Array

- it is collection of similar data types
- it quccupies contigous memory

```
int arr[] = {5,10,15,20,25}; //init with fixed values
```

- above line will create an array and init with 5, 10, 15, 20 values.
- how to access the element => arr[0] => 1st element arr[1] => 2nd element

```
System.out.println(arr[0]); // 5
```

- now to modify the elements

```
arr[1] = 8 ; // this line will modify the value inside 2nd element
```

- array index is always starts from 0.

How to init array with dyanamic size or at run time

```
int arr[] = new int[5] ; // init array for 5 integers
```

- above code will init array for 5 element with 0 value.

```
int size = 5; // we can take input from user as well
int arr[] = new int[size];
```

how to access element of array

```
int arr[] = {5,10,15,20,25};
for(int i =0 ; i < 5 ; i ++){
    System.out.println(arr[i]);
}
```

how dynamic array

```
//int arr[] = {5,10,15,20,25};
int size = 5;
int arr[] = new int[size] ;
for(int i =0 ; i < size ; i ++){
    System.out.println(arr[i]);  // 0 0 0 0 0 all default values
}
```

```
int size = 5;
int arr[] = new int[size] ;


// init array with i++ values =>
for(int i =0 ; i < size ; i ++){
    arr[i]  = i;
}

for(int i =0 ; i < size ; i ++){
    System.out.println(arr[i]);
}

/*
//output
0
1
2
3
4

*/
```

*array size:

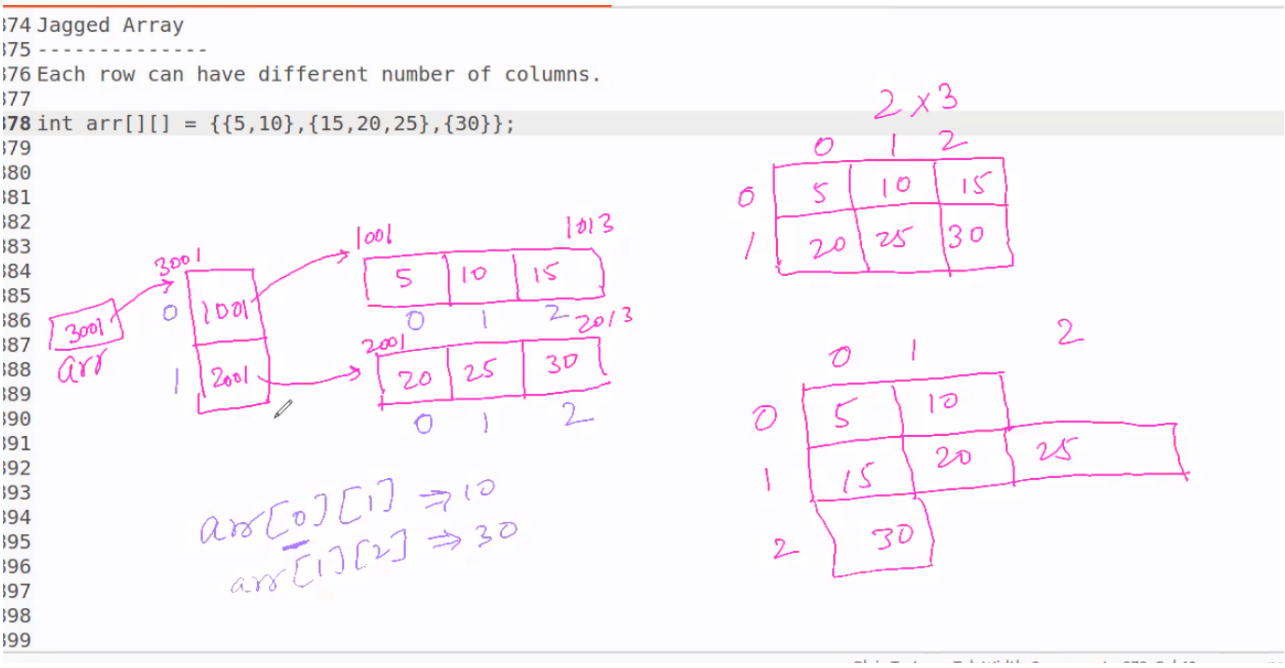
```
int arr[] = { 1,2,3,44,4};
int size = arr.length;  // it will give size of array 5
```

2D ARRAY

```
//2d array => array of array
int arr[][]  = { {1,2,3} , {4,5,6} , {7,8,9} };
```

```
int arr[][]  = { {1,2,3} , {4,5,6} , {7,8,9} };

for(int i = 0 ; i <3 ; i++){
    for(int j =0; j < 3 ; j++){
        System.out.print(arr[i][j]);
    }
    System.out.println();
}
// output
123
456
789
```

- below image is internal representation :



```
Jagged Array
--------------
Each row can have different number of columns.

int arr[][] = {{5,10},{15,20,25},{30}};
```

- static allocation => decided at compile time (but all memory is allocated at run time)
- dynamic allocation => decided at run time
- its basically we are giving instructions to JVM in which way to initialize the array
- if size is not known at compile timr

```
int row = 3;
int col = 3;

int arr[][] = new int[row][col];

for(int i = 0 ; i <row ; i++){
    for(int j =0; j < col ; j++){
       arr[i][j] = j ;
    }
}

for(int i = 0 ; i <row ; i++){
    for(int j =0; j < col ; j++){
        System.out.print(arr[i][j]);
    }
    System.out.println();
}

//output
012
012
012
```

- we can try with different row size and col size
-

```
int row = 4;
int col = 3;
```

- in this case 4 rows and 3 colunm will be there in array

Jagged Array

- no of col per row will different
- like this

```
int arr[][] = { {1, 2},
                {12, 24, 36},
                {50} };
```

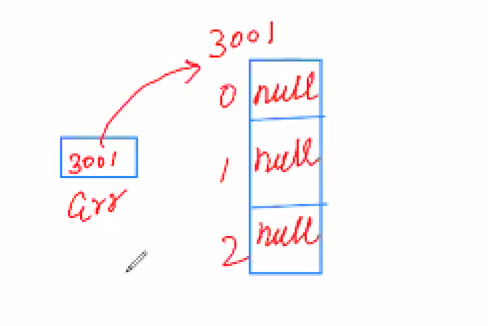
- how to find out its size

```


arr[0].length ; // 2
arr[1].length ; // 3
arr[2].length ; // 1
```

```
int arr[][] = { {1, 2},
                        {12, 24, 36},
                        {50}
                        };

        for( int i =0 ; i < 3 ; i++){
            for(int j =0 ;j < arr[i].length ; j++) // here size of col is variable so we take length of each col
            {
                System.out.print(arr[i][j] + " ");
            }
            System.out.println();
        }

// output:
1 2
12 24 36
50
```

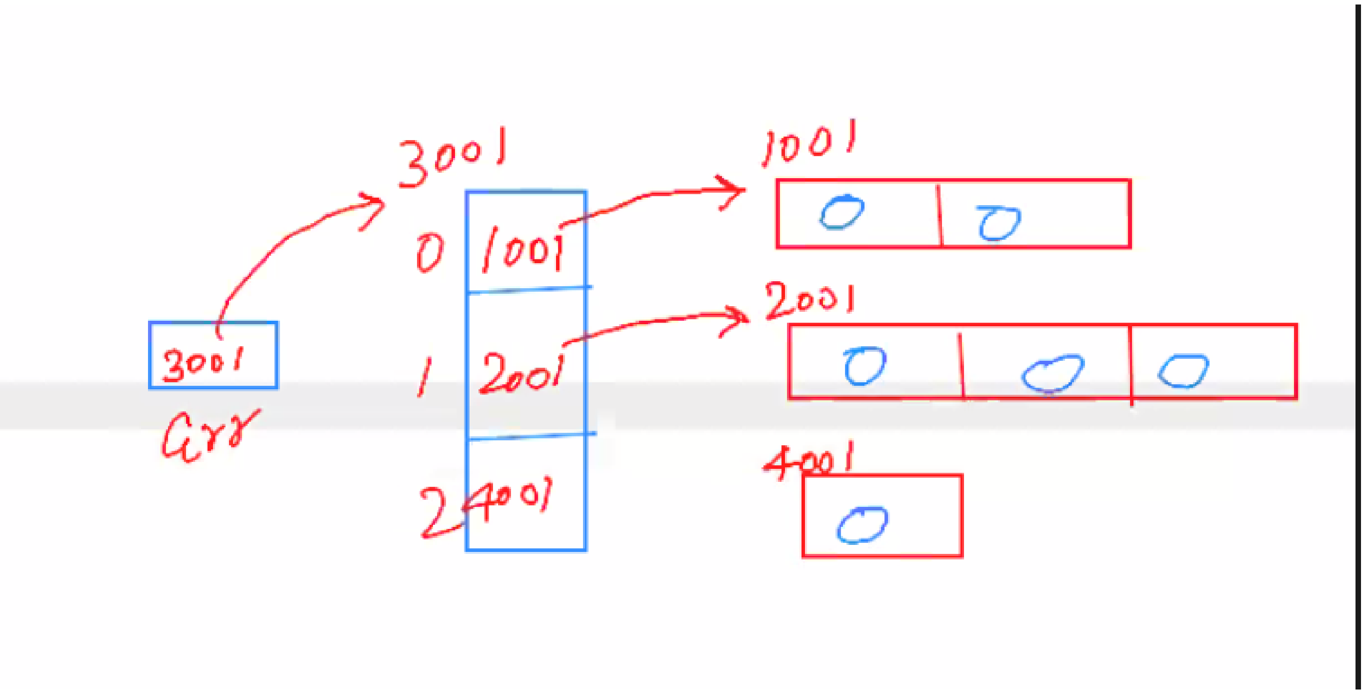
how to make it dyanamic

```
int row = 3;
int col ; // varraies

int arr[][] = new int[row][];
```



- now create dyanamic array for col

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



```
int arr[][] = new int[row][]; // init rows
     arr[0] = new int[2];     // init cols with default values
     arr[1] = new int[3];
     arr[2] = new int[1];
for(int i = 0 ; i <row ; i++){
    for(int j =0; j < arr[i].length ; j++){
        System.out.print(arr[i][j] + " ");
    }
    System.out.println();
}

// output
0 0
0 0 0
0
```

```
int row = 3;
int col ; // varraies

int arr[][] = new int[row][];
     arr[0] = new int[2];
     arr[1] = new int[3];
     arr[2] = new int[1];

     for(int i = 0 ; i <row ; i++)
     {
    for(int j =0; j < arr[i].length ; j++)
    {
       arr[i][j] = j + 1 ;  // putting values in each row
    }
}
for(int i = 0 ; i <row ; i++){
    for(int j =0; j < arr[i].length ; j++){
        System.out.print(arr[i][j] + " ");
    }
    System.out.println();
}

// out put
1 2
1 2 3
1
```

but we didn't take user input for col values