Day 4

Path and Classpath

```
- Path is Operating System's platforms environment variable that is used
to locate java language tools.
- export PATH=/usr/bin/
- Classpath is Java platforms environment variable that is used to locate
.class file(s).
- If .class files are exist at different location then we need to set
classpath.
- export CLASSPATH=./bin/;
- By default classpath is set to current directoy.
    javac -d ./bin/ ./src/Complex.java;
    export CLASSPATH=./bin/
    javac -d ./bin/ ./src/Program.java;
    java Program
```

Package

```
- It is a java language feature that is used:
    1. To group/organize functionally equivalent/related types together.
    2. To avoid name clashing/collision/ambiguity.
- package is keyword in java.
- If we want to add any type inside package then it is mandatory to
include package delcaration statement inside .java file.
- Package declaration statement must be first statement in .java file.
```

```
package p1; //It must be first Statement
class Complex
{    }
```

```
package p1; //OK
package p2; //Not OK
class Complex
{    }
```

```
- Package name is physically mapped with folder.
- If we define any class/type inside package then it is called packaged
type otherwise unpackaged type.
```

Package can contain following types

```
    - Sub Package
    - Interface
    - Class
    - Enum
    - Error
    - Exception
    - Annotation Type
    - If we want to access any type outside package then we should use either
    F.Q.Typename or import statement.
    - Defualt access modifier of any type is always package level private
```

```
package p1;
??? class Complex   ///???-> package level private
{   }
```

```
    - To access type outside package, access modifier of the type most be
    public.
    - Access modifier of type can be either package level private or public
    only.
    - According to Java Language Specification( JLS ), name of public
    class/type and name of .java file must be same.
    - .java file can contain only one public class but it can contain multiple
    non public classes.
```

Can we write multiple public classes in single .java file? why?

```
    - We can use packaged class/type inside unpackaged type.
    - If we define any type without package then it is considered as member of
    default package. Since we can not import default package, we can not
    access unpackaged type inside packaged type.
    - Convention for package name
        * "com.company_name.project_name"
        * com.mysql.jdbc
        * org.sunbeam.dbda
        * org.sunbeam.dmc
    - Math is a final class declared in java.lang package. All the members of
    Math class are static.
    - java.lang package contains fundamental classes of core java. This is
    package is by default imported in every .java file.
```

> – If we want to access static members without classname then we should use
> static import.

```java
//import static java.lang.Math.*;
import static java.lang.System.out;
import static java.lang.Math.PI;
import static java.lang.Math.pow;
class Program
{
    public static void main(String[] args)
    {
        float radius = 10.0f;
        float area = ( float )( PI * pow(radius, 2) );
        out.println("Area      :    "+area);
    }
}
```

Eclipse Demo

Array

> – It is linear data structure / collection in which we can store elements
> of same type in continous memory location.
> – To access elements of array we should use index/subscript operator([])
> and integer index.
> – Array index always begins with zero.
> – Checking array bounds i.e min/max index is a job of JVM in java.
> – In java, array is non primitive type i.e. reference type. In other word
> to create instance of array it is mandatory to use new operator.
> – If we want to process elements of array then we should use methods
> declared in java.util.Arrays class.
> – There are three types of array in java
>   1. Single dimensional array
>   2. Multidimensional array
>   3. Ragged array
> – There are four types of loop in java
>   1. do–while
>   2. while
>   3. for
>   4. foreach loop / iterator

Single dimensional Array

```java
//int arr[ ]  = new int[ 3 ];       //OK
    int[] arr  = new int[ 3 ];       //OK
```

— using illegal index, if we try to access elements of array then JVM
throws ArrayIndexOutOfBoundsException.

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Multi dimensional Array

— Array of array which contain array of same length is called
multidimensional array.