Arraylists

Issues with arrays

1) Fix size
2) Size needs to be known in advance

What's the fix to this problem ?

Arraylist

→ Dynamic size

→ No need to know size beforehand

Real world examples

→ Shopping list

→ Tabs in my browser

→ YouTube Playlist

Syntax

```
ArrayList<Integer> arr = new Arraylist<Integer>();
```

↳ this is the type of data

→ Cannot be a primitive type like int, double

→ Hence we use classes like Integer, Long, Double etc.

Operations

Insert element — arr.add(16)

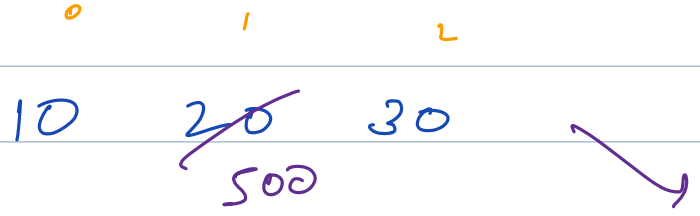
Get element at index i — arr.get(5)

Remove element at index i — arr.remove(2)

Update element at index i — arr.set(1, 33)

index ↓

new value



arr.set(1, 500)

arr[1] = 500

Take an arraylist as input

5 10 20 30 40 50

```
ArrayList<Integer> arr = new ArrayList<Integer>();
int n = scn.nextInt()
for(i=0;i<n;i++){
        int x = scn.nextInt()
        arr.add(x)
}
```

```
ArrayList<> arr = new ArrayList<>();
```

Q Given an arraylist, return an arraylist with multiples of 5 or 7

Eg [1, 5, 3, 0, 7]

ans → [5, 0, 7]

```
ArrayList<Integer> multiples(ArrayList<Integer> arr){
    ArrayList<Integer> ans = new ArrayList<Integer>();
    for(int i=0; i<arr.size(); i++){
        if(arr.get(i)%5==0 ||
           arr.get(i)%7==0){
            ans.add(arr.get(i))
        }
    }
    return ans
}
```

A = 9

B = 5

9 18 27 36 45

Q Given 2 integers A & B, return first B multiples of A

Eg A = 2 2, 4, 6, 8
B = 4

```
ArrayList<Integer> firstB(int A, int B){
    ArrayList<Integer> arr = new Arraylist<Integer>();
    for(int i=1; i<=B; i++){
        arr.add(i*A)
    }
    return arr
}
```

mat = {{1,2,3,4},
{1,5}
{7,8,9,10,11,12}
}

2D arraylist

```
Arraylist<ArrayList<Integer>> mat = new
                    Arraylist<ArrayList<Integer>>();
```

Operations

Insert element

Get element at index i

Remove element at index i

Update element at index i

Q Print 2D arraylist line by line

[[1,4], [0], [10, -5, 1]]

1 4
0
10 -5 1

```
for(int i=0; i< list2d.size(); i++){
    for(int j=0; j< list2d.get(i).size(); j++){
        print(list2d.get(i).get(j) + "  ")
    }
    println()
}
```

Q. Given N, print the numeric staircase as arraylist

N = 3 arr = [[1], [1,2], [1,2,3]]

```
Arraylist<Arraylist<Integer>> list2d = new
                    Arraylist<Arraylist<Integer>>();

for(int i=1 ; i<=N; i++){
    Arraylist<Integer> arr = new Arraylist<Integer>();
    for(j=1 ; j<=i ; j++){
        arr.add(j)
    }
    list2d.add(arr)
}
```