Development:

Javac:

We can use this command to compile a single or group of java files.

Syn:

Javac [options]A.java/A.java B.java

java:

we can use java Command to a run a .class file.

Syn

java[option] A

Note:- we can complie a group of .java files at a time where as ae can run only on .class file at a time.

Classpath:

- classpath described the location where required .class file are available.
- JVM will always to locate the required .class file.
- The Following are various possible ways to set the classpath.

1)Permenently by using environment variable classpath

- This class path will be preserved after system restart also.

2)At command prompt level by using set Command.

Set classpath=%classpath %;D:\path>

- This class path will be only for that particular command prompt once command execution completes automatically classpath will be lost.

3)At command level by using cp option

java-cpD:\path>Test

- This classpath is applicable only for this particular command. Once command execution completes automatically classpath.will be lost.
- Among the above 3 ways the most commonly used approach is setting classpath or command level.

Example:

```
Class Test
  {
   public static void main(String args[])
   {
    System.out.println("Classpath  Demo");
}
}
```

```
D:\Durgaclass\>javac Test.java

                              >Java Test    //valid
                              O/p= Classpath  Demo


        D:\.java Test  //R.E.NoClassDefoundError  //invalid

        D:\>java-cp D:\Durgaclasses Test   //valid

                                   O/p= ClasspathDemo
```

Note:

If we set classpath explicitly then we can run java program from any location but if we are not Setting the classpath then we have to run java program only from current working directly.

Example 2)

C:	D:

public class fresher
{
	class Company
	{

public void m1()
{
System.out.println("I Wan't Job");
}
}
	Public static void main(string args[])
	{
	fresher f=new fresher();
	f.m1();
	System.out.println("Getting a job is very
	easy not required to warry");
	}
	}

```
C:\> javac Fresher.java  //valid

D:\> javac Company.java   // cannot find symbol

                                        Symbol:Class Fresher

                                        Location: class Company

D:\> javac –cp c:Company.java  //valid

D:\javac Company   //R.E.  NoClassDefoundError:Fresher

D:\ java-cp c:Company   //R.E.  NoClassDefoundError:Company

D:\java-cp D:;C: Company D:\java-cp;C:Company

  o/p= I wan't Job

       Getting Job is very eassy   not required to warry

E:\java-cp D:;C: Company
```

Example 3)

C:	D:	E:

Package pack1.pack2;
Public class Ram
{
  public void m1()
  {
 	
System.out.println("Hell
o");
  }
}
	Package pack3.pack4;
	Import pack1.pack2.
	Ram
	pblic class Sham
	{
	  Public void m1()
	  {
	 Ram r=new Ram();
	  r.m1();
	System.out.println("Hiiii
	i");
	  }
	}
		Package pack3.pack.Sham;
		Public class Desha
		{
		  Public static void main(-)
		  {
		 Sham s=new Sham();
		  s.m1();
		System.out.println("Weldon
		e");
		  }
		}

```
C:\> java –d.Ram  //valid

D:\> java-d.Sham.java  //C.E.=cannot find symbol

                                    Symbol:class Ram

                                    Location:class Sham

D:\>java-cp c:  -d.Sham.java   //valid

E:\>javac Desha.java   // C.E.= cannot find symbol

                                    Symbol:class Sham

                                    Location:class Desha

E:\>javac-cp D:Desha.java

E:\>java Desha     //R.E.=NoClassDefoundError:Sham

E:\>java-cp D:Desha    //R.E.=NoClassDefoundError:Desha

E:\>java-cp ;D:Desha    //R.E.=NoClassDefoundError:Ram

E:\>java-cp E: ;D:;C:;Desha
```

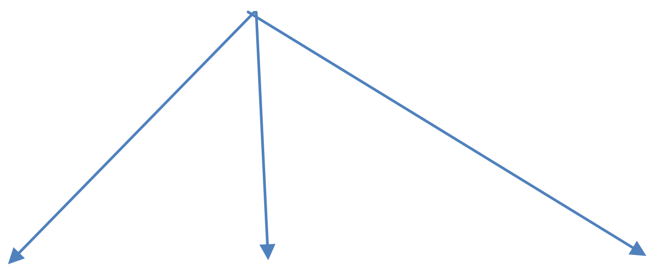
Notes :-

1)Compiler will check only one level dependency where as JVM will check all Levels of dependency

2) If any folder structure created because Of package statement it should be resolved Through import statement only & Base package Location we have to update in classpath

3) Within the classpath the order of location is very impotance for the required .class file ,JVM will always search the location.

Left→ Right in classpath. Once JVM finds the required.file then the rest of the classpath wan't to be searched.



C: D: E:

class Priya
 {
  Public static void main(-)
  {
System.out.println("C:Priya");
}
}
	class Priya
	 {
	  Public static void main(-)
	  {
	System.out.println("D:Priya");
	}
	}
		class Priya
		 {
		  Public static void main(-)
		  {
		System.out.println("E:Priya");
		}
		}

```
C:\> javac Priya.java   //valid

D:\> javac Priya.java    //valid

E:\> javac Priya.java    //valid

C:\> java Priya   //valid
```

Output: c:Priya

```
D:\>java-cp C:;D:;E: Priya

          o/p= C:Priya

D:\>java-cp E:;D:;C: Priya

          o/p= E:Priya

D:\>java-cp D:;E:;C: Priya

          o/p= D:Priya
```

JAR File

- If several dependent files are available then it is never recommanded to set each class file individually in the classpath we have to group all those. Class file into a single I/P file and we have to make that Zip file available in the class path.This zip file is nothing but JAR file.

  Example:

To denelope a servlet all required .class file are available in Servlet-api.jar.We have to make this Jar file available in the classpath then only servlet will be compiled.

➢ jar vs war vs ear

1) **jar : (java archive file)**
   It contains a group of .class files
2) **war : (web archive file)**

it represent a web application which may contain servlets,JSPS,HTML,CSS.JavaScript,etc…….

3) **ear : (enterprise archive file)**
   It represent an enterprise application which may conatins Servlets,JSPS,EJBS,JNS Components etc.

- **Various commands**
  1) **To create a jar file:**
     jar – cvf durga.jar A.class B.class c.class *.class
  2) **To extract a jar File:**
     jar- xvf durga.jar
  3) **To display of contains of a jar file:**
     Jar-tvf durga.jar

  Example:

```
public class Durga
  {
     public static int add(int x,int y)
      {
        return  x*y;
     }
          public static int add(int x,int y)
      {
        return  2* x*y;
     }

}
```

```
c:\>javac Durga.java
c:\> jar – cvf Durga.jar durga.class

class Desha
{
    public static void main(String args[])
    {
      System.out.println(“durga.add(10,20)”);
      System.out.println(“durga.multipy(10,20)”);
    }
a}
D:\> javac Desha.java     //invalid
D:\>javac –cp c:Desha.java   //invalid
D:\>  javac –cp c:\Desha.java    //valid
D:\> javac –cp;c:\ Desha.java

O/P: 2000 &400
```

Note:
Whenever we are placing a jar file in the classpath compulsory name of the jar file we should include,just Location is not enough.

➢ **Short Cut way to place jar file:-**

- If we are placing the jar file in the following location then it is not required to set classpath explicitly bydefault it is available to JVM & Java compiler.

$$\begin{tikzcd}
\text{JDK} \arrow[d] \\
\text{JRE} \arrow[d] \\
\text{LIB} \arrow[d] \\
\text{ext} \arrow[d] \\
\textbf{*.jar}
\end{tikzcd}$$

System Properties

- For every system persistence information will be maintain in the form of system properties .These may include os name varchual machine version,user country..etc
- We can get System properties by using getProperties () method of System class

Example:

Demo program to print an System Properties

```
import java.util.*;
    class Test
     {
      public static void main(String args[])
       {
          Properties p=System.getProperties();
           p.list(System.out);
       }
}
```

- We can set System Property from the command prompt by using option

Que) JDK vs JRE vs JVM

- **JDK(Java Development Kit):-**

To develop & run java application the required environment provided by JDK.

- **JRE(Java Runtime Environment):-**

To run java application the required environment provided by JRE.

- **JDK(Java Virtual Machine):-**
  The machine is responsible to execute java program.

JDK=JRE+TOOLS
JRE=JVM+Libraries

Note:
On client machine we have to install JRE,where as on the developess machine to install JDK.

Difference Between Path And Classpath

- **Classpath**
- We can use classpath to describe the location where required.class files are available.
- If we are not setting the classpath then our program wan't be run.

- **Path**
  - we can use path variable to describe the location where reguired binary executable are available .
  - if we are not setting path variable then java & javac commands wan't work.
  - If m1() return type is void,then we will get compiletimeError saying"void type not allowed here"

4) Various Runtime Flags

1) –ea: To enable assertions in every non-System class.
2) –enableassertions:- It is Exactly same as -ea
3) –da :- To disable assertion in every non-system class.
4) –disableassertions:- same as –da.
5) –esa:- To enabled assertions in every system class.
6) –enabledSystemassertions:- it is exactly same as –esa.
7) –dsa:- To disable assertions in nevery System class.
8) –disableSystemassertions:- it is same as –dsa.

Example:-1)

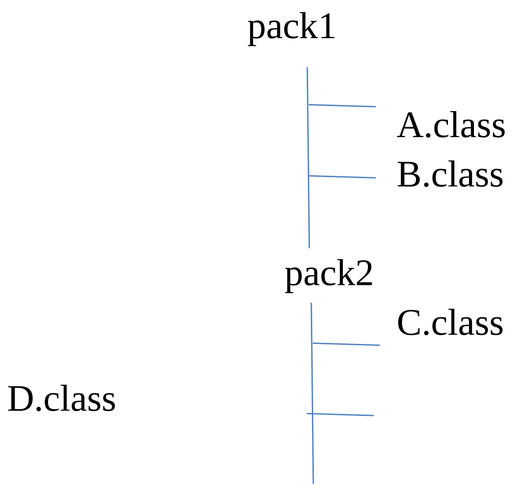
```
java –ea –esa –da –esa –ea –dsa
```

we can use these flag in together & all these flags executed from Left To Right

Example:-2)

1)java –ea:pack1.A
2)java –ea:pack1.B -ea:pack1 pack2.D
3) java –ea -da packB

Example:-3)



- TO anable assertion in only A class
  1) Java -ea:pack1.A
- TO anable assertion in both B & D class
  2) Java -ea:pack1.B -ea:pack1:pack2.D
- TO anable assertion in every non-System class except B
  3) Java -ea:pack1. –da:pack1.B
- TO anable assertion in every class of pack1 & its sub except sub packages
  4) Java -ea:pack1.
- TO anable assertion in every where with in pack1 except pack2
  5) Java -ea:pack1. –da:pack1,pack2

6) Appropriate & Inappopriate use of asserting

1) It is always Inappropriate to mix progamimg logic with assert statement because there is no execution of assert statement at runtime.
   Example:

Withdraw(int x)	Withdraw(int x)
{	{
If(x<100)	assert(x<100)
{	} //unproperway
Throw new IAE();	
}	
} //proper way	