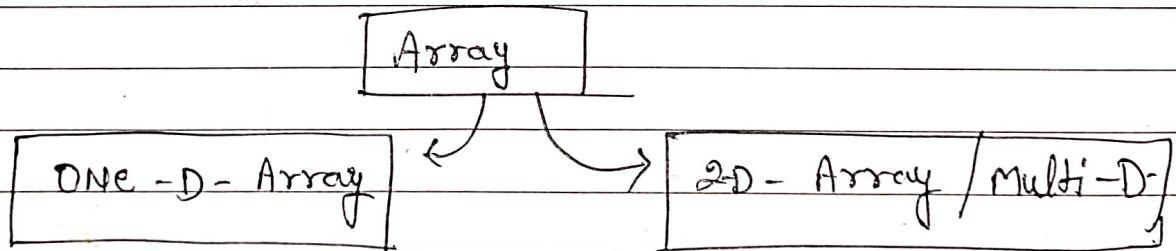


Array :- An Array is a group of Variable of Similar datatype that Share Common Name and store in Continuous Memory location. The size of array refer how many element an array can hold.

We Can Identify an array element by using array Name and its Index No. First element index No is 0 and last index No is less than one of the size of the array.

An Array is a fixed datatype but its take memory at runtime.

In a Simple Words We Can Say that an array is used to store Multiple Values under Single Name.

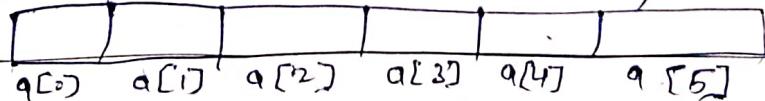


ONE - D - Array :- An Array that has One Subscript is known as One - D - Array.

`int a [] = new int [6];`

or

`int a [] = new int [6];`



Valid / Invalid Array Declaration.

`int a[] = new int[];` X

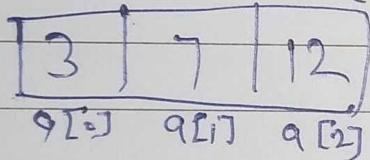
`int a[10] = new int[];` X

`int a[10] = new int[10];` X

`int a[] = new int[10];` ✓

`int p = 10;`  
`int q[] = new int[p];` ✓

`int q[] = {3, 7, 12};`



WAP that read 50 No. from user and display bigger No.

import java.util.\*;

class A

{  
public static void main (String []); (String [])

{  
Scanner ob = new Scanner (System.in);

int a[] = new int [50];

int i;

SOPL ("Enter 50 No.");

for (i=0; i<50; i++)

{

a[i] = ob.nextInt();

}

int max = a[0];

for (i=1; i<50; i++)

{

if (a[i] > max)

max = a[i];

}

SOPL ("Bigger No = " + max);

{  
}

Java

```
int n;  
n = ob.nextInt();  
int a[] = new int[n];
```

C Language

```
int n;  
scanf("%d", &n);  
int a[n]; - CR Error
```

length - `gt` is a property of an array. `gt` returns length of an array.

```
int a[] = { 7, 8, 15, 16, 25 };
```

```
int b = a.length;
```

```
SOPL(b); → 5
```

```
SOPL(a[0]); → 7
```

```
SOPL(a[5]); ↴
```

Array Index Out Of Bounds Exception is occurred

To Traverse

```
for (int b:a)  
SOPL(b);
```

or

```
for (i=0; i<a.length; i++)  
SOPL(a[i]);
```

WAP that read N elements in an array and display bigger no.

```
import java.util.*;  

class T  

{  

    public static void main(String k[])
    {
```

Scanner ob = new Scanner (System.in);

int n;

SOPL ("Enter size of array");

n = ob.nextInt();

int a[] = new int[n];

int i, max;

SOPL ("enter value");

for (i=0; i<n; i++)
 {

a[i] = ob.nextInt();

max = a[0];

for (i=1; i<n; i++)
 {

if (a[i] > max)

max = a[i];
 }

SOPL ("Bigger No = " + max);

}

2-D Array :- An Array that has 2 subscript is known as 2-D Array.

They store data in the form form of matrix or table where first subscript represent row and second Represent Column.

int a[ ][ ] = new int [3][4];

or

int [][]a = new int [3][4];  
0 1 2 3

0

1

2

|         |         |         |         |
|---------|---------|---------|---------|
| a[0][0] | a[0][1] | a[0][2] | a[0][3] |
| a[1][0] | a[1][1] | a[1][2] | a[1][3] |
| a[2][0] | a[2][1] | a[2][2] | a[2][3] |

Valid / invalid 2-D Array Declaration.

int a[ ][ ] = new int [ ] [ ]; X

✓ int a[] [ ] = new int [2] [3]; ✓

int a [ ] [ ] = new int [ ] [3]; X

int a[ ][ ] = new int [2] [ ]; ✓

Note :- In java each Row have No of equal or unequal Column.

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

↓  
Each Row has 4 Column.

`int a [ ] [ ] = new int [3] [ ];`

q[0] = newint[3];

`a[1] = new int[2];`

`a[2] = new int[4];`

$a[0][0]$     $a[0][1]$     $a[0][2]$   
 $a[i][j]$     $a[i][j]$   
 $a[2][0]$     $a[2][1]$     $a[2][2]$     $a[2][3]$

(++)(?)

WAP that read element in  $r \times c$  matrix and display matrix form.

Scanner ob = new Scanner (System.in);

int r, c;

SopL ("Enter No of row & column");

r = ob.nextInt();

c = ob.nextInt();

int a[][] = new int [r][c];

int i, j;

SopL ("Enter values");

for (i=0; i<r; i++)

{

for (j=0; j<c; j++)

{

a[i][j] = ob.nextInt(); }

~~SopL ("matrix form = "); }~~

for (i=0; i<r; i++)

{

for (j=0; j<c; j++)

{

```

System.out.print(a[i][j]);
}
sopL(); (i=0; i<3; i++)
{
    {
        (j=0; j<3; j++)
    }
}
    }{.sopL();
}
    
```

WAP that read elements in  $3 \times 3$  array and display L shape.

|      |      |            |
|------|------|------------|
| 0, 0 | 0, 1 | 0, 2 (" ") |
| 1, 0 | 1, 1 | 1, 2       |
| 2, 0 | 2, 1 | 2, 2       |

; ( ) 2002 22/2

O/P

0, 0

1, 0

2, 0 2, 1 , 2, 2

(s=j || s=i || n=i) fi  $\rightarrow$  equal 0

Scanner ob = new Scanner (System.in);

(s=3 || n=i || o=i) fi  $\rightarrow$  " " 0

int a[][] = new int [3] [3];

int (i,j; i<3; i++) fi  $\rightarrow$  T

sopL (" Enter values");

for (i=0; i<3; i++) fi  $\rightarrow$  length + height of 3x3

{ (s=(i+1)) fi  $\rightarrow$  +1 at i+1(j)?

for (j=0; j<3; j++)

{ (s=j+i) fi  $\rightarrow$  X

a[i][j] = ob.nextInt();

SOPL ("L shape =");

for ( $i=0$ ;  $i<3$ ;  $i++$ )

{  
    for ( $j=0$ ;  $j<3$ ;  $j++$ )

}

    if ( $j==0 \text{ || } i==2$ )

        SOP ( $a[i][j]$ );

    else

        SOP (" ");

}

    else SOPL();

}

U shape :- if ( $j==0 \text{ || } j==2 \text{ || } i==2$ )

C " :- if ( $i==0 \text{ || } j==0 \text{ || } i==2$ )

T " :- if ( $i==0 \text{ || } j==1$ )

Left to Right diagonal :- if ( $i==j$ )

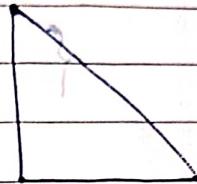
Right to left :- if ( $(j+i)==2$ )

X :- if ( $i==1 \text{ || } (i+j)==2$ )

Lower Right Triangle if ( $i > j$ )

(++i <= j)  $\Rightarrow$

Upper Right Triangle if ( $i > j$ )



WAP that display transpose matrix  
into ("r\*c matrix")

Scanner ob = new Scanner (System.in);

int r,c;

SopL ("Enter Row & Column Size");

r = ob.nextInt();

c = ob.nextInt();

int a[][] = new int[r][c];

int b[][] = new int[r][c];

SopL ("Enter Value");

for (i=0; i<r; i++)

{

for (j=0; j<c; j++)

{

a[i][j] = ob.nextInt();

}

for ( $i = 0; i < c; i++$ ) { print digit  $\rightarrow$  row };

{ for ( $j = 0; j < r; j++$ ) {

{ ( $i - j$ )  $\rightarrow$  column digit  $\rightarrow$  col }

$$b[i][j] = a[j][i];$$

xition backward polypih test  $\rightarrow$  1003

SopL ("Transpose = "); what

for ( $i = 0; i < c; i++$ ) { do row };

{ for ( $j = 0; j < r; j++$ ) {

{ ( $i$ )  $\rightarrow$  row do  $\rightarrow$  col }

System.out.print( $b[i][j]$ );

{ } } }  $\rightarrow$  answer = [ ] [ ]  $\rightarrow$  tri

SopL (); answer = [ ] [ ]  $\rightarrow$  tri

{ } } }  $\rightarrow$  what want  $\rightarrow$  1002

( $i + j$   $\rightarrow$   $i = j$ )  $\rightarrow$  if

( $i + j$   $\rightarrow$   $i = j$ )  $\rightarrow$  if

{ }  $\rightarrow$  what want  $\rightarrow$  1002

WAP that Read N elements in an array and Count even and odd values.

```
import java.util.*; // import package
class A { // class declaration
    }
```

```
public static void main (String k[])
{
    }
```

```
int a [100];
```

```
int i, e=0, od=0;
```

```
Scanner ob = new Scanner (System.in);
```

```
SOP ( " Enter any value in Array ");
```

~~a = ob~~

```
for (i=0; i<n; i++)
```

```
{
```

```
a[i] = ob.nextInt();
```

```
}
```

```
if (a[i] % 2 == 0)
```

```
{
```

```
e++;
```

```
else
```

```
od++;
```

```
}
```

```
SOP (" Even No = " + e);
```

```
SOP (" Odd No = " + od);
```

```
} }
```

WAP that swap first half with second half.

if Array Contain  $\boxed{1 \ 2 \ 3 \ 4 \ 5}$

$\boxed{4 \ 5 \ 3 \ 1 \ 2}$

if Array Contain  $\boxed{1 \ 2 \ 3 \ 4 \ 5 \ 6}$

$\boxed{4 \ 5 \ 6 \ 1 \ 2 \ 3}$

import java.util.\*;

class A

{

public static void main (String k [] )

{

int n;

~~Scanner~~ Scanner ob = new Scanner (System.in);

System.out.println ("Enter Array size");

n = ob.nextInt();

int a [] = new int [n];

System.out.println ("Enter Values");

for (i=0; i<n; i++)

a [i] = ob.nextInt();

int p;

if (n%2 == 0)

else

$$p = (n/2) + 1;$$

for ( $i=0$ ;  $i < n/2$ ;  $i++$ )

{

$$t = a[i];$$

$$a[i] = a[p];$$

$$a[p] = t;$$

$p++$ ;

}

SopL ("New Array = ");

for ( $i=0$ ;  $i < n$ ;  $i++$ )

SopL (  $a[i]$  );

}