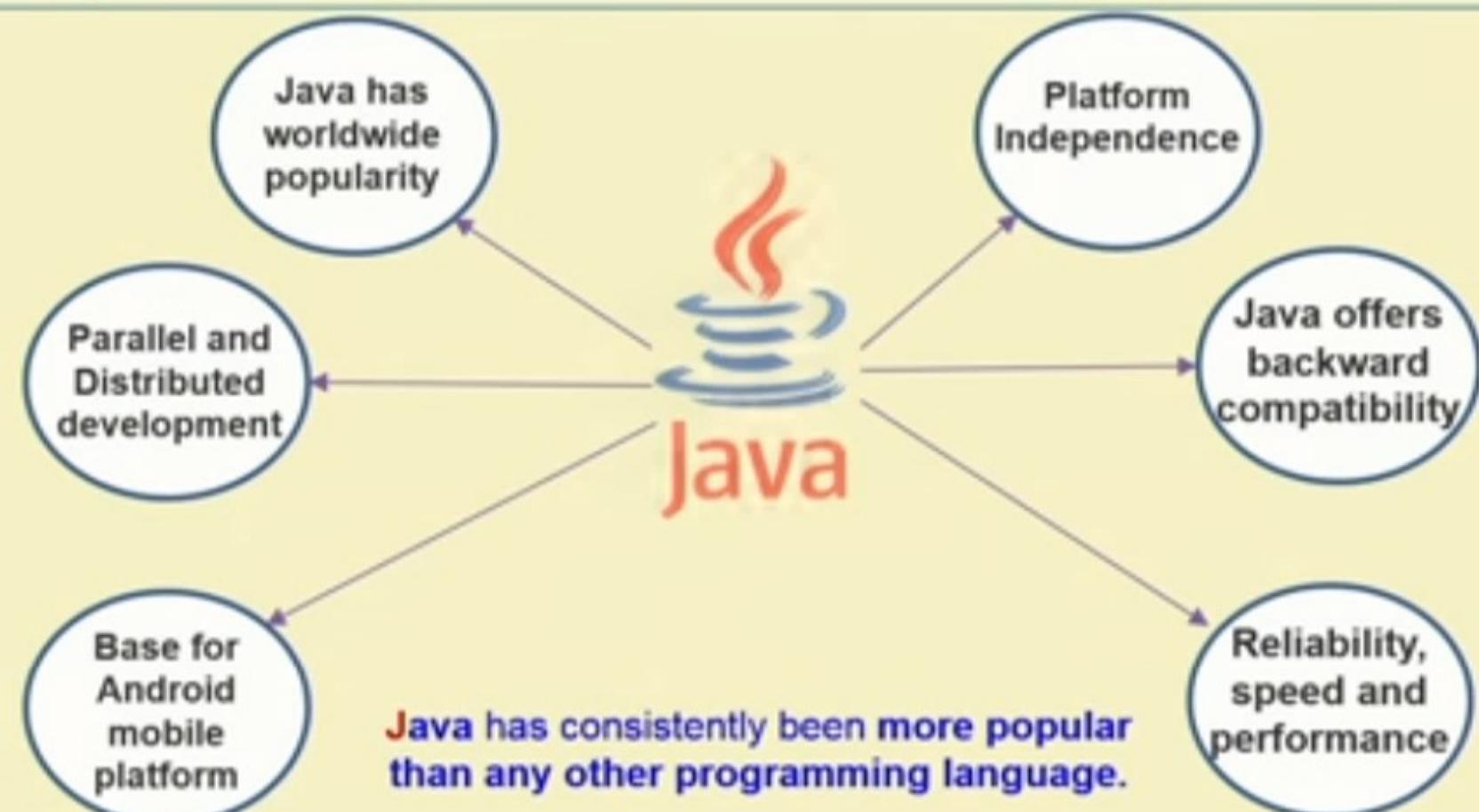
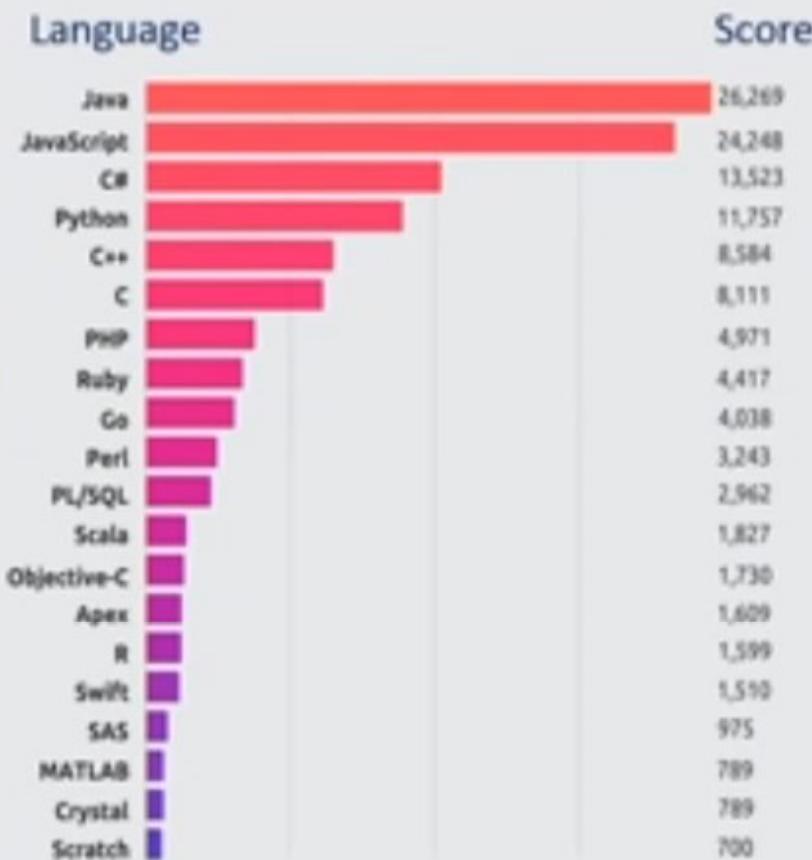


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Current popularity

Most In-Demand Languages



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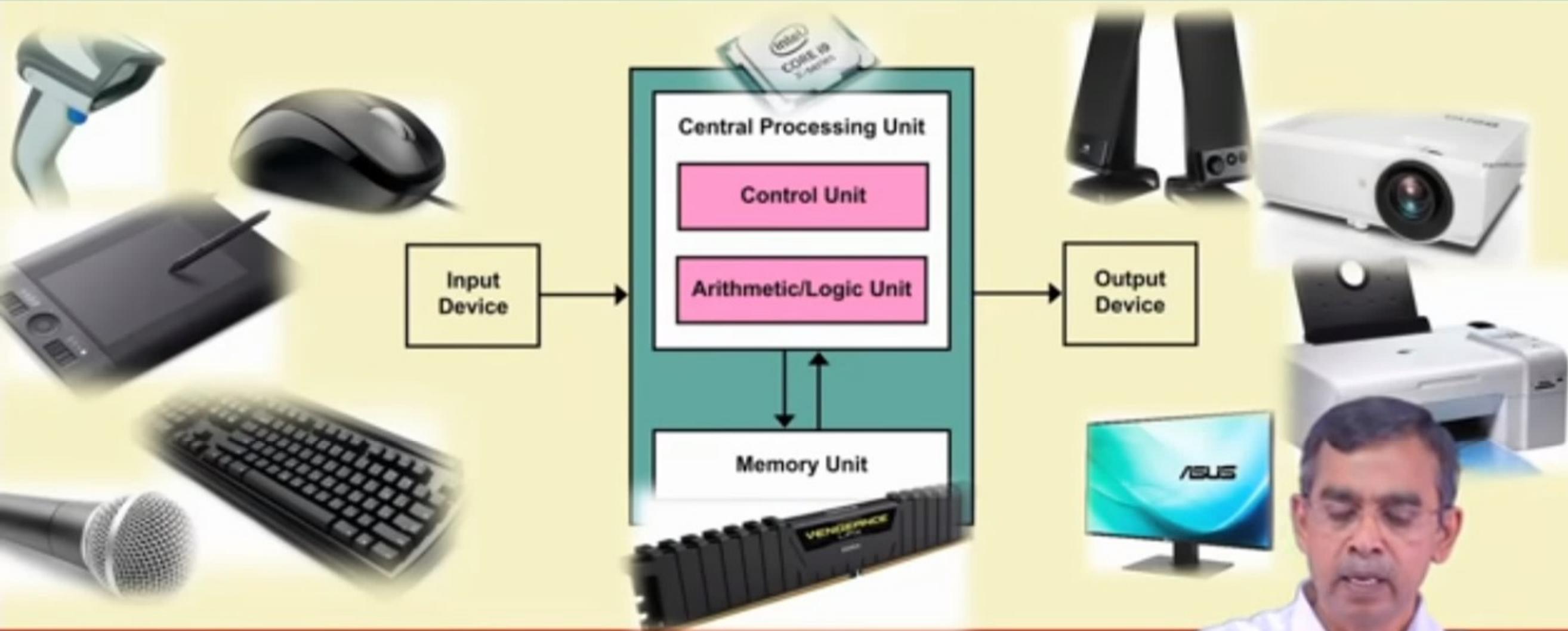


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Von Neumann architecture of computing



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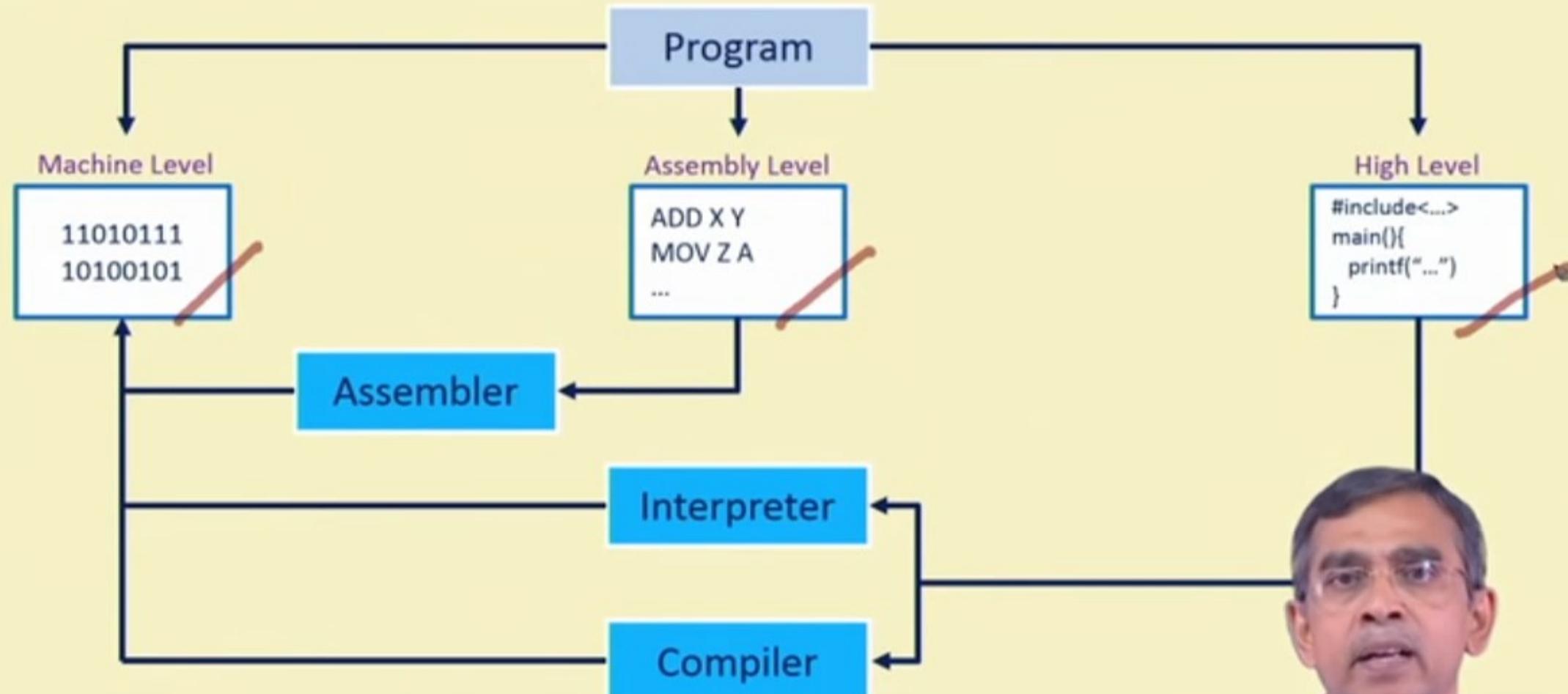
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Programming languages



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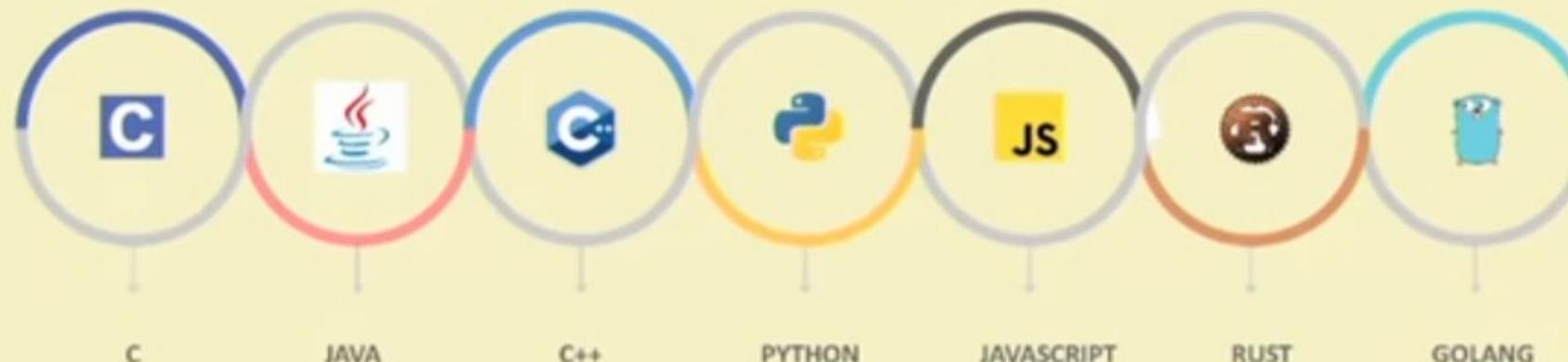


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Third generation programming languages



- A third generation (programming) language (3GL) is a grouping of programming languages that introduced significant enhancements to second generation languages, primarily intended to make the programming language more programmer-friendly.
- English words are used to denote variables, programming structures and commands, and Structured Programming is supported by most 3GLs.
- Commonly known 3GLs are FORTRAN, BASIC, Pascal, JAVA and the C-family (C, C+, C++, C#, Objective-C) of languages. Also known as a high-level programming language.



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High-level Programming Principles



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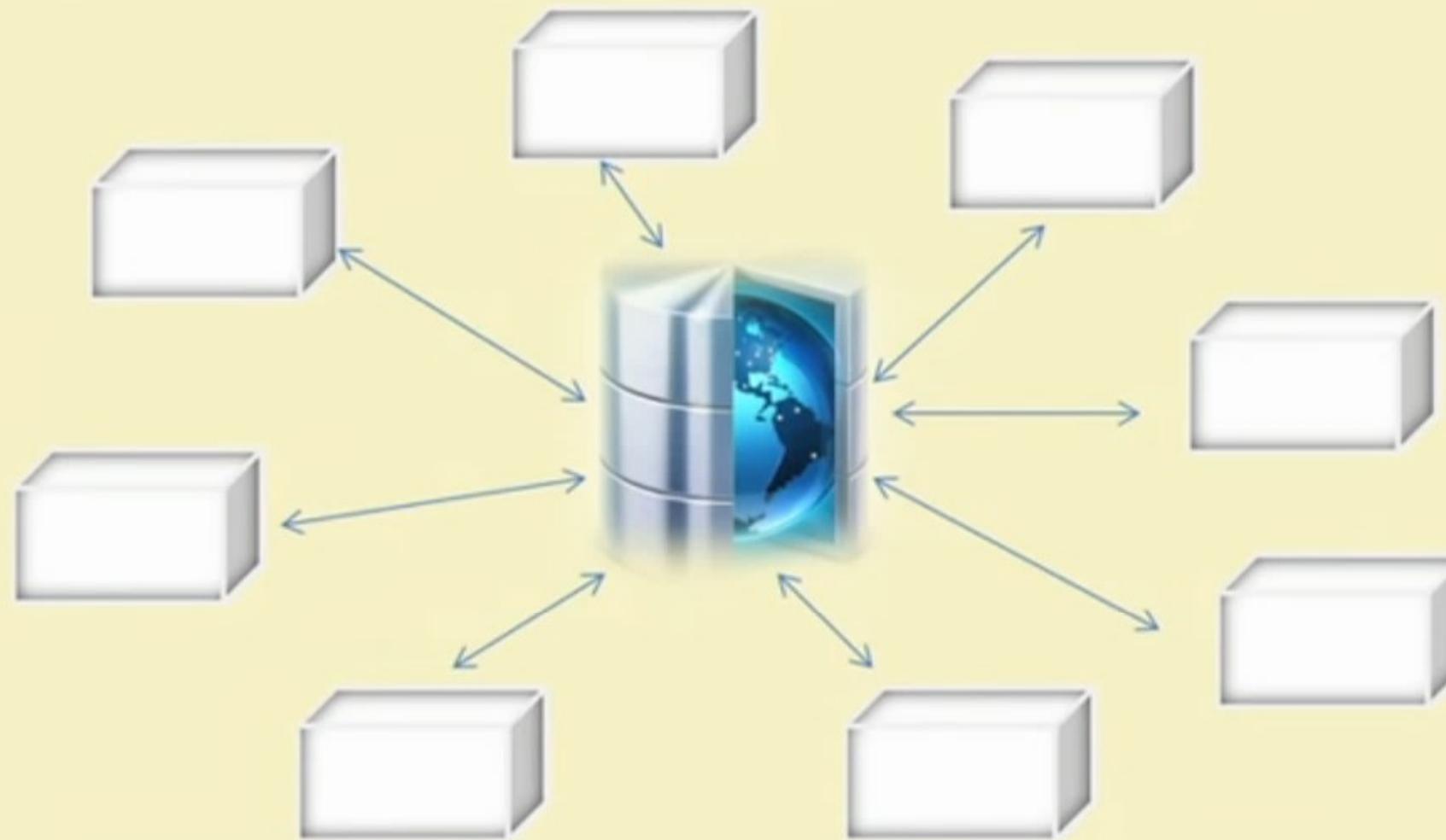


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Function-oriented programming



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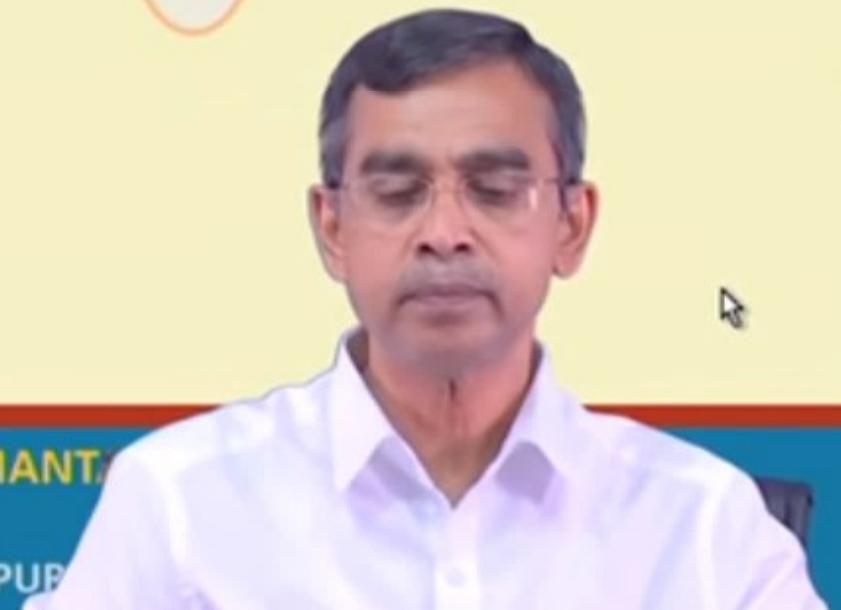
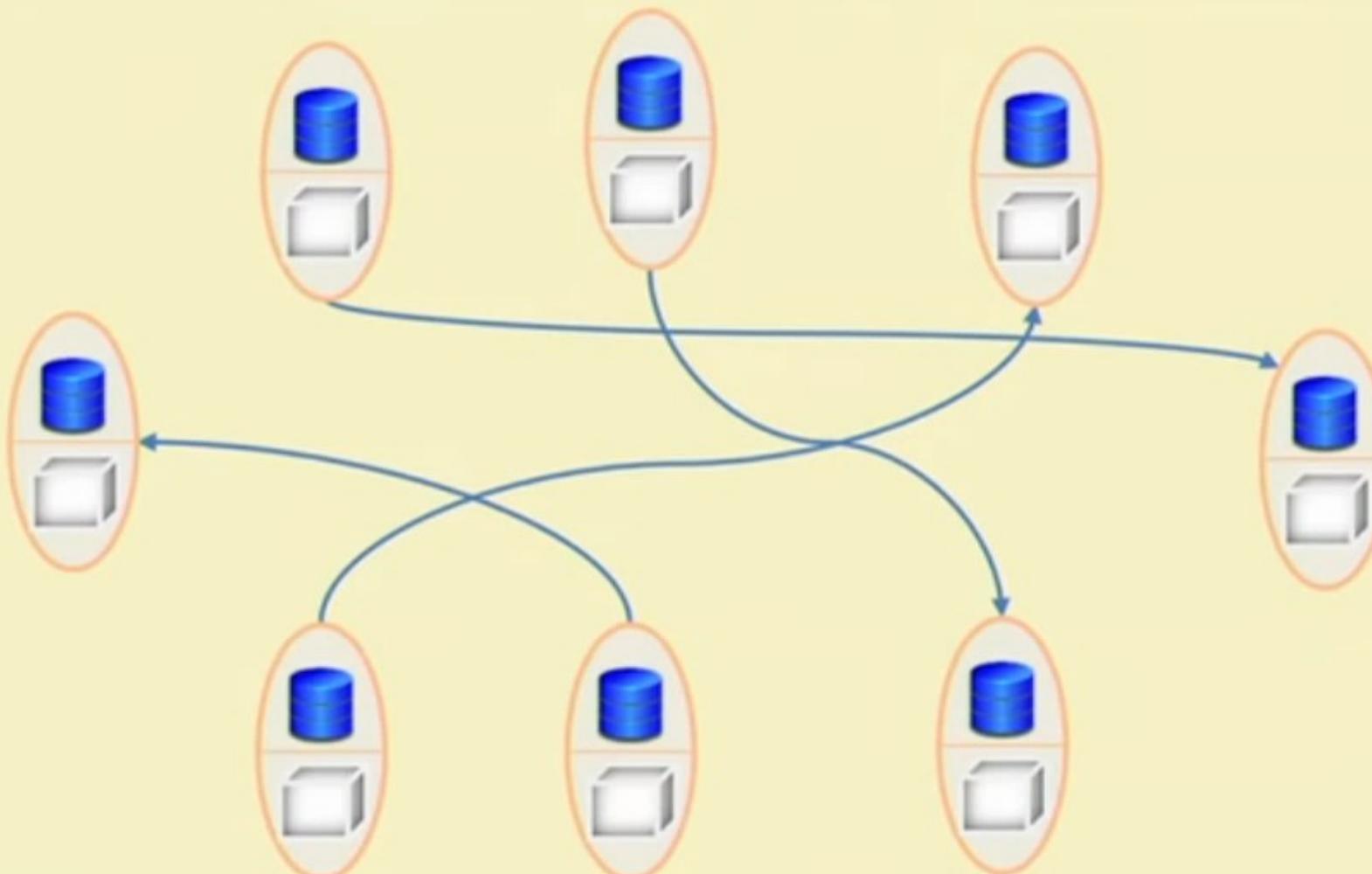


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Object-oriented programming



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FOP versus OOP

	Function Oriented Programming (FOP)	Object Oriented Programming (OOP)
Program organization	Program is divided into small parts called functions.	Program is divided into parts called objects.
Importance	Importance is not given to data but to functions	Importance is given to the data rather than procedures procedures
Approach	FOP follows top down approach	OOP follows bottom up approach
Access Specifiers	Does not have any access specifier	Has three access specifiers, namely Public, Private, Protected Private, Protected
Data Moving	Data can move freely from function to function in the system	Objects can move and communicate with each other each other
Maintainability	To add new data and function is not so easy	Provides an easy way to add new data and function function
Data Access	Function uses global data for sharing that can be accessed freely from function to function in freely from function to function in the system.	Object uses local data and can be accessed in a control manner in a control manner
Data Hiding	No data hiding is possible, hence security is not possible	Provides data hiding, hence secured programming is possible programming is possible
Overloading	Polymorphism is not possible	Polymorphism is possible
Examples	C, Visual Basic, FORTRAN, Pascal.	C++, JAVA, VB.NET, C#.NET.



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Java programming paradigms

Java is based on the concept of object-oriented programming. As the name suggests, at the center of it all is an object. Objects contain both data and the functionality that operates on that data. This is controlled by the following four paradigms

- **Encapsulation**
- **Inheritance**
- **Information hiding**
- **Polymorphism**



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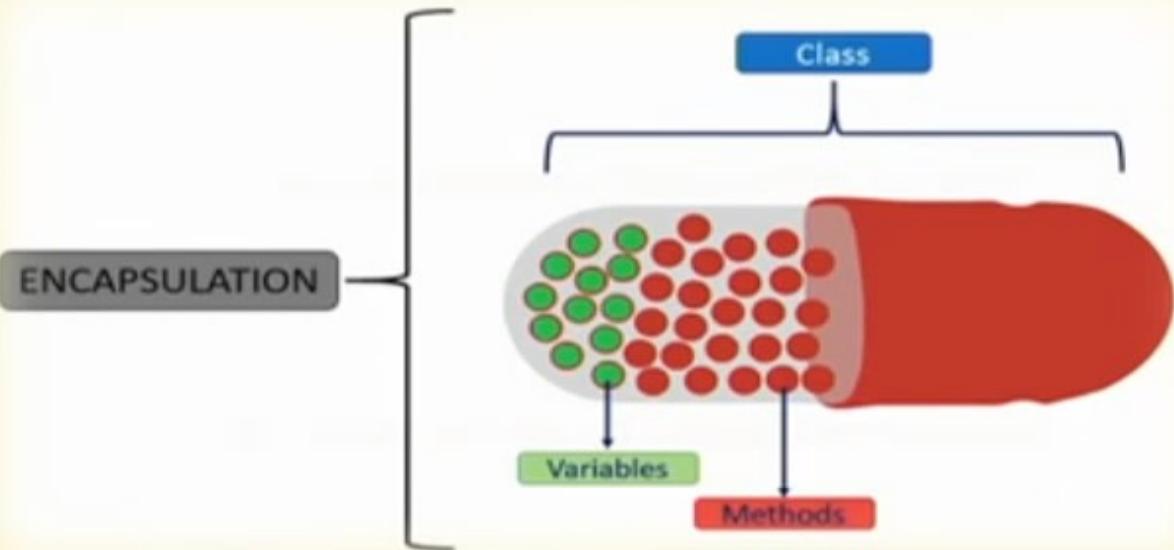
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Encapsulation in Java



Encapsulation in Java is a process of wrapping code and data together into a single unit, for example, a capsule which is mixed of several medicines.



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Encapsulation: Example



Book

data {
 Title
 Author
 Accession No.
 Cost
 Borrower DOI}

methods {
 Issue()
 Fine()
 Return()
 Open()
 Close()}

Name
Roll No.
Address
Marks
Books[]

Search Books()
Request()
Renew()
Enroll()
Exit()



BROWER



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Encapsulation: Example



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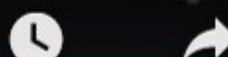
Encapsulation: Example

Books



Borrowers





Inheritance in Java

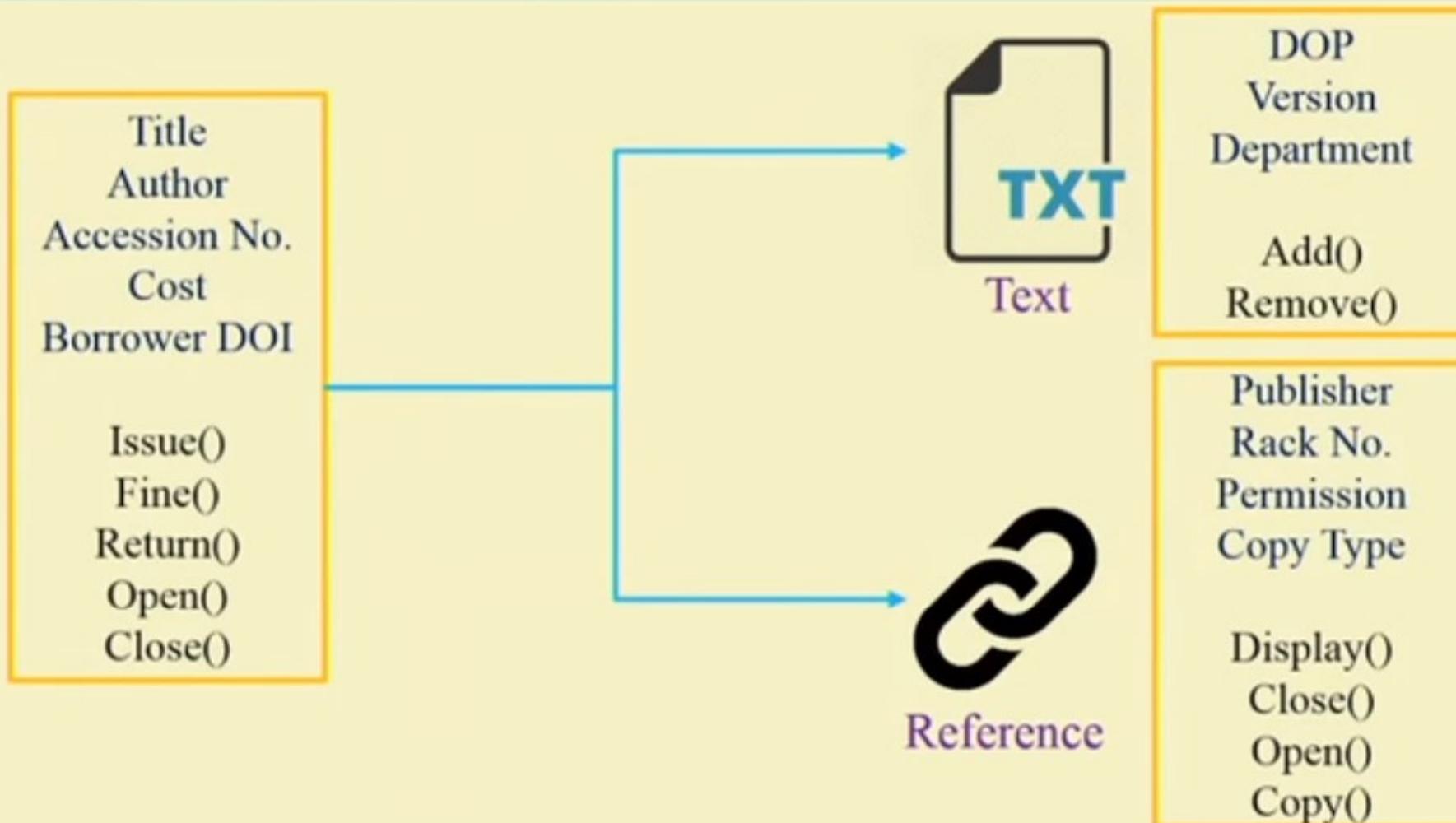
Inheritance in Java is a mechanism in which one object acquires all the properties and behaviors of a parent object. It is an important part of OOPs (Object-Oriented Programming system).



Inheritance: Example



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Information hiding



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Polymorphism

In object-oriented programming,

polymorphism refers to a programming language's ability to process objects depending on their class.



Image



Document

`print()`



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Polymorphism: Example

print()

```
x, y;
s1, s2;
Img, Doc, Doc1, Doc2
```

```
Add(x, y)
Add(s1, s2)
Add(Img, Doc)
Add(Doc1, Doc2)
```

Add(**x, y**) : 12 +34

Add two numbers

Add(**s1 + s2**) : Debasis + Samanta

Merge two strings

Add(**Img, Doc**) : Image + Document

Paste an Image to a document

Add(**Doc1, Doc2**) : Document1 + Document2

Merge two documents



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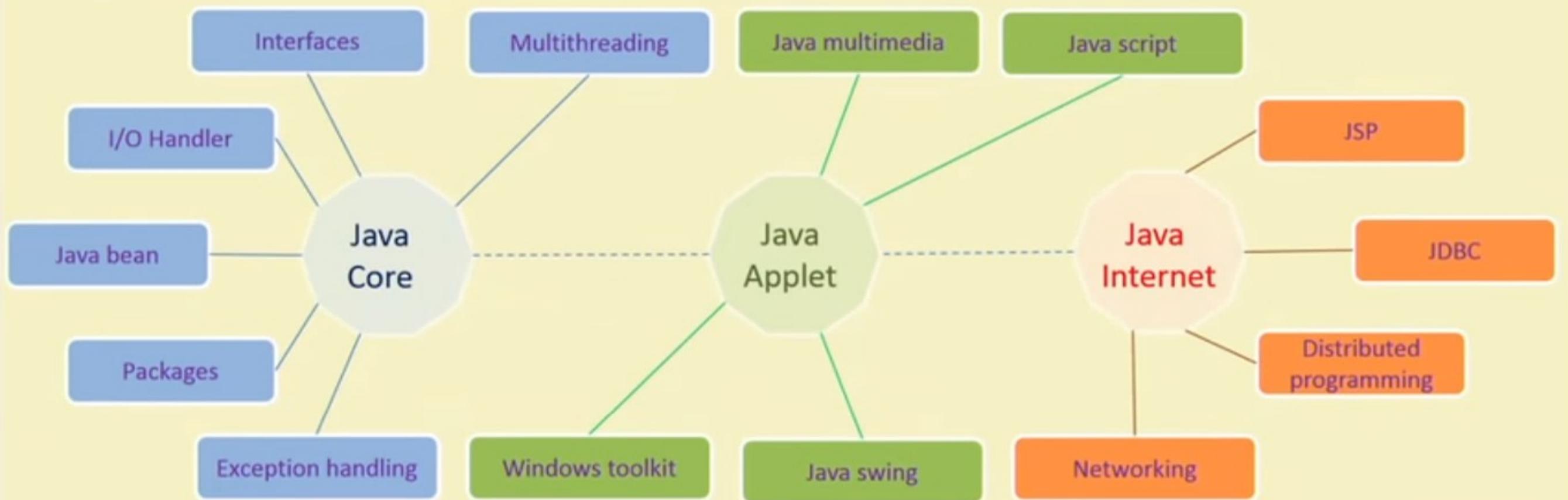


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Features of Java programming



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Questions to think...

- Can a software be developed in Java so that it runs in any **OS**? Any machine?
- How a browser (e.g., Mozilla, Google Chrome, Safari, etc.) works in your mobile/ Computer?



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Program in C and Java

A program in C to display message

```
#include <stdio.h>

int main()
{
    printf("Hello, World!");
    return 0;
}
```

A program in Java to display message

```
import java.lang.*;

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





C versus Java

Aspects	C	Java	Aspects	C	Java
Paradigms	Procedural	Object-oriented	Inheritance	No inheritance	Supported (Simple inheritance)
Platform Dependency	Dependent	Independent	Pointers	Supported	No Pointers
Datatypes : union, structure	Supported	Not supported	Code translation	Compiled	Interpreted
Pre-processor directives	Supported (#include, #define)	Not supported	Multi-threading and Interfaces	Not supported	Supported
Header files	Supported	Use packages (import)	Exception Handling	No exception handling	Supported
Storage class	Supported	Not supported	Database Connectivity	Not supported	Supported



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Java program editing

- Any text editor can be used to write Java programs. For example,
 - In Windows
 - **Notepad, Edit, Wordpad, MS-Word**, etc.
 - In Unix
 - **vi, emacs, gedit** etc.
- Save the program
 - Save the program in a file with the name

HelloWorldApp.java



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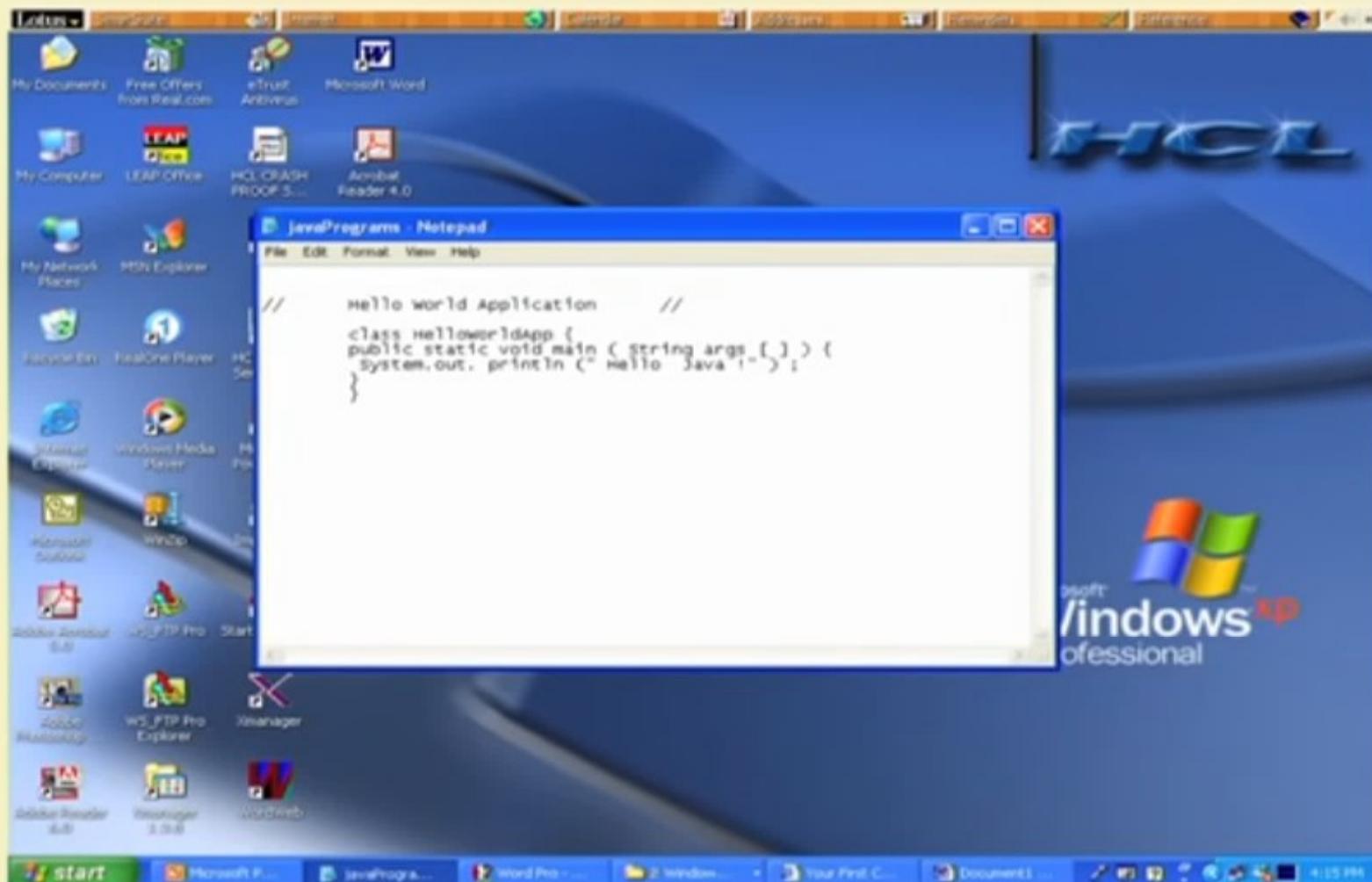


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Java program editing





Watch later

Share

Java program editing





Java program editing

MS
DOS MS-DOS Prompt

8 x 12 ▾

C:\WINDOWS>cd C:\java

C:\java>dir

```
Volume in drive C is DB02
Volume Serial Number is F3C4-E800
Directory of C:\java

.              <DIR>        07-22-99 11:23p .
..             <DIR>        07-22-99 11:23p ..
HELLOW~1 JAU   272       07-22-99 11:23p HelloWorldApp.java
               1 file(s)      3,829 bytes
               2 dir(s)     218,734,592 bytes free
```

C:\java>



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9:49 / 28:58

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Java program compilation

The Java compiler (`javac`) converts a Java program into Java byte code

- Open a DOS shell (in Windows) or Terminal (in Unix)
- Move to the directory where your Java program has been saved
- Enter the following command to compile:

`javac HelloWorldApp.java`



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Java program compilation

MS
DOS MS-DOS Prompt

8 x 12 ▾

C:\java>dir

```
Volume in drive C is DB02
Volume Serial Number is F3C4-E800
Directory of C:\java

. <DIR> 07-22-99 11:23p .
.. <DIR> 07-22-99 11:23p .
HELLOW^1 JAV 272 07-23-99 12:39a HelloWorldApp.java
HELLOW^1 CLA 478 07-23-99 12:48a HelloWorldApp.class
2 file(s)    750 bytes
2 dir(s)   218,734,592 bytes free
```

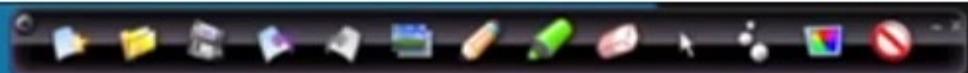
C:\java>

The file `HelloWorldApp.java` and its corresponding class file `HelloWorldApp.class` are circled in red.



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Java program execution

To execute the Java program, type the command **java** (from the command prompt).

- For example, the current program `HelloWorldApp.class` can be executed as

java `HelloWorldApp`



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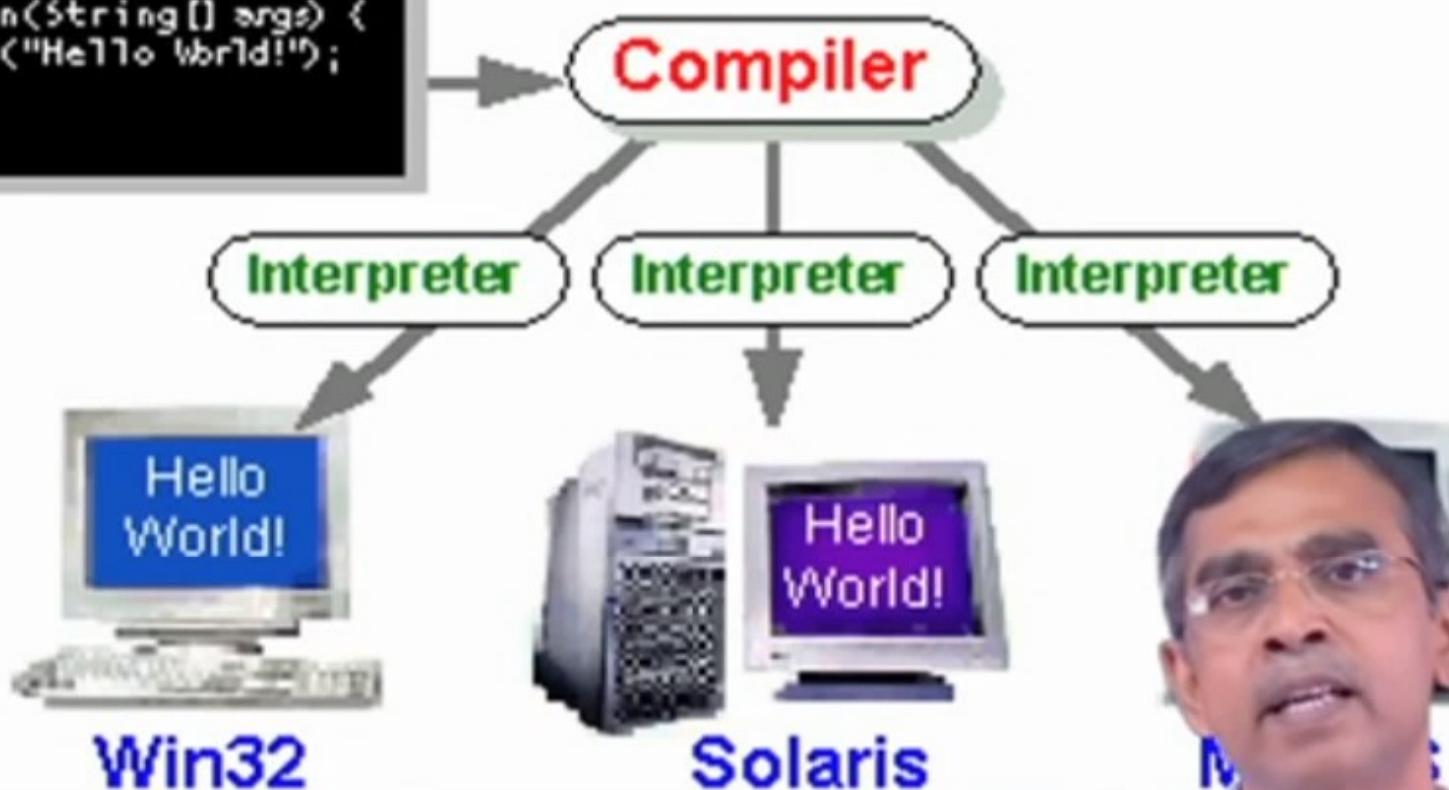


Java program execution

Java Program

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

HelloWorldApp.java



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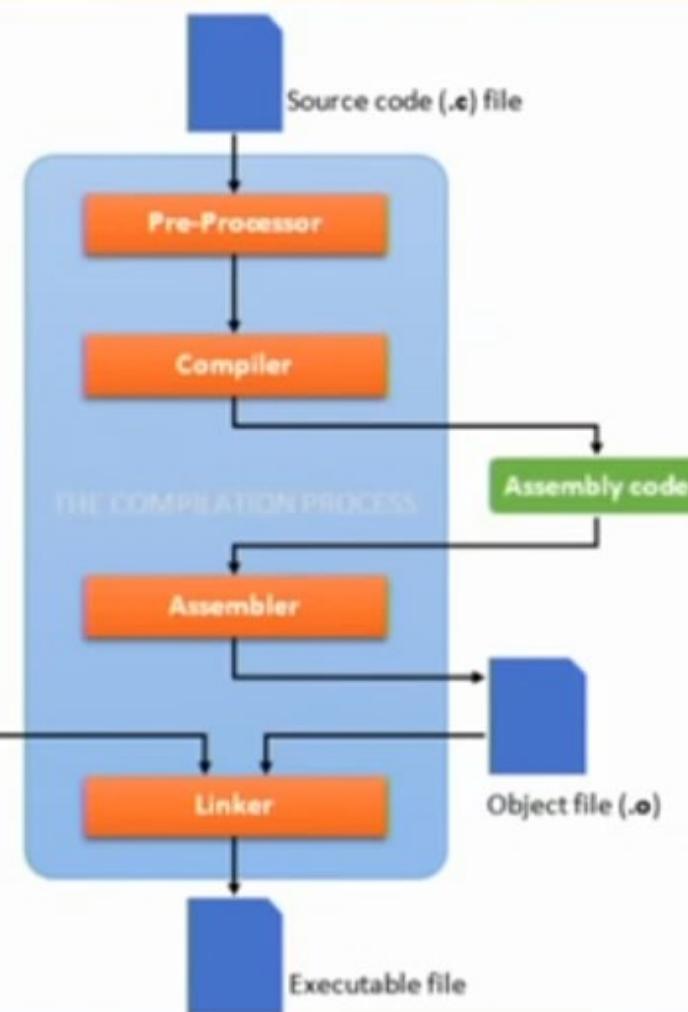
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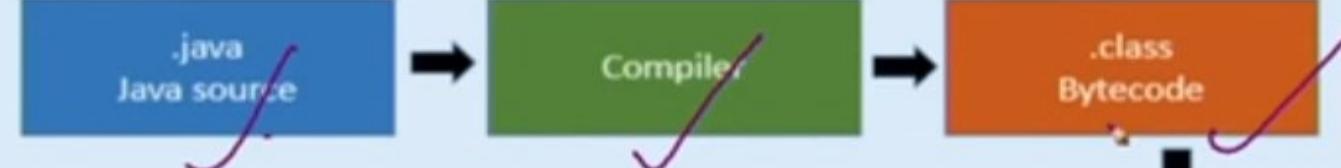


C/C++ versus Java execution

C



At compile time



At run time



JAVA



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C++ versus Java

Areas of applications

- C++ is best suitable for developing large software.
 - Library management system, Employee management system, Passenger reservation system, etc.
- Java is best suitable for developing communication/ Internet application software.
 - Network protocols, Internet programs, web page, web browser, etc.



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C++ versus Java : Programming features

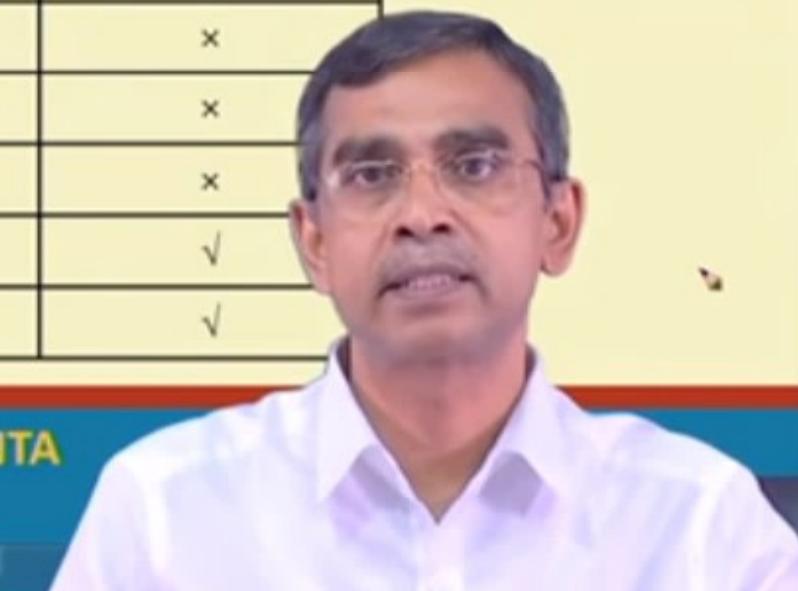
Features		in C++	in Java
Data abstraction and encapsulation		√	√
Polymorphism		√	√
Binding	Static	√	√
	Dynamic	√	√
Inheritance	Single Inheritance	√	√
	Multiple Inheritance	√	✗
Operator overloading		√	✗
Template classes		√	✗
Global variables		√	✗
Header files		√	✗
Pointers		√	✗
Interface and packages		✗	√
API (Application Programming Interface)		✗	√



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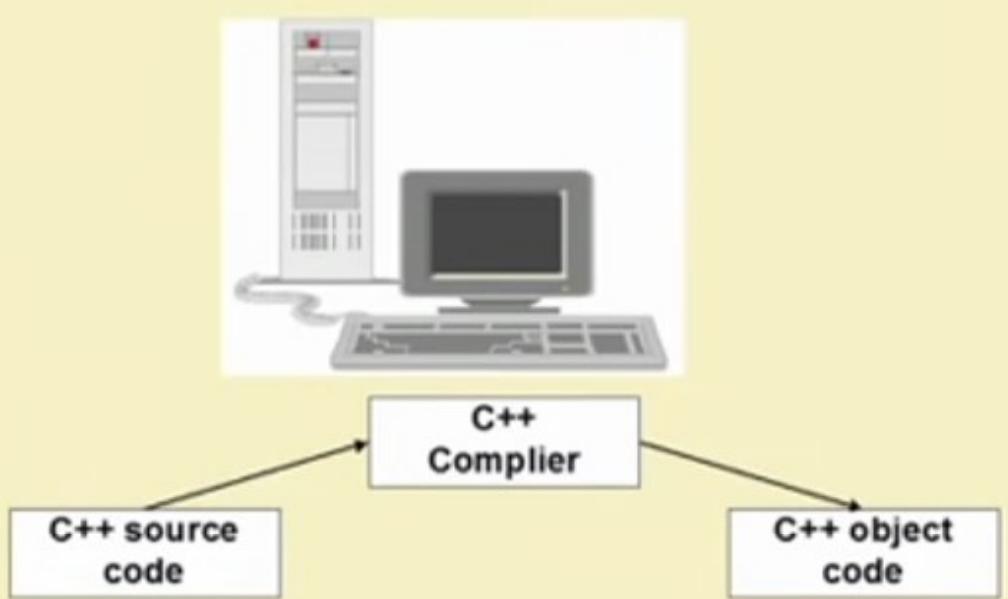
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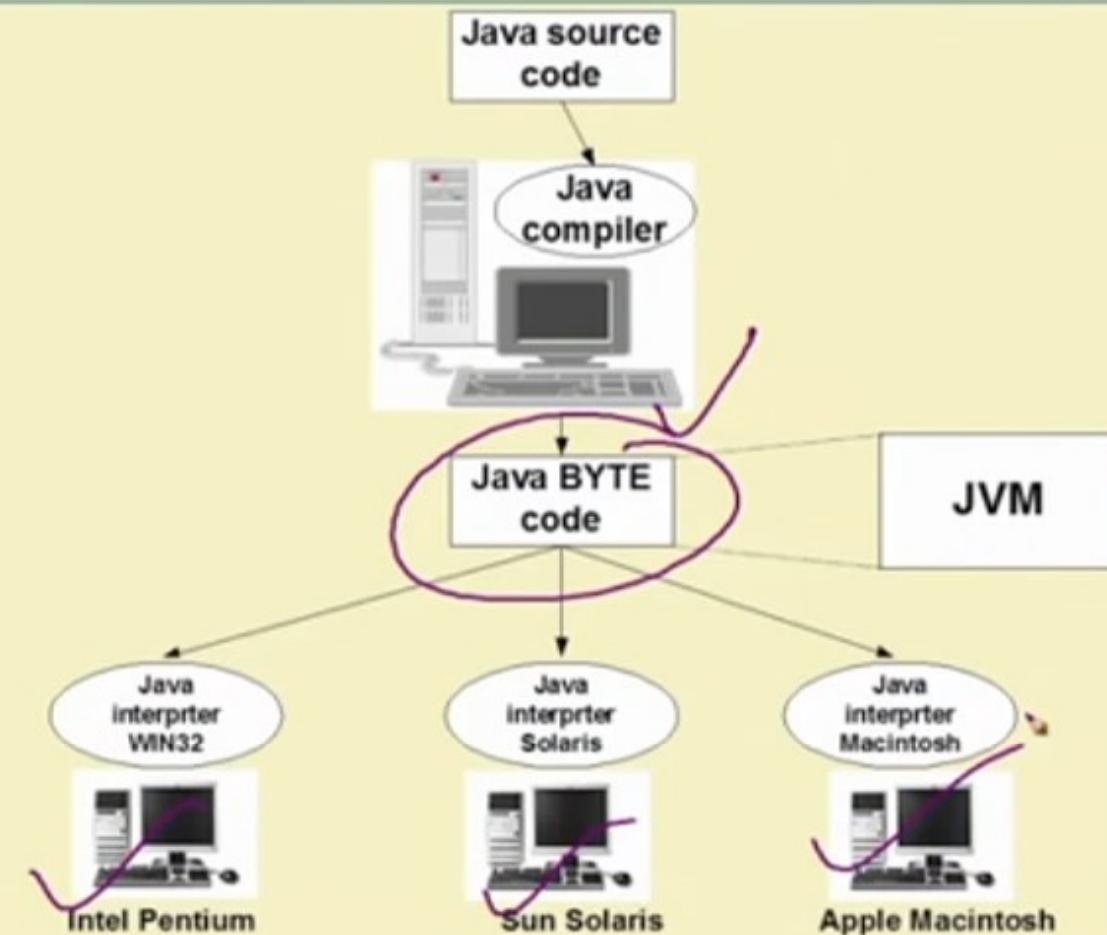




C++ versus Java : Programming environments



C++ provides platform dependent programming



Java provides platform independent programming

Questions to think...

- How a Java program can include two or more classes and then compile them?
- How a browser can run a Java program?



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Tools available for Java programming

- **Java Software Developer's Kit (SDK) : Java™ 2 SDK**
 - SDK from *JavaSoft*, a division of Sun Microsystems Inc.
 - Contains the basic tools and libraries necessary for creating, testing, documenting and executing Java programs.
- Java™ 2 SDK, Standard Edition
 - <https://java.sun.com/j2se/1.4.2/docs/index.html>
 - Official site for Java™ 2 SDK, Standard Edition



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Tools available for Java programming

There are seven main programs in SDK

- *javac* – the Java Compiler
- *java* – the Java Interpreter
- *javadoc* – generates documentation in HTML
- *appletviewer* – the Java Interpreter to execute Java applets
- *jdb* – the Java Debugger to find and fix bugs in Java programs
- *javap* – the Java Disassembler to displays the accessible functions in a compiled class; it also displays the meaning of byte code
- *javah* – to create interface between Java and C routines

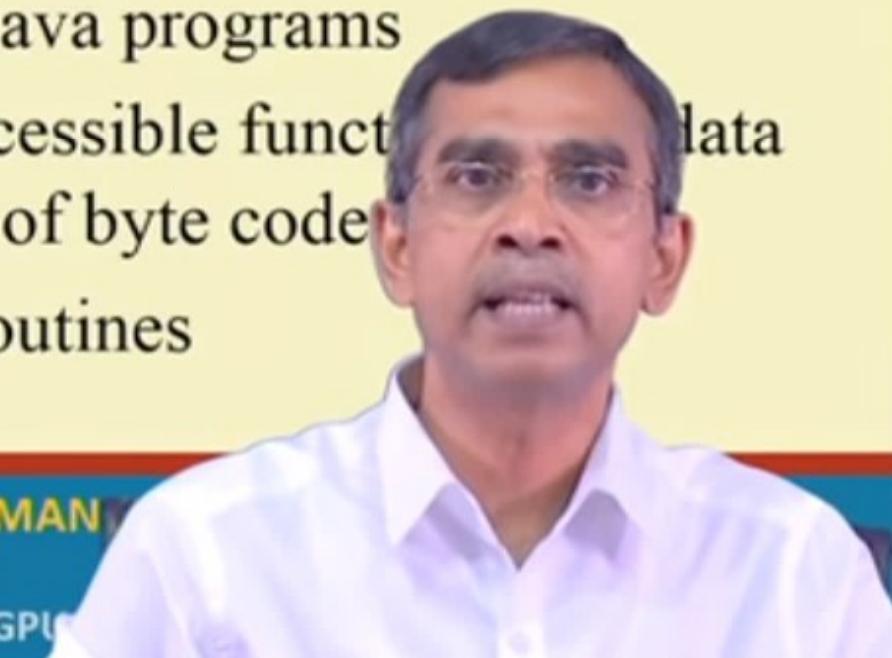


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Tools available for Java programming

- Additional few sources

- **Javatpoint website** : Another official site for Java™ 2 SDK, Standard Edition, help, tutorial, etc.

<https://www.javatpoint.com/java-tutorial>

- **Free Java Download** : Download Java for your desktop computer
<https://www.java.com/en/download/index.jsp>



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Resource for Java programming

- There are many resources for learning Java
 - The Java™2 Tutorials
 - The Java tutorials are practical guides for programmers who want to use the Java programming language to create applications.
<https://java.sun.com/docs/books/tutorial/index.html>
 - Sun Developer Network
 - Sun Microsystem's official website listing down all the API documentation, latest Java Technologies, books and other resources.
<https://java.sun.com/reference/docs/>



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Packages in Java

API (Application Programming Interface) in Java SDK

- The API enables Java programmers to develop varieties of applets and applications
- It contains **nine** packages
 - *java.applet* – for applet programming
 - *java.awt* – the **Abstract Windowing Toolkit** for designing GUI like *Button*, *Checkbox*, *Choice*, *Menu*, *Pannel*, etc.
 - *java.io* – file input/output handling
 - *java.lang* – provides useful classes like to handle *Object*, *Thread*, *Exception*, *String*, *System*, *Math*, *Float*, *Integer*, etc.



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Packages in Java

- *java.lang* – provides useful classes like to handle *Object, Thread, Exception, String, System, Math, Float, Integer* etc.
- *java.net* – classes for network programming; supports TCP/IP networking protocols
- *java.util* – it contains miscellaneous classes like *Vector, Stack, List, Date, Dictionary, Hash* etc.
- *javax.swing* – for designing graphical user interface (**GUI**)
- *java.sql* – for database connectivity (**JDBC**)

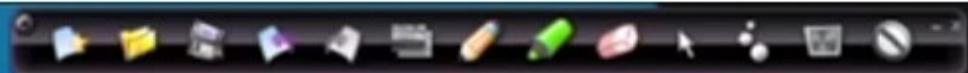


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Other third part tools for Java programming

Java IDE (Integrated Development Environment)

- Number of IDEs are available to support the productivity of software development
 - *Sun's Java Workshop* from *Sun's JavaSoft* (recently powered with Visual Java)
 - *Mojo* from *Penumbra Software* (best visual environment for creating Java applets)
 - *Jumba* from *Aimtech and IBM* (graphical applet builder)
 - *Semantic Café* from *Semantics* (a de-facto standard for Java development on Windows systems)



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Other third part tools for Java programming

Web browser

- Java environment requires Java-enabled web browser to supports Java applets
- Few (free) popular Java-enabled web browsers:
 - *HotJava* from JavaSoft web site (<http://java.sun.com>)
 - *Netscape Navigator* from Netscape home page (<http://home.netscape.com>)
 - *Internet Explorer* from Microsoft's web page (<http://www.microsoft.com>)



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Few more from Java professionals

Net Beans - <https://netbeans.org/downloads/>

- This is one of the most commonly used IDEs for Java and some major languages.



NotePad++ - <https://notepad-plus-plus.org/download/v7.5.8.html>

- This is a very advanced and handy NotePad, it has several built-in tools and functions for making programming easy.



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A rich subset of the Java language

Built-In Types	
int	double
long	String
char	boolean

System	
System.out.println()	
System.out.print()	
System.out.printf()	

Flow Control	
if	else
for	while

Parsing	
Integer.parseInt()	
Double.parseDouble()	

Boolean	
true	false
	&&
!	

Arrays	
a[i]	
new	
a.length	

Punctuation	
{	}
()
,	;

String	
+	...
length()	compareTo()
charAt()	matches()

Assignment	
=	

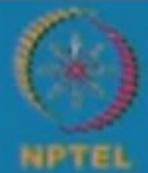
Objects	
class	static
public	private
toString()	equals()
new	main()

Primitive Numeric Types		
+	-	*
/	%	++
--	>	<
<=	>=	==
!=		

Math Library	
Math.sin()	Math.cos()
Math.log()	Math.exp()
Math.sqrt()	Math.pow()
Math.min()	Math.max()
Math.abs()	Math.PI



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Built-in data types in Java

Type	Size
boolean	1 bit
byte	8 bits
char	16 bits
short	16 bits

In Java, every variable has a type declared in the source code. There are two kinds of types: **reference types** and **primitive types**. Reference types are references to objects. Primitive types directly contain values.

Type	Size
int	32 bits
long	64 bits
float	32 bits
double	64 bits



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The Java character set

- **The Java language alphabet**
 - Uppercase letters ‘A’ to ‘Z’
 - Lowercase letters ‘a’ to ‘z’
 - Digits ‘0’ to ‘9’
 - Java special characters:

,	<	>	.	_
()	;	\$:
%	[]	#	?
'	&	{	}	"
^	!	*	/	
-	\	~	+	



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Identifiers in Java

- **Identifiers**
 - Names given to various program elements (**variables**, constants, class, methods, etc.)
 - May consist of letters, digits and the underscore ('_') character, with no space between.
 - Blank and comma are not allowed.
 - First character must be an alphabet or underscore.
 - An identifier can be arbitrary long.
 - Identifier should not be a reserved word.
- **Java programming language is case sensitive.**
 - area, AREA and Area are all different!



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Datatype declaration rule

Declaration and assignment statements

```
int a, b = 0;  
a = 123;  
b = 45;  
int c = a + b;  
System.out.print("The sum is" + c);
```



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Array in Java



An *array* is a **finite ordered** collection of **homogeneous** data elements.

Following are the three tasks to manipulate an array in **Java**

- Declaration of an array.
- Allocate memory for it.
- Loading the values into array.



Creating an array

Declaration of array

```
<type> <arrayName>[ ];
```

Example:

```
int x[ ];
```

```
<type>[ ] <arrayName>;
```

Example:

```
int [ ] x;
```

Allocate memory for an array

```
<arrayName> = new <type> [<size>];
```

Example:

```
x = new int [100];
```



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Creating an array

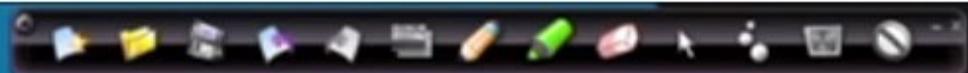
Define and allocate memory together

```
<type> <arrayName> [ ] = new <type> [<size>];
```

Example:

```
int x [ ] = new int [100];
```





Storing elements in array

Initialization of array: An alternative way

```
<type> <arrayName> [ ] = { <list of values> };
```

Example:

```
int x [ ] = {12, 3, 9, 15};
```



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Processing elements in an array

- **Insertion**
 - Insertion at any location
 - Insertion at front
 - Insertion at end
 - Insertion in sorted order
- **Deletion**
 - Deletion of a particular element
 - Deletion of an element at a particular location
 - Deletion of the element at front
 - Deletion of the element at end
- **Searching and Traversal**
 - Finding the smallest and largest element
 - Printing all elements or some specific element
- **Sorting**
 - In ascending order, descending order, lexicographical order etc.



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Array in Java: A quick visit

- Declaration of an array

Examples

```
int numbers[ ];
float averageScores[ ];
int [ ] rollNo;
float [ ] marks;
```

- Memory allocation for an array

Examples

```
numbers = new int [5];
averageScores = new float [20];
rollNo = new int [49];
marks = new float [54];
```

- Initialization of an array

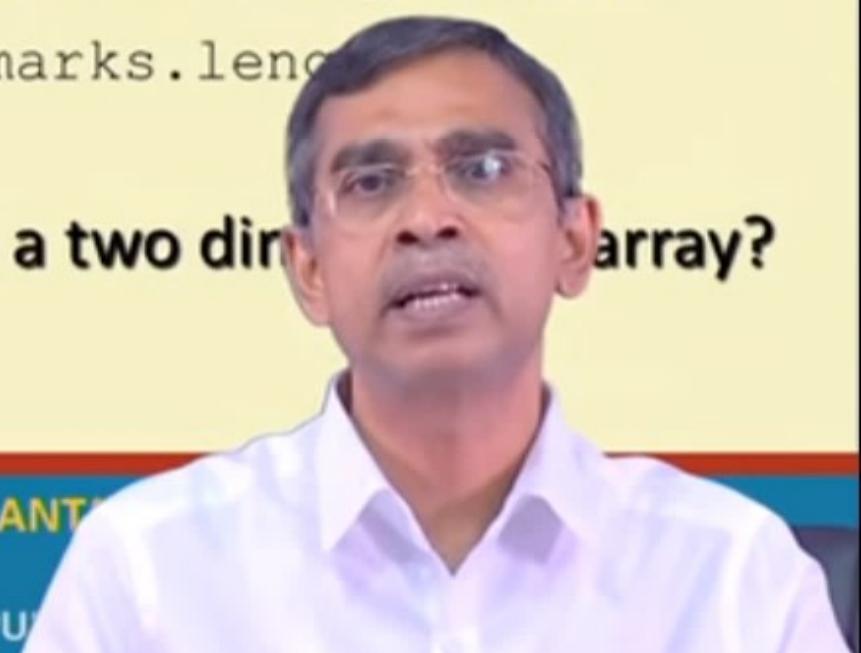
Examples

```
int numbers[] = {5, 4, 2, 1, 3};
float marks[] = {2.5, 3.4, 4.5};
```

What is the size of the array marks?

`n = marks.length`

How to define a two dimensional array?



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Creating a 2D array

Declare and Allocate

Example:

```
int myArray [ ] [ ];  
myArray = new int [3] [4];
```

OR

```
int myArray [ ] [ ] = new int [3] [4];
```



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Loading a 2D array

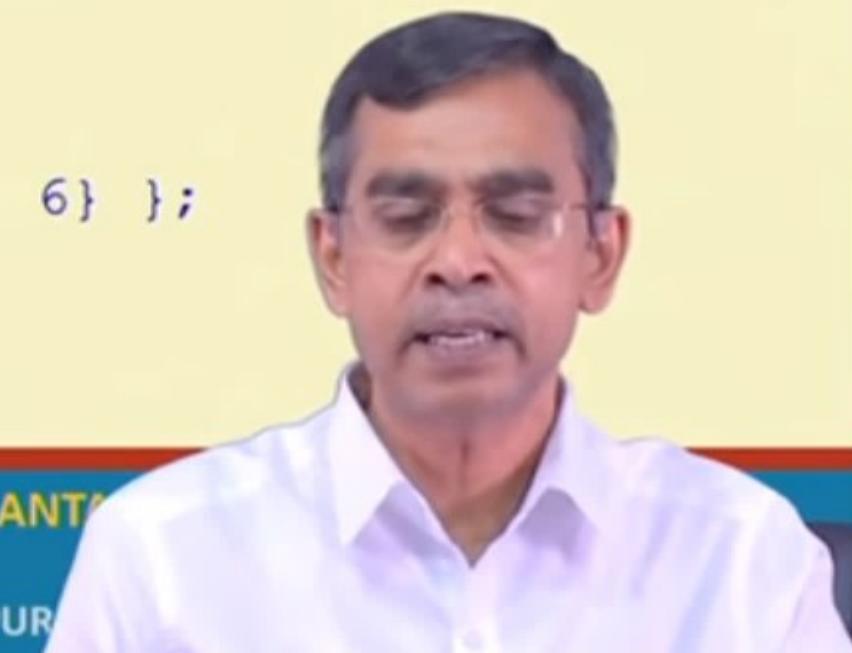
Initializing a 2D array : An example

1	2	3
4	5	6

```
int myArray [2] [3] = {1, 2, 3, 4, 5, 6};
```

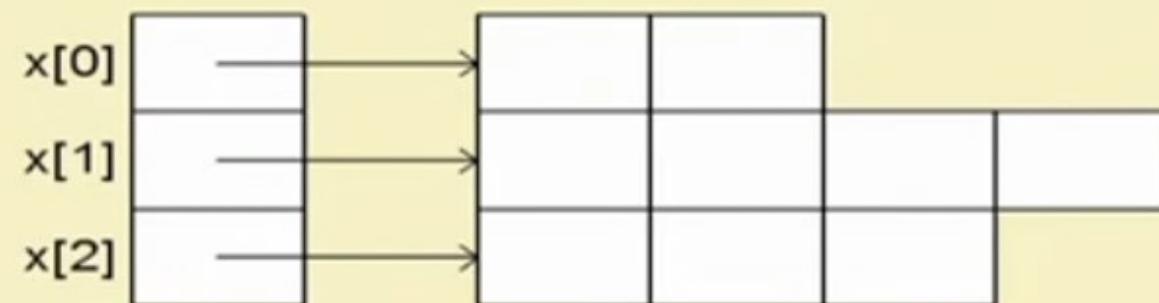
OR

```
int myArray [ ] [ ] = { {1, 2, 3}, {4, 5, 6} };
```





Variable sized 2D array



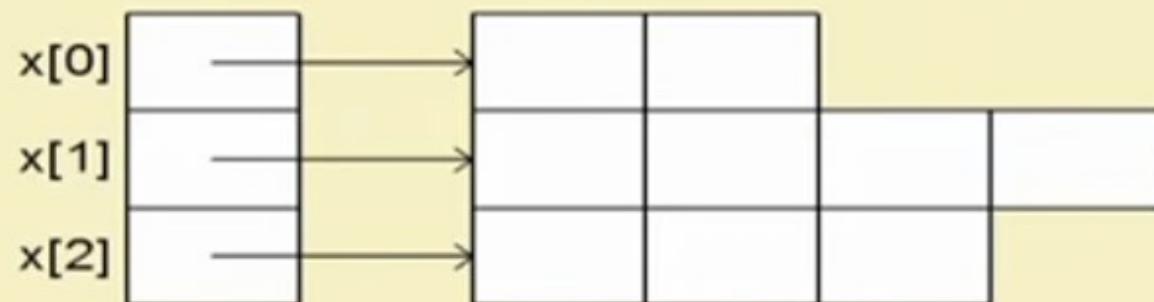
- Creating a variable-sized 2D array

```
<type><2DarrayName>[][] = new <type> [<rowSize>][];  
for (int i = 0; i < <rowSize>; i++)  
    <2DarrayName>[i] = new <type> [<colSizei>];
```





Variable sized 2D array



- Creating a variable-sized 2D array**

```
<type><2DarrayName>[][] = new <type> [<rowSize>][];  
for (int i = 0; i < <rowSize>; i++)  
    <2DarrayName>[i] = new <type> [<colSize>];
```

- Another way: Example**

```
int x [ ] [ ] = new int [3] [ ];  
x[0] = new int [ ];  
x[1] = new int [ ];  
x[2] = new int [ ];
```



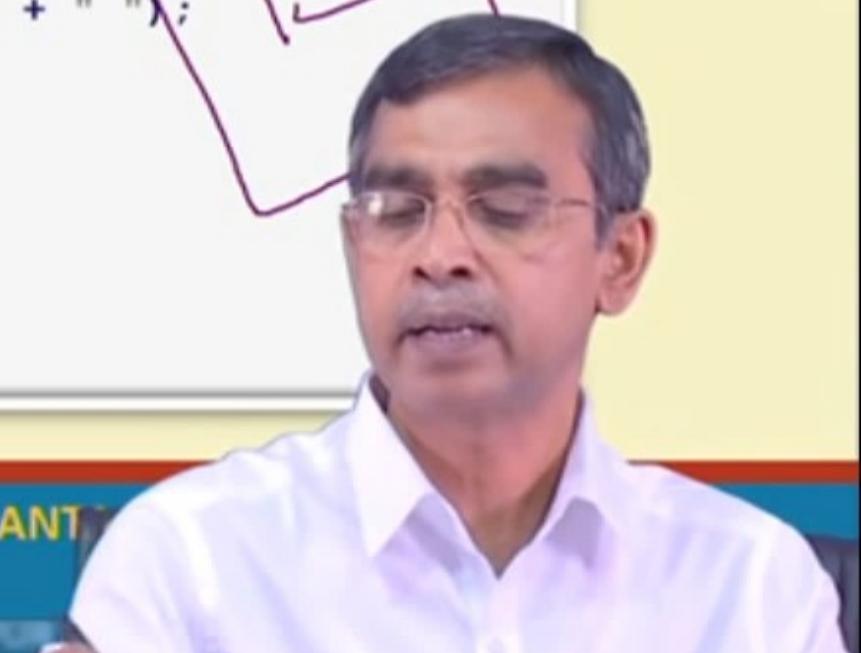


3D arrays : An example

```

class a3DArray {
    public static void main(String args[]) {
        int my3DArray [ ][ ][ ] = new int [3][4][5];
        int i, j, k;
        for(i=0; i<3; i++)
            for(j=0; j<4; j++)
                for(k=0; k<5; k++)
                    my3DArray[i][j][k] = i * j * k;
        for(i=0; i<3; i++) {
            for(j=0; j<4; j++) {
                for(k=0; k<5; k++)
                    System.out.print(my3DArray[i][j][k] + " ");
                System.out.println();
            }
            System.out.println();
        }
    }
}

```



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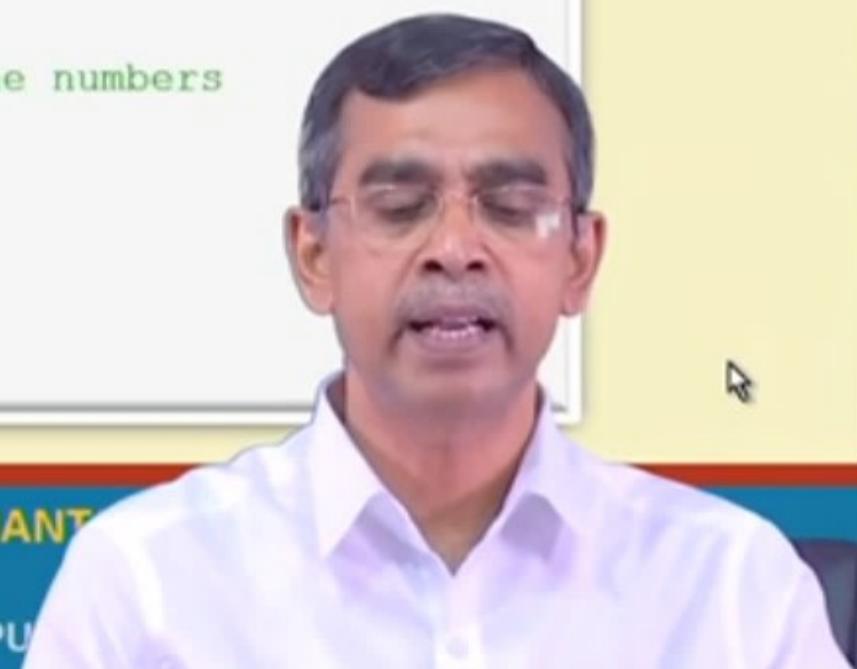
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Example program using an array

```
class TestArray{
    public static void main(String args[]) {

        int a[] = new int[5];          //Declaration and instantiation
        a = {10, 20, 30, 40, 50};    //Initialization
        //Traversing array
        for(int i=0;i<a.length;i++){ //length is the property of array
            System.out.println(a[i]);
        }
        // Average calculation
        float sum = 0; avg;
        for(i=0;i<a.length;i++) //Calculating the sum of the numbers
            sum += a[i];
        avg = sum/a.length;
        System.out.println("Avergae = " + avg);
    }
}
```



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Questions to think...

- How to write recursive programs in Java?
- Which program? Application or applet?



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In today's demonstration

- a) How to install Java?
- b) Setting environment variables to run Java programs.
- c) Editing a Java program and its compilation and execution.
- d) Few simple Java programs:
 - i. *Hello World program*
 - ii. *Demonstrating 3DArray*
 - iii. *Average calculation*



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D:\NPTEL Java\All Final\Week 1\Code\Demonstration-I\FirstJavaProgram.java - Notepad

```
File Edit Search View Encoding Language Settings Tools Macro Run Plugins Window ?  
New T FirstJavaProgram.java  
1 class FirstJavaProgram{  
2     public static void main(String[] args) {  
3         System.out.println("Congratulations! Your first  
4     }  
5 }  
6
```

Demonstration-I

Command Prompt

```
D:\NPTEL Java\All Final\Week 1\Code\Demonstration-I>javac FirstJavaProgram.java  
D:\NPTEL Java\All Final\Week 1\Code\Demonstration-I>java FirstJavaProgram  
Congratulations! Your first java program run successfully
```

```
D:\NPTEL Java\All Final\Week 1\Code\Demonstration-I>
```

●	OneDrive	ArrayList	10-Nov-18 10:11 PM CLASS File 1 KB
●	This PC	ArrayList.java	10-Nov-18 10:20 PM JAVA File 1 KB
●	3D Objects	PopUpProgram.class	10-Nov-18 10:20 PM CLASS File 1 KB
●	Desktop	FirstJavaProgram.java	10-Nov-18 10:20 PM JAVA File 1 KB
●	Documents	helloworld.class	10-Nov-18 11:27 PM CLASS File 1 KB
●	Downloads	helloworld.java	24-Oct-18 08:25 AM JAVA File 1 KB
●	Music	TestArray.class	10-Nov-18 10:10 PM CLASS File 1 KB
●	Pictures	TestArray.java	10-Nov-18 10:23 PM JAVA File 1 KB
●	Videos		
●	SAMSUNG 750E		
●	Programs (D)		
●	ESD-USB (E)		
●	ESD-USB (E)	.seventsd	
●		Spotlight-V100	
●		boot	
●		Data	
●		efi	
●		NPTEL Java	
●		NPTEL OOP-Java	
●		sources	
●		support	
●		Work	

Java : length : 187 lines : 6

Ln : 6 Col : 1 Sel : 0 | 0

Windows (CR LF)

UTF-8

INS

8 items 1 item selected 484 bytes



Type here to search





Watch later Share

Lecture 04: Demonstration - I

```
1 class FirstJavaProgram1{  
2     public static void main(String[] args) {  
3         System.out.println("Congratulations! Your first java  
4     }  
5 }  
6
```

Command Prompt

```
D:\NPTEL Java\All Final\Week 1\Code\Demonstration-I>javac FirstJavaProgram.  
D:\NPTEL Java\All Final\Week 1\Code\Demonstration-I>java FirstJavaProgram  
Congratulations! Your first java program run successfully  
D:\NPTEL Java\All Final\Week 1\Code\Demonstration-I>javac FirstJavaProgram.  
D:\NPTEL Java\All Final\Week 1\Code\Demonstration-I>java FirstJavaProgram  
Congratulations! Your first java program run successfully  
D:\NPTEL Java\All Final\Week 1\Code\Demonstration-I>javac FirstJavaProgram.  
D:\NPTEL Java\All Final\Week 1\Code\Demonstration-I>java FirstJavaProgram  
Error: Could not find or load main class FirstJavaProgram  
D:\NPTEL Java\All Final\Week 1\Code\Demonstration-I>
```

A screenshot of a Windows desktop environment showing a Java development setup.

Java Source File:

```
1 class helloworld{  
2     public static void main(String args[]){  
3         System.out.println("Hello, World!");  
4         System.out.println("Hi");  
5     }  
6 }
```

Terminal Window:

```
D:\NPTEL Java\All Final\Week 1\Code\Demonstration-I>javac helloworld.java  
D:\NPTEL Java\All Final\Week 1\Code\Demonstration-I>java helloworld  
Hello, World!  
Hi  
D:\NPTEL Java\All Final\Week 1\Code\Demonstration-I>javac helloworld.java  
D:\NPTEL Java\All Final\Week 1\Code\Demonstration-I>java helloworld  
Hello, World!  
Hi
```

File Explorer:

- Java\All Final\Week 1\Code\Demonstration-I:
 - java-0.2.2.jar
 - LICENSE
 - README
 - release
 - src
 - THIRDPARTYLICENSEREADME.txt
 - THIRDPARTYLICENSEREADME-JAVAFX.txt

System Status:

- Java source file
- length : 135 lines : 6
- Ln:6 Col:2 Sel:0|0
- Windows (CR LF)
- UTF-8
- INS

Taskbar:

- Type here to search
- File Explorer
- Edge
- Google Chrome
- File Manager
- PowerShell
- Notepad
- File Explorer
- 4:08 PM
- 12-Nov-18

D:\NPTEL Java\All Final\Week 1\Code\Demonstration-II\TestArray.java - Notepad++

File Edit Search View Encoding Language Settings Tools Macro Run Plugins Window ?

TestArray.java

```
1 class TestArray{
2     public static void main(String args[]){
3
4         int a[] = {10, 20, 30, 40, 50}; //Initialization
5         //Traversing array
6         for(int i=0;i<a.length;i++){ //length is the property
7             System.out.println(a[i]);
8         }
9         // Average calculation
10        float sum = 0, avg;
11        for(int i=0;i<a.length;i++) //Calculating the sum of all elements
12            sum += a[i];
13        avg = sum/a.length;
14        System.out.println("Avergae = " + avg);
15    }
16}
17
18
```

Java source file length : 522 lines : 18 Ln : 1 Col : 1 Sel : 0 | 0 Windows (CR LF) UTF-8 INS

Select Command Prompt

D:\NPTEL Java\All Final\Week 1\Code\Demonstration-II>





D:\NPTEL Java\All Final\Week 1\Code\Demonstration-I\TestArray.java - Notepad

File Edit Search View Encoding Language Settings Tools Macro Run Plugins Window ?

TestArray.java

```
1 class TestArray{  
2     public static void main(String args[]){  
3         int a[] = {10, 20, 30, 40, 50}; //Initialization  
4         //Traversing array  
5         for(int i=0;i<a.length;i++){ //length is the property  
6             System.out.println(a[i]);  
7         }  
8         // Average calculation  
9         float sum = 0, avg;  
10        for(int i=0;i<a.length;i++) //Calculating the sum of  
11            sum += a[i];  
12        avg = sum/a.length;  
13        System.out.println("Avergae = " + avg);  
14    }  
15 }  
16  
17  
18
```

Command Prompt

D:\NPTEL Java\All Final\Week 1\Code\Demonstration-I>javac TestArray.java

D:\NPTEL Java\All Final\Week 1\Code\Demonstration-I>java TestArray

10
20
30
40
50
Avergae = 30.0

Watch later Share

Search Demonstration-I

Java source file length: 522 lines: 18 Ln: 1 Col: 1 Sel: 0 | 0 Windows (CR LF) UTF-8 INS

Type here to search



D:\NPTEL Java\All Final\Week 1\Code\Demonstration-I\TestArray.java - Notepad

File Edit Search View Encoding Language Settings Tools Macro Run Plugins Window ?

New1 TestArray.java

```
1 class TestArray{  
2     public static void main(String args[]){  
3         int a[]={10, 20, 30, 40, 50}; //Initialization  
4         //Traversing array  
5         for(int i=0;i<a.length;i++){ //length is the p  
6             System.out.print(a[i]+ " ");  
7         }  
8         System.out.println();  
9         // Average calculation  
10        float sum = 0, avg;  
11        for(int i=0;i<a.length;i++) //Calculating the  
12            sum += a[i];  
13        avg = sum/a.length;  
14        System.out.println("Avergae = " + avg);  
15    }  
16 }  
17  
18  
19
```

Command Prompt

```
10  
20  
30  
40  
50  
Avergae = 30.0  
D:\NPTEL Java\All Final\Week 1\Code\Demonstration-I>javac TestArray.java  
D:\NPTEL Java\All Final\Week 1\Code\Demonstration-I>java TestArray  
1020304050Avergae = 30.0  
D:\NPTEL Java\All Final\Week 1\Code\Demonstration-I>javac TestArray.java  
D:\NPTEL Java\All Final\Week 1\Code\Demonstration-I>java TestArray  
10 20 30 40 50 Avergae = 30.0  
D:\NPTEL Java\All Final\Week 1\Code\Demonstration-I>javac TestArray.java  
D:\NPTEL Java\All Final\Week 1\Code\Demonstration-I>java TestArray  
10 20 30 40 50  
Avergae = 30.0  
D:\NPTEL Java\All Final\Week 1\Code\Demonstration-I>
```

Java source file length : 550 lines : 19 Ln: 13 Col: 24 Sel: 0 | 0 Windows (CR LF) UTF-8 INS

Type here to search



A screenshot of a Windows desktop environment displaying a Java code editor and a terminal window.

The Java code editor (Notepad++) shows a file named `a3DArray.java` with the following content:

```
1 class a3DArray {
2     public static void main(String args[]) {
3
4         int my3DArray [ ][ ][ ] = new int [3][4][5];
5
6         int i, j, k;
7         for(i=0; i<3; i++)
8             for(j=0; j<4; j++)
9                 for(k=0; k<5; k++)
10                    my3DArray[i][j][k] = i * j * k;
11
12
13        for(i=0; i<3; i++) {
14            for(j=0; j<4; j++) {
15                for(k=0; k<5; k++)
16                    System.out.print(my3DArray[i][j][k] + " ");
17                System.out.println();
18            }
19            System.out.println();
20        }
21    }
22 }
23 }
```

The terminal window (Command Prompt) shows the output of running the compiled Java program:

```
O:\NPTEL Java\All Final\Week 1\Code\Demonstration-I>javac a3DArray.java
O:\NPTEL Java\All Final\Week 1\Code\Demonstration-I>java a3DArray
0 0 0 0
0 0 0 0
0 0 0 0
0 0 0 0
0 0 0 0
0 0 0 0
0 1 2 3 4
0 2 4 6 8
0 3 6 9 12
0 0 0 0
0 2 4 6 8
0 4 8 12 16
0 6 12 18 24
```

At the bottom left of the terminal window, there is a watermark: "D:\NPTEL Java\All Final\Week 1\Code\Demonstration-I".

The status bar at the bottom of the screen displays:

- Java source file
- length : 546 lines : 23
- Ln : 16 Col : 11 Sel : 0 | 0
- Windows (CR LF)
- UTF-8
- INS

The taskbar at the bottom includes icons for File Explorer, Task View, Edge browser, File Manager, and others.

D:\NPTEL Java\All Final\Week 1\Code\Demonstration-I\a3DArray.java - Notepad

```
File Edit Search View Encoding Language Settings Tools Macro Run Plugins Window ?  
New Open Save All Open Recent Find Replace Go To Properties Help  
a3DArray.java  
1 class a3DArray {  
2     public static void main(String args[]) {  
3         int my3DArray [ ][ ][ ] = new int [3][4][5];  
4         int i, j, k;  
5         for(i=0; i<3; i++)  
6             for(j=0; j<4; j++)  
7                 for(k=0; k<5; k++)  
8                     my3DArray[i][j][k] = i * j * k;  
9  
10        for(i=0; i<3; i++) {  
11            for(j=0; j<4; j++) {  
12                for(k=0; k<5; k++)  
13                    System.out.print(my3DArray[i][j][k] + " ");  
14                System.out.println();  
15            }  
16            System.out.println();  
17        }  
18    }  
19}  
20}  
21}  
22}  
23}
```

Java source file length : 546 lines : 23 Ln : 16 Col : 11 Sel : 0 | 0 Windows (CR LF) UTF-8 INS

Type here to search

Command Prompt

```
D:\NPTEL Java\All Final\Week 1\Code\Demonstration-I>javac a3DArray.  
D:\NPTEL Java\All Final\Week 1\Code\Demonstration-I>java a3DArray  
0 0 0 0 0  
0 0 0 0 0  
0 0 0 0 0  
0 0 0 0 0  
0 0 0 0 0  
0 1 2 3 4  
0 2 4 6 8  
0 3 6 9 12  
  
0 0 0 0 0  
0 2 4 6 8  
0 4 8 12 16  
0 6 12 18 24
```

D:\NPTEL Java\All Final\Week 1\Code\Demonstration-I>

