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Basic Java- Introduction to Java





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Objectives

- At the end of this module, you will be able to :
 - Understand why we need Java
 - Understand History of Java
 - Get to know Importance of Java to internet
 - Java Platform and libraries
 - Compilation and execution of java programs
 - Understand features of Java
 - To know different versions of Java
 - Write first Java program using Eclipse IDE





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Configurations required

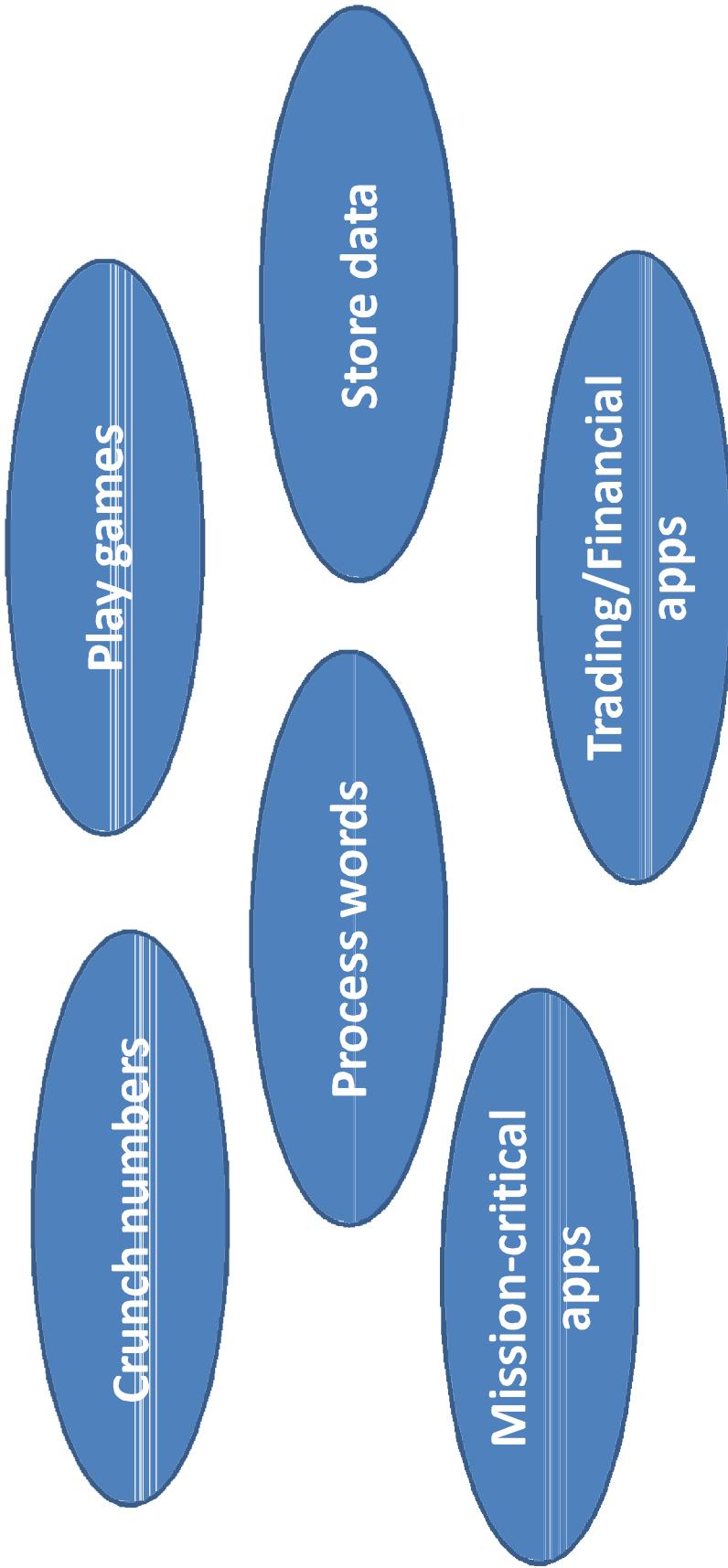
- JDK 1.8
- Eclipse Luna
- MySQL
- Java 8 Documentation





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Why Java?



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Short History

- Java was conceived by *James Gosling, Patrick Naughton and team* in *1991*.
- First version took 18 months ("Oak").
- Oak was renamed to "Java" in 1995.





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Why Java Is Important to the Internet?



Security



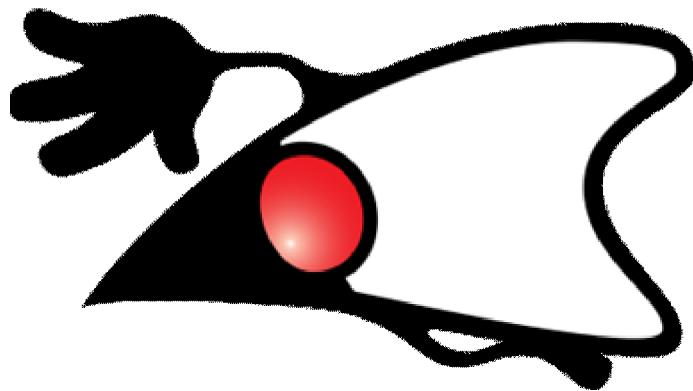
Portability

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Java Platform and Class Libraries



- Java Platform, Standard Edition (Java SE)
- Java Platform, Enterprise Edition (Java EE)
- Java Platform, Micro Edition (Java ME)



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Java Platform and Class Libraries

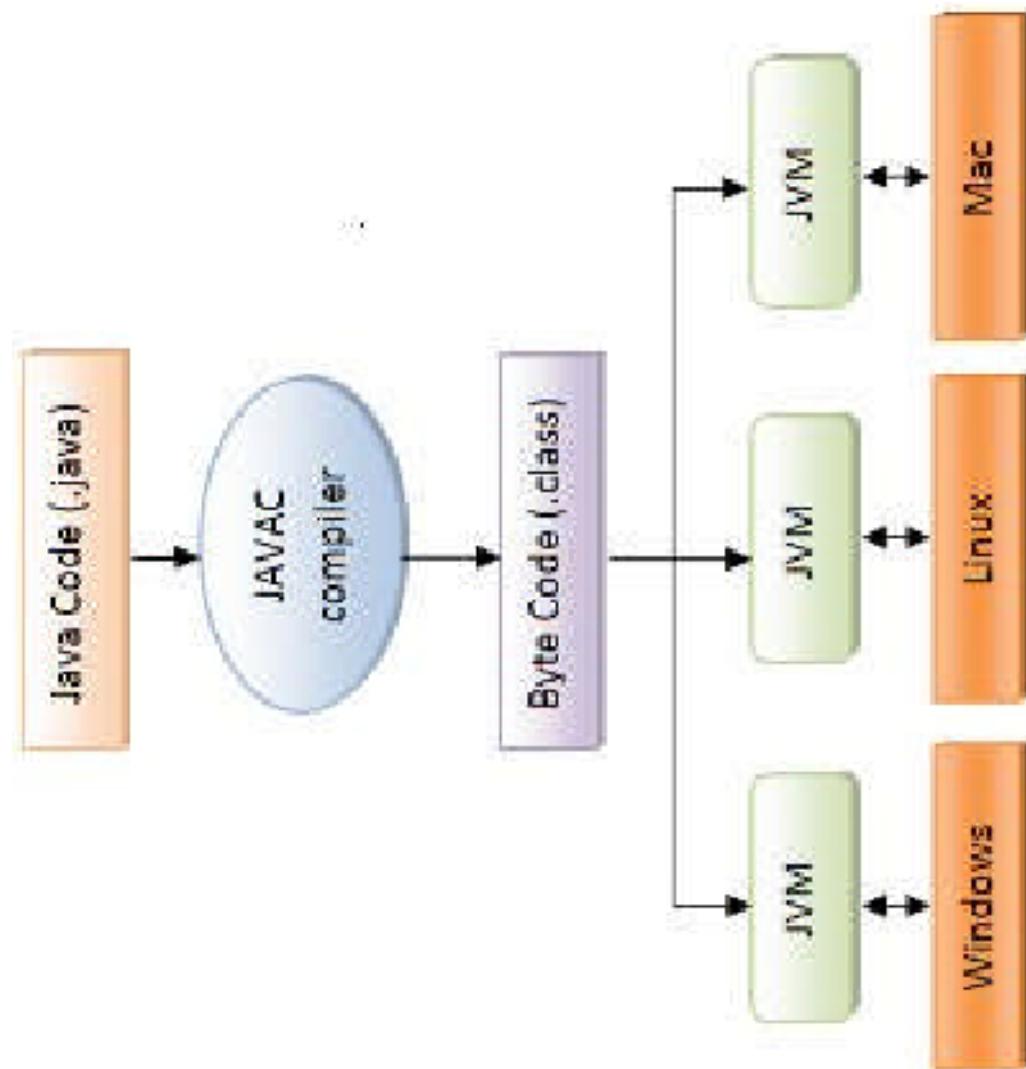
		Java Language								
		java	javac	javadoc	apt	jar	javap	JPDA	JConsole	Java VisualVM
Security		Int'l	RMI	IDL	Deploy	Monitoring	Troubleshoot	Scripting	JVM TI	
Deployment Technologies		Deployment			Java Web Start			Java Plug-in		
Accessibility		AWT			Input Methods			Swing		Java 2D
User Interface Toolkits		Drag n Drop			Image I/O			Print Service		Sound
Integration Libraries		IDL	JDBC™	JNDI™	RMI	RMI-IIOP			Scripting	
JRE	Other Base Libraries	Beans	Intl Support		I/O	JMX		JNI	Math	
	Networking	Networking	Override Mechanism		Security	Serialization		Extension Mechanism	XML JAXP	
lang and util		Collections	Concurrency Utilities		JAR		Logging		Management	
Preferences API		Ref Objects	Reflection		Regular Expressions		Versioning		Instrument	
Java Virtual Machine		Java Hotspot™ Client VM				Java Hotspot™ Server VM				
Platforms		Solaris	Linux		Windows		Other			



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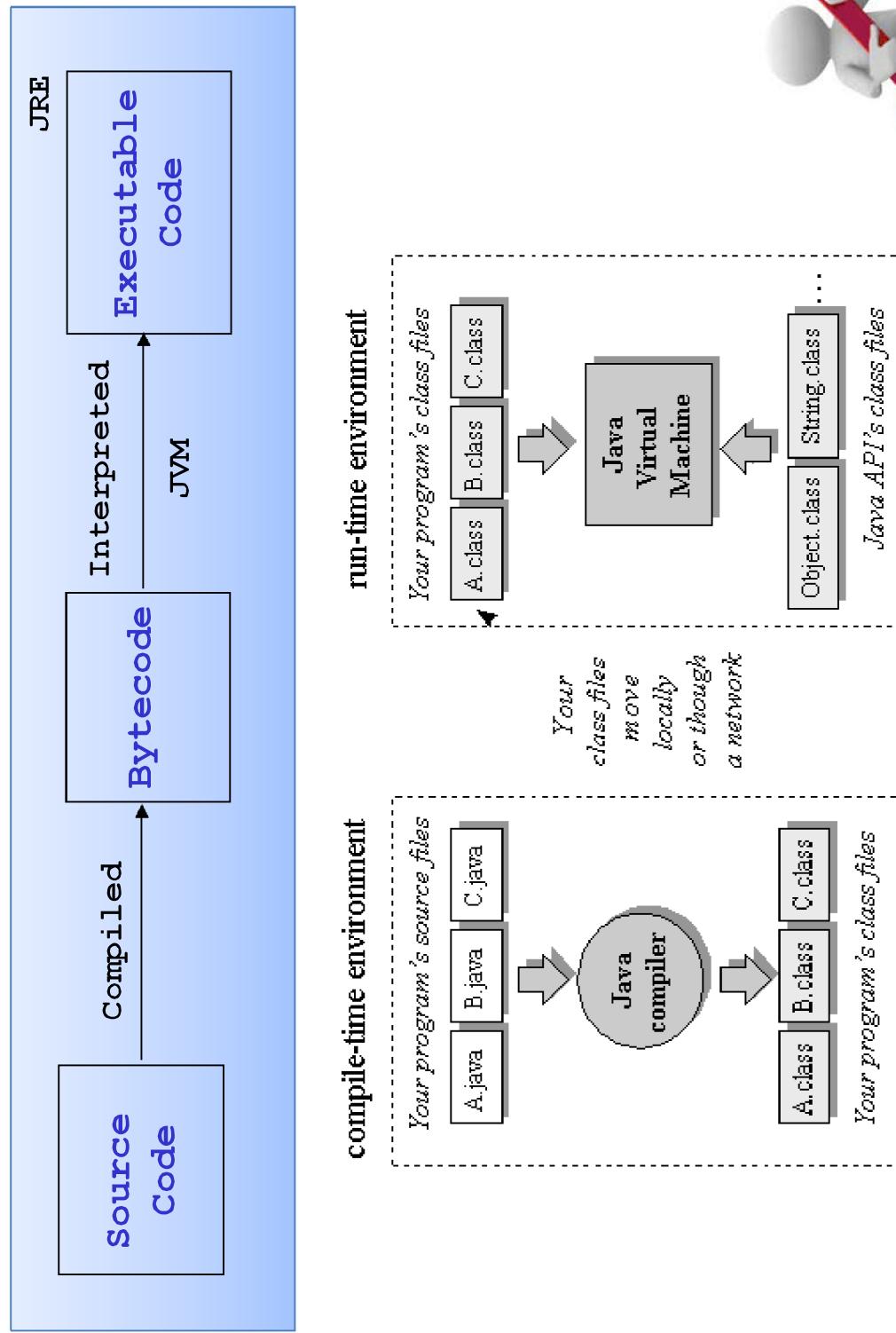
The Bytecode





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Compilation and Execution





- Bytecode is the intermediate representation of Java programs.
- Bytecode understanding helps in debugging and doing performance and memory usage tuning.





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Java Virtual Machine

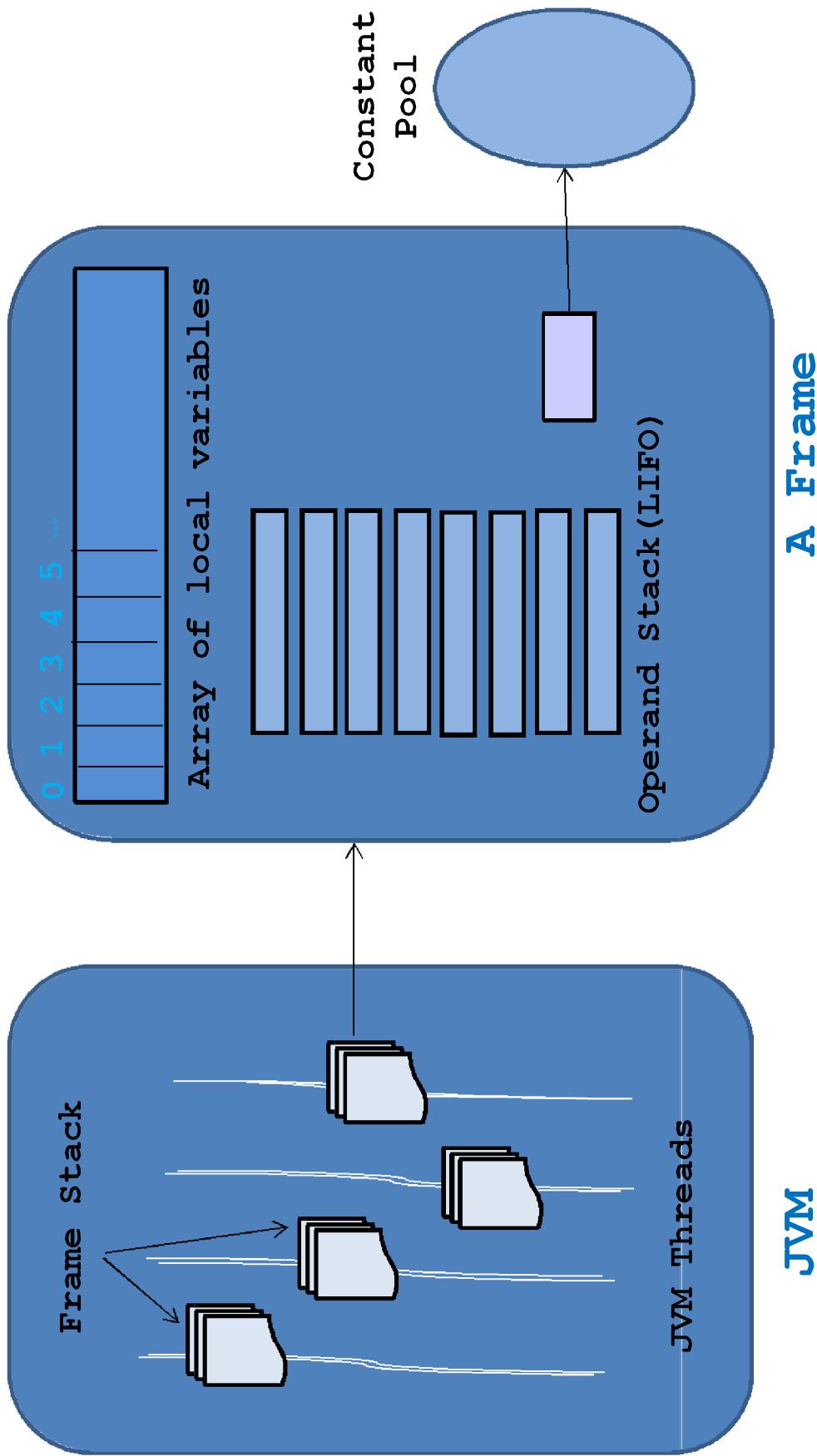
- JVM uses stack-based model of computation.
- Each thread has a JVM stack which stores frames.
- Each time a method is invoked a new stack frame is created.
- Each stack frame consists of Operand Stack, Array of local variables, and a reference to Constant Pool





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Java Virtual Machine



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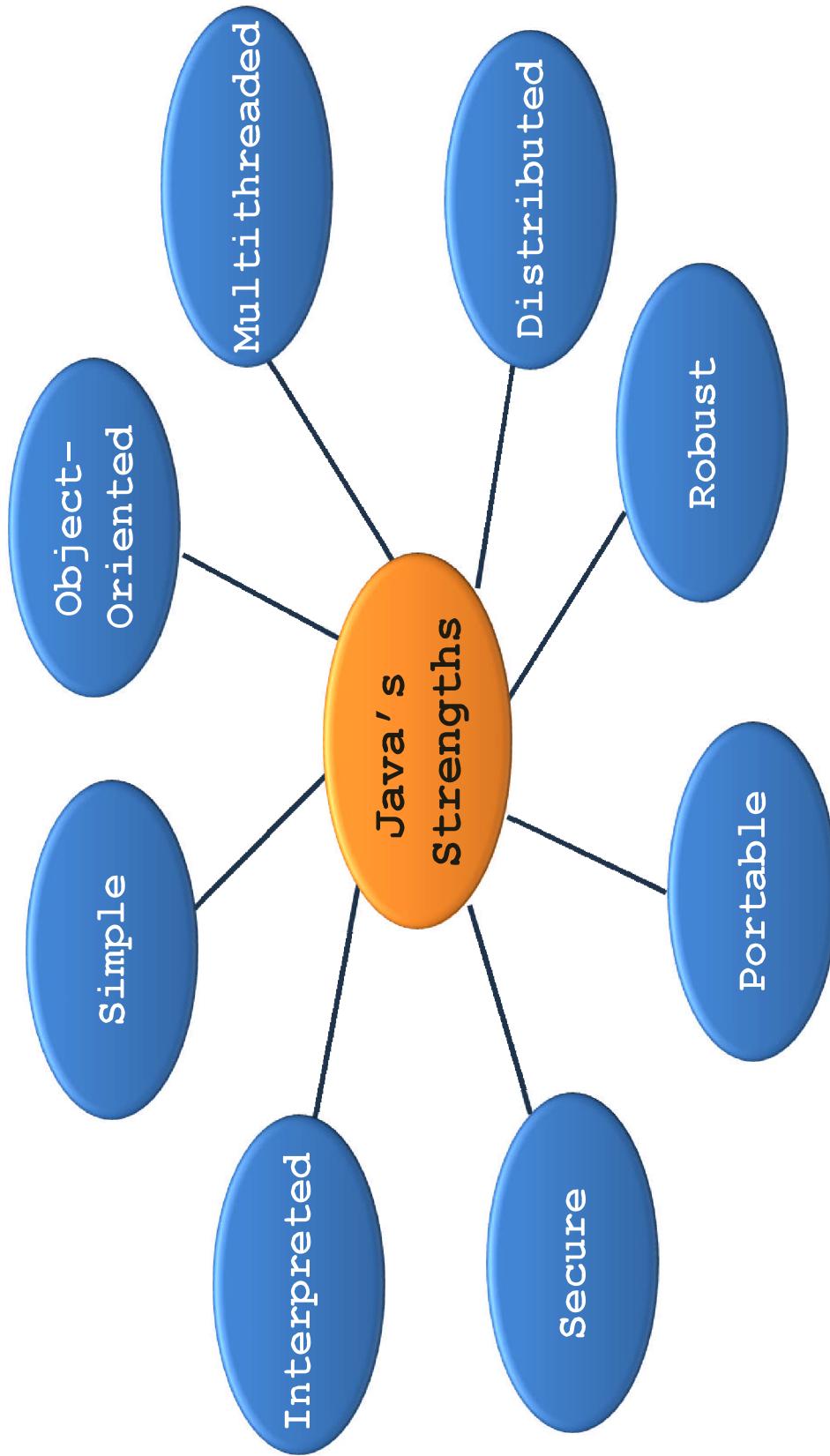
A Frame





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Why Java?





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Features added in Java versions

- Jdk 1.1
 - JDBC (Java Database Connectivity)
 - Inner Classes
 - Java Beans
 - RMI (Remote Method Invocation)
 - Reflection (introspection only)





- Jdk 1.2
 - Collections framework.
 - Java String memory map for constants.
 - Just In Time (JIT) compiler.
 - Jar Signer for signing Java ARchive (JAR) files.
 - Policy Tool for granting access to system resources.
 - Java Foundation Classes (JFC) which consists of Swing 1.0, Drag and Drop, and Java 2D class libraries.
 - Java Plug-in
 - Scrollable result sets, BLOB, CLOB, batch update, user-defined types in JDBC.
 - Audio support in Applets.





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Features added in Java versions

- Jdk 1.3
 - Java sound
 - Jar indexing





- Jdk 1.4
 - XML Processing
 - Java Print Service
 - Logging API
 - Java Web Start
 - JDBC 3.0 API
 - Assertions
 - Preferences API
 - Chained Exception
 - IPv6 Support
 - Regular Expressions
 - Image I/O API





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Features added in Java versions

- Java 5
 - Generics
 - Enhanced for Loop
 - Autoboxing/Unboxing
 - Typesafe Enums
 - Varargs
 - Static Import
 - Metadata (Annotations)





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Features added in Java versions

- Java 6
 - Scripting Language Support
 - Collection API interfaces like Deque, NavigableSet, NavigableMap
 - Collection API classes as ArrayDeque
 - JDBC 4.0 API





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Features added in Java versions

- Java 7
 - Strings in switch Statement
 - Type Inference for Generic Instance Creation
 - Multiple Exception Handling
 - Try with Resources
 - Binary Literals, underscore in literals
 - Diamond Syntax





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Features added in Java versions

- Java 8
 - Lambda Expressions
 - Default Methods
 - Type Annotations

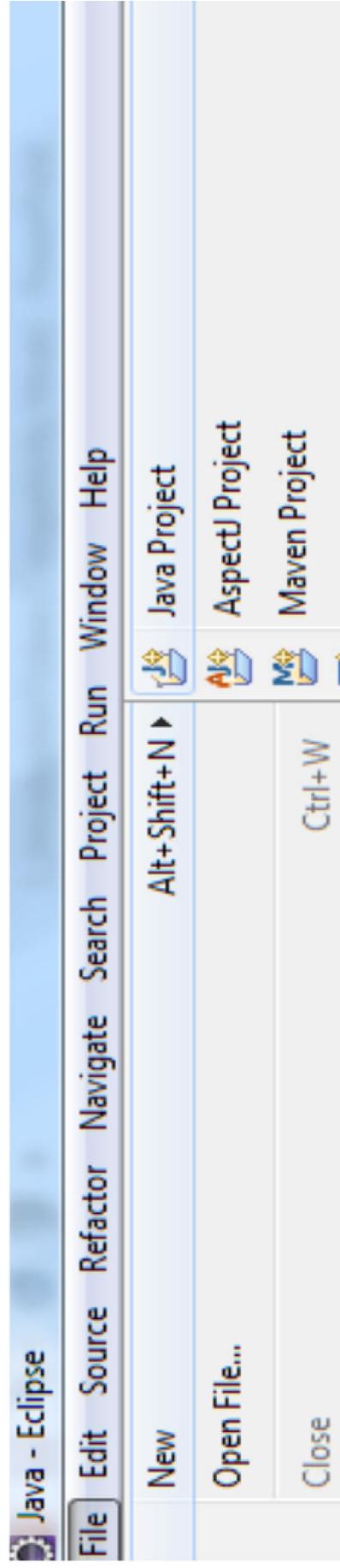




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How to develop application using Eclipse?

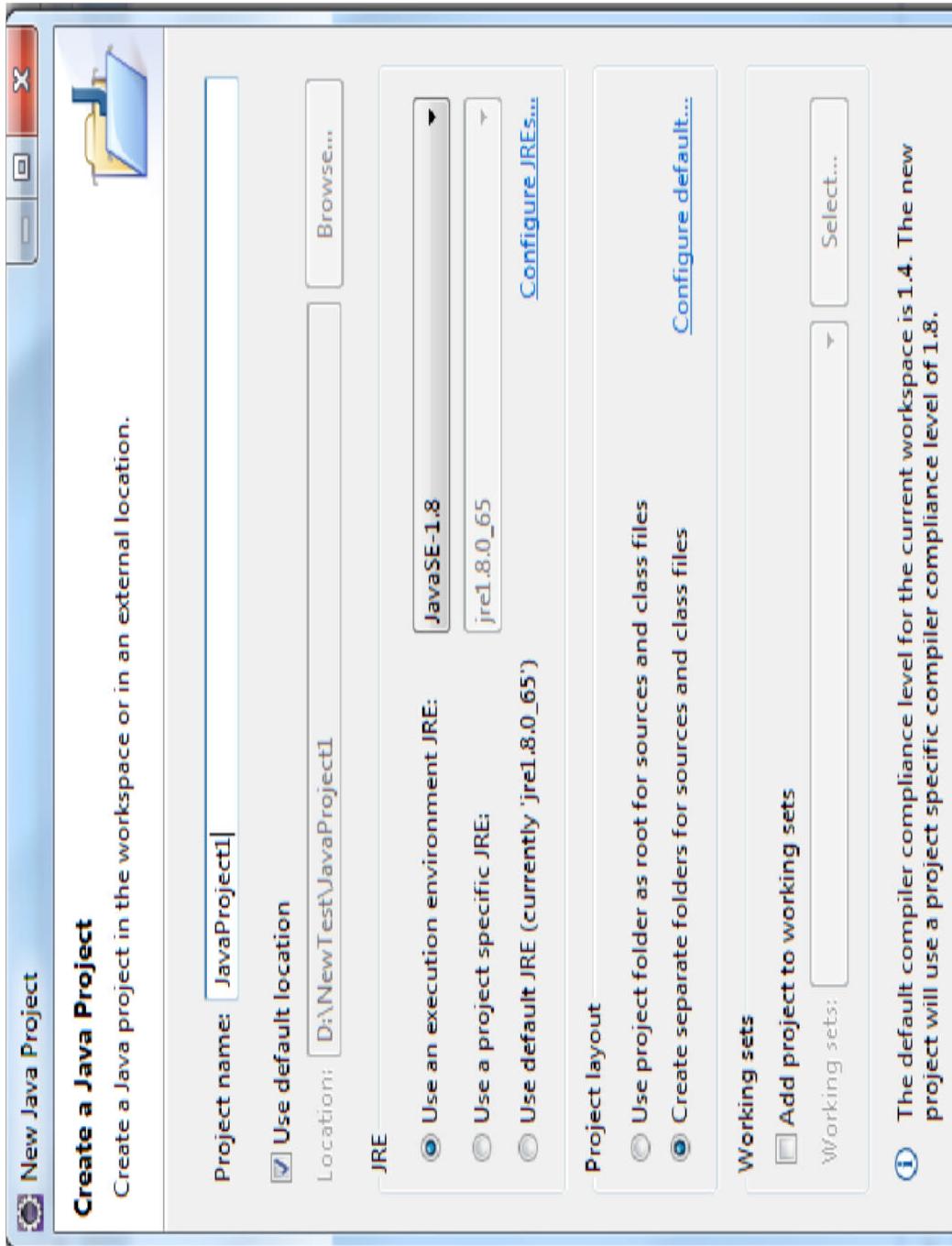
- Open Eclipse.
- Specify the workspace.
- Create a new Java Project
 - File -> New -> Java Project





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Specify project name and click finish

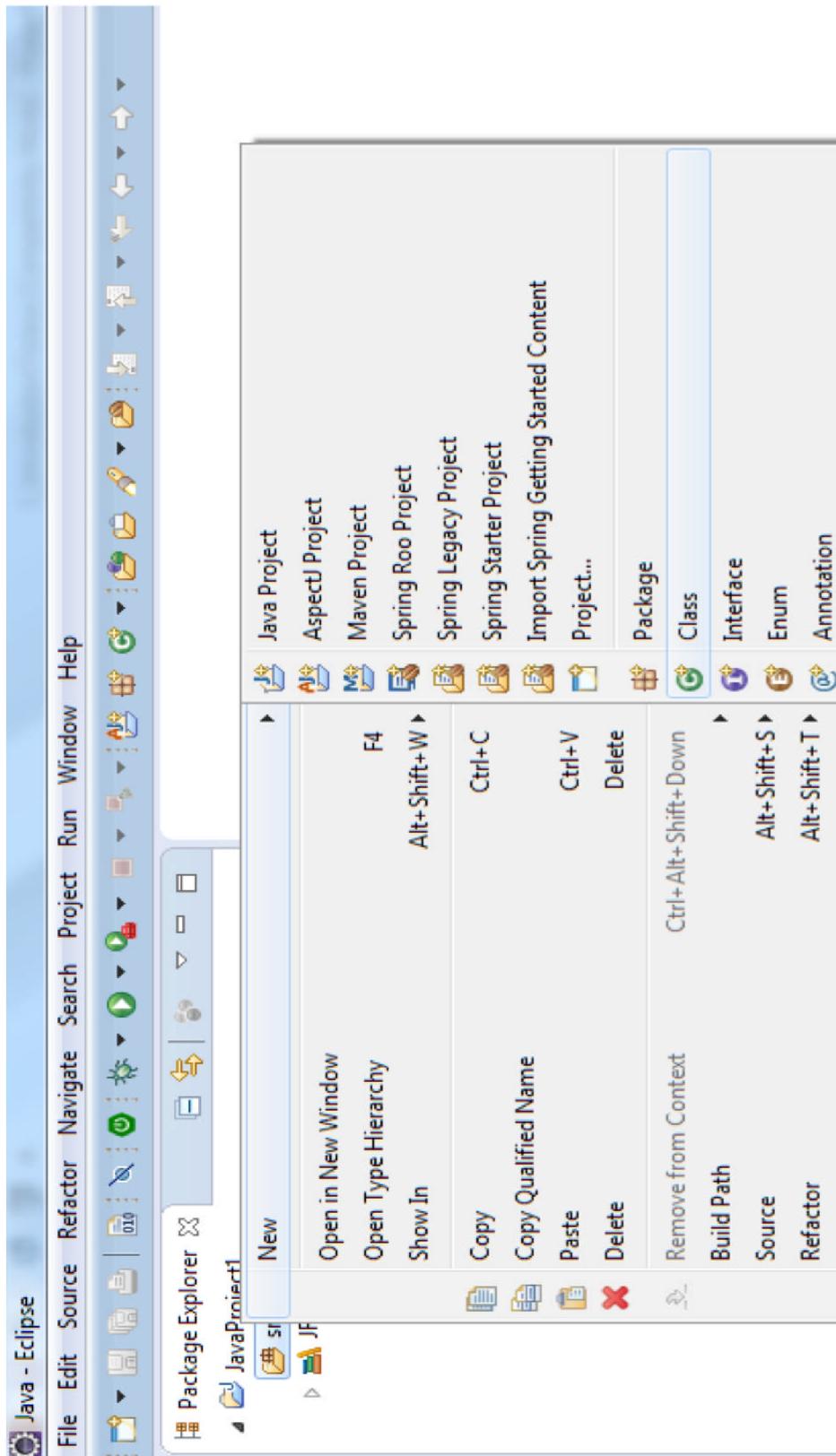




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Create a new class

- Right click on src -> New -> Class





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Specify class name

New Java Class

Java Class

⚠ The use of the default package is discouraged.

Source folder: JavaProject1/src (default)

Package:

Enclosing type:

Name: HelloWorld

Modifiers: public package private protected
 abstract final static

Superclass: java.lang.Object

Interfaces:

Which method stubs would you like to create?

public static void main(String[] args)
 Constructors from superclass
 Inherited abstract methods

Do you want to add comments? (Configure templates and default value [here](#))

Generate comments



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Write the following code

Java HelloWorld

```
1  
2 public class HelloWorld {  
3  
4     public static void main(String[] args) {  
5         System.out.println("Hello World");  
6     }  
7  
8 }  
9
```





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Save and execute

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

```
1 public class HelloWorld {  
2     public static void main(String[] args) {  
3         System.out.println("Hello World");  
4     }  
5 }  
6  
7 }  
8 }  
9 }
```

The code is a simple Java program that prints "Hello World" to the console. The file is named `HelloWorld.java`. The IDE interface includes a toolbar with various icons, a menu bar with options like Search, Project, Run, Window, and Help, and a status bar at the bottom.



Observe output on the console

The screenshot shows the Eclipse IDE interface. On the left, the code editor displays a Java file named `HelloWorld.java` with the following content:

```
1 public class HelloWorld {  
2     public static void main(String[] args) {  
3         System.out.println("Hello World");  
4     }  
5 }  
6  
7 }  
8 }  
9 }
```

To the right of the code editor is the **Console** view, which shows the output of the program's execution:

```
<terminated> HelloWorld [Java Application] C:\Program Files\Java\jre1.8.0_65\bin\javaw.exe (Apr 20, 2016, 11:18:10 AM)  
Hello World
```



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Summary : Session

With this we have come to an end of our first session, where we discussed about

- Basics of Java
- History , features and various versions of Java
- How to develop Java application using eclipse

At the end of this session, we expect you to

- Understand basics of Java
- Develop an application using Java



Reference Material : Websites & Blogs

- <https://docs.oracle.com/javase/tutorial/getStarted/intro/definition.html>
- https://java.com/en/download/faq/whatis_java.xml
- <https://docs.oracle.com/cd/E19455-01/806-3461/6jck06gqd/index.html>
- <http://javarevisited.blogspot.in/2011/12/jre-jvm-jdk-jit-in-java-programming.html>
- <https://docs.oracle.com/javase/tutorial/java/concepts/>
- <http://www.javatpoint.com/java-oops-concepts>



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Reference Material : Books

- ***Head First Java***

- By: *Kathy Sierra, Bert Bates*
- Publisher: *O'Reilly Media, Inc.*

- ***Java Complete Reference***

- By *Herbert Schildt*



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Thank You !!!