

# Arrays in Java

Selvamani Kannan



# Agenda

- Recap recursion, Divide and Conquer
- Primitive data types
- Arrays
  - Need for an array and examples
  - 1D, 2D
  - Implementation
- Problem solving

# Recap

- Recursion Recall
  - recursion
  - Base case
  - Recursion tree
  - Stack space
- Divide and conquer

# Primitive data types

#	Data types	Size
1	int	32 bit
2	float	32 bit
3	char	16 bit
4	double	64 bit
5	byte	8 bit
6	short	16 bit
7	boolean	1 bit
8	long	64 bit

# Arrays

# Array

- `Int a = 1`
- `int b = 2`
- `int c = 3`
- `int d = 4`



# Array

- Finite length
  - All elements are of same type
  - Index based (0 as starting index)
  - Cannot increase
- 
- Declaration
  - Instantiation
  - Initialization

## Arrays - Heap memory

```
int arr[] = new int[4];
```

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

```
arr[0] = 10;
```

```
arr[1] = 20;
```

```
arr[2] = 30;
```

```
arr[3] = 40;
```

```
arr[4] = 50; // Error
```

```
int nums[] = {11,21,31,41};
```

0	1	2	3
10	20	30	40

101

Heap Memory	
variable	Address
arr	101



## 2D array

```
int a[] = {2,4,6,8};
```

```
int b[] = {1,3,5,7};
```

```
int c[] = {9,1,2,3};
```

```
int arr[][] = {a,b,c};
```

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

	0	1	2	3
0	2	4	6	8
1	1	3	5	7
2	9	1	2	3

- Jagged array

## Printing array

```
int arr[] = {2,4,6,8};
```

- ```
for(int i=0;i<arr.length;i++){  
    System.out.println(arr[i]);  
}
```
- ```
for(int k: arr){  
    System.out.println(k);  
}
```

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

- ```
for(int i=0;i<arr.length;i++){  
    for(int j=0;j<arr[i].length;j++){  
        System.out.println(arr[i][j]);  
    }  
}
```
- ```
for(int k[]: arr){  
    for(int i:k){  
        System.out.println(i);  
    }  
}
```

# Complexity

Operation	Complexity
Insert, Delete	Need to create an new array and copy $O(n)$
Access, Update,	Using index, directly access or set value $O(1)$
Size	Fixed
Memory allocation	Contiguous

# Questions

# Problems

## Reverse an array

Reverse the given array

Sample Input and Output:

1. Input: {1,2,3,4,5}  
Output: {5,4,3,2,1}
2. Input: {10,51,93,77,61}  
Output: {61,77,93,51,10}
3. Input: {'N', 'e', 'w', 't', 'o', 'n', ' ', 'S', 'c', 'h', 'o', 'o', 'l'}  
Output: {'l', 'o', 'o', 'h', 'c', 'S', ' ', 'n', 'o', 't', 'w', 'e', 'N'}

Thank you!!!