Hashmap

3 → frequency map

→ Max freq element

Question 4

str1 = abcddcba

a - 2
b - 2
d - 2
c - 2

good string — true

str2 = abcddca

a = 2
b = 1
c = 2
d = 2

not a good string — false

Sol) string = abcdabcd

hm (keys = value)
a = 2
b = 2
c = 2
d = 2

int val = hm.get(str.charAt(0))

val = 2

```java
public static void main(String[] args) {
    Scanner scn = new Scanner(System.in);
    String str= scn.nextLine();
    HashMap<Character,Integer> hm = new HashMap<>();
    for(int i=0;i<str.length();i++){
        char ch = str.charAt(i);
        if(hm.containsKey(ch)){
            hm.put(ch,hm.get(ch)+1);
        }else{
            hm.put(ch,1);
        }
    }
    int val = hm.get(str.charAt(0)); // 2
    for(int freq :hm.values()){ // runs for each loop over values
        if(val !=freq){
            System.out.println("false");
            return;
        }
    }

    // for(char c :hm.keySet()){// runs for each loop over keys
    //     System.out.println(c+"-"+hm.get(c));
    // }

    System.out.println("true");
    /* Enter your code here. Read input from STDIN. Print output to STDOUT. Your cla
}
```

hm: a = 2, b = 2, c = 1

freq: 2 | 2 | 1

≠ false

freq = 1

1 != 2

O(n)

O(1)

(abcde)

spaceComplexity = O(n)

TC = O(n) × O(1)
= O(n)

a = 1
b = 1
c = 1
d = 1
e = 1

hm = O(n)

2-D array

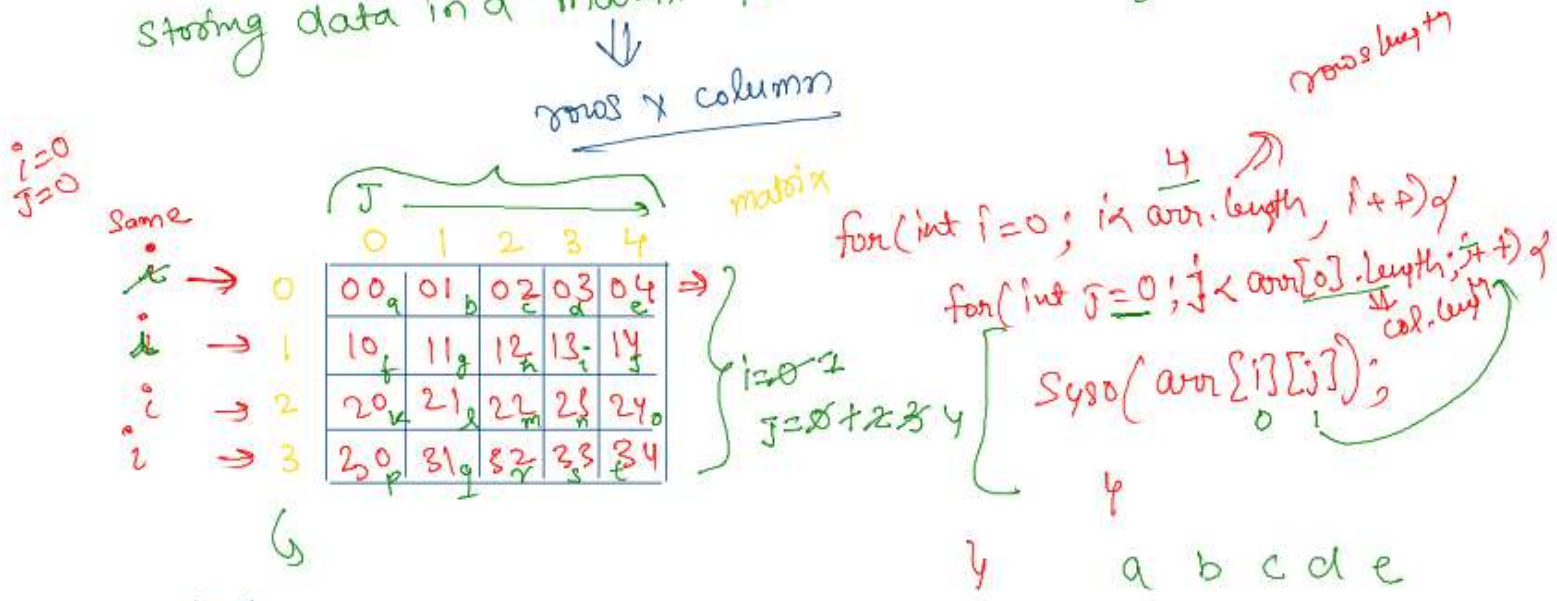
Patterns

1-D Array

storing data in a matrix format = 2D array

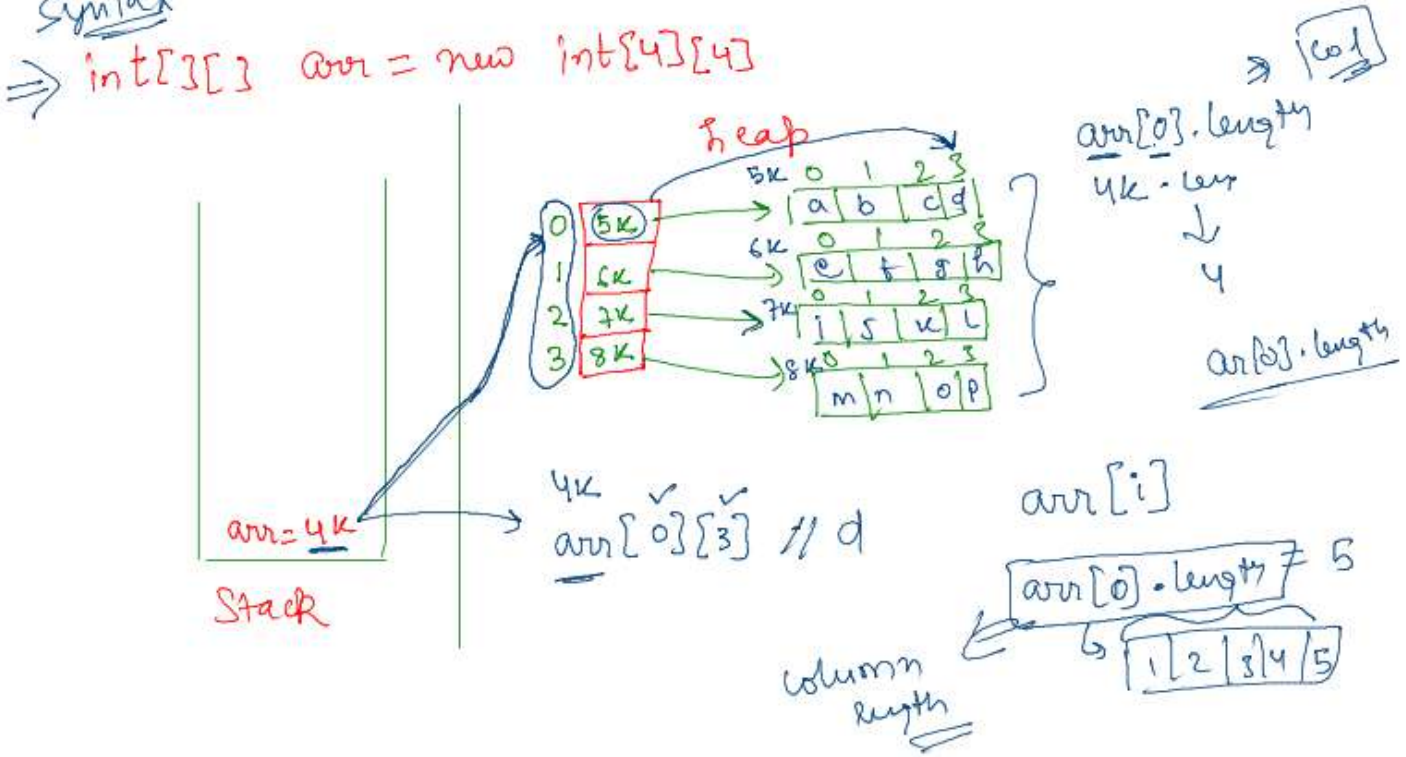
⇓

rows x column



Syntax

⇒ int[][] arr = new int[4][4]



TC = row.length * col.length

(n*m)

for(i → row)

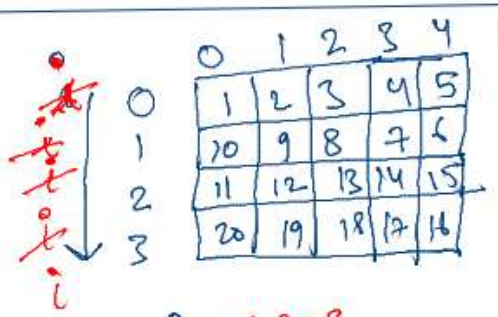
for(j → col)

arr[0].length

arr[i].length

```
public static void main(String[] args) {
    Scanner scn = new Scanner(System.in);
    int row = scn.nextInt();
    int col = scn.nextInt();

    int[][] arr = new int[row][col];
    for(int i=0;i<arr.length;i++){
        for(int j=0;j<arr[0].length;j++){
           arr[i][j]= scn.nextInt();
        }
    }

    for(int i=0;i<arr.length;i++){
        for(int j=0;j<arr[0].length;j++){
            System.out.print(arr[i][j]+" ");
        }
        System.out.println();
    }
    /* Enter your code here. Read input from STDIN. Pri
}
```

```
public static void main(String[] args) {
    Scanner scn = new Scanner(System.in);
    int row = scn.nextInt();
    int col = scn.nextInt();//6 arr[0].length ==6

    int[][] arr = new int[row][col];
    for(int i=0;i<arr.length;i++){
        for(int j=0;j<col;j++){
           arr[i][j]= scn.nextInt();
        }
    }

    for(int i=0;i<arr.length;i++){
        if(i%2==0){
            for(int j=0;j<col;j++){
                System.out.print(arr[i][j]+" ");
            }
            System.out.println();
        }
```



arr[0].length = 5

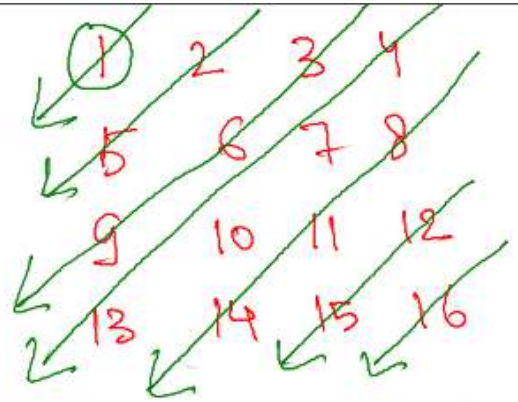
i = 0 1 2 3

1 2 3 4 5

11 12 13 14 15

Qus

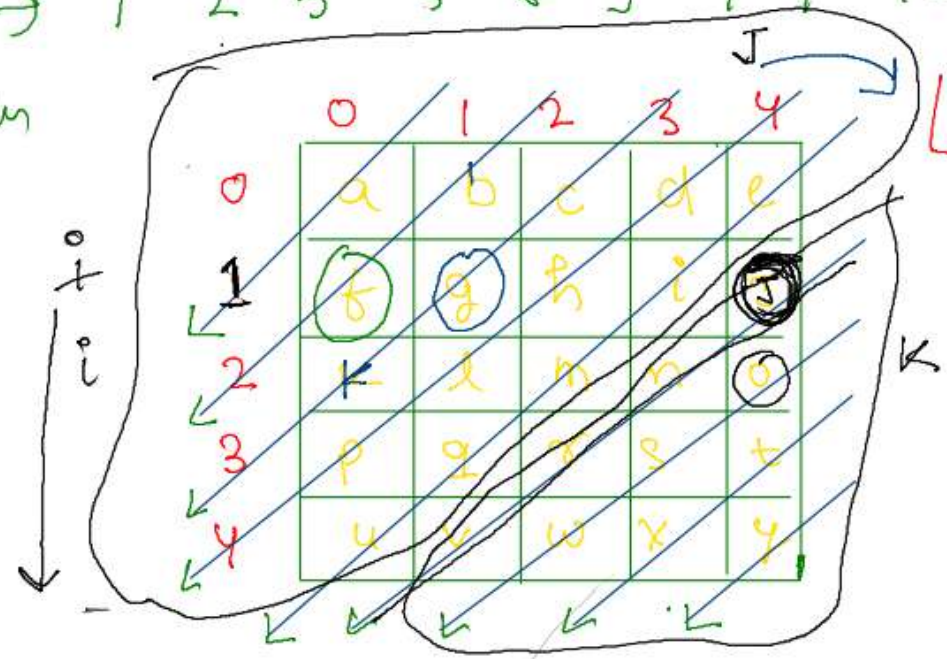
4*4



→ 1 2 5 3 6 9 4 7 10 13 8 11 14 12 15 16

take copy from top

i j
1 0



K=0 1 2 3

i=0

J=3

1, 4

k=1
i=k

a b f c g k

TC = $O(n^2)$

```
}
for(int k=0;k<n;k++){
    int i=0;
    int j=k;
    while(j>=0){
        System.out.print(arr[i][j]+" ");
        i++;
        j--;
    }
}
```

1 → Traversal

n*n

$= O(n^2)$

```
// for upper half triangle
  for(int k=0;k<n;k++){
      int i=0;
      int j=k;
      while(j>=0){
          System.out.print(arr[i][j]+" ");
          i++;
          j--;
      }
  }
  //lower half triangle
   for(int k=1;k<n;k++){
       int i = k;
       int j = arr.length-1;
       while(i<n){
           System.out.print(arr[i][j]+" ");
          i++;
          j--;
       }
   }

   /* Enter your code here. Read input from STDIN. Print ou
}
```