Day 8: 2D Arrays

Agenda

- Quiz 3
- Stack v Heap Review
- Array Review
- 2D Arrays
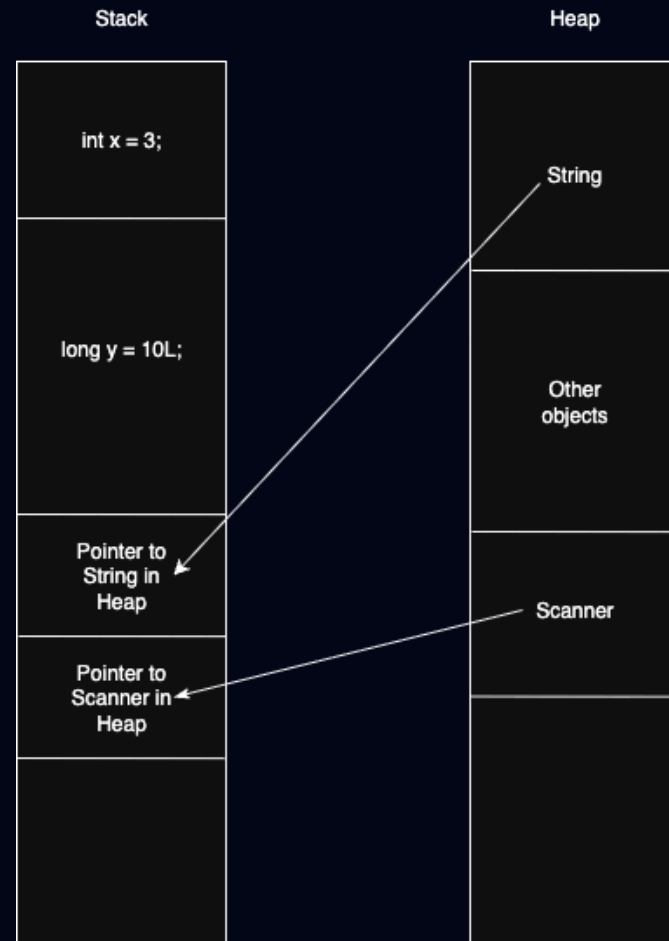- In class

Quiz 3

Stack v Heap Review

I wanted to review the Stack and the Heap as I felt that could've been explained better last week.

Array Review

Initializing Arrays

Reminder, in order to initialize an array, we must use the following syntax:

```
<type>[] <name> = new <type>[size];

<type>[] <name> = { <vals> };

For example

int[] arr = new int[10];

int[] arr = { 1, 2, 3, 4, 5 };
```

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Get/Set

With an array, we can only get and set values. We cannot add or remove values.

```
int[] arr = new int[10];

arr[0] = 1;

arr[1] = 3;

System.out.println(arr[0]); // 1
```

Length

We can use the `.length` property of arrays to get their length.

This is useful for iterating through an array.

```
int[] arr = new int[10];

arr.length; // gives 10
```

Iteration

```java
int[] arr = new int[10];

for(int i = 0; i < arr.length; i++)
{

  System.out.println(arr[i]);

}
```

```java
int[] arr = new int[10];

for(int val : arr) {

    System.out.println(val);

}
```

2D Array

What if we want an array with a row and a column?

We can use a 2D Array!

We set the number of rows and number of columns.

In the case to the right, there are 5 rows and 5 columns.

```
int[][] nums = new int[5][5];

nums[0][0] = 1;

System.out.println(nums[0][0]); //
1
```

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We can still only get and set values though!

```java
int[][] nums = new int[5][5];

nums[0][0] = 1;

System.out.println(nums[0][0]); // 1
```

What about iterating through it?

```java
int[][] nums = new int[5][5];

for(int i = 0; i < nums.length;
i++) {

  for(int j = 0; j < nums[i].length;
  j++) {

    System.out.print(nums[i][j] + "
    ");

  }

  System.out.println();

}
```

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Or alternatively:

```
int[][] nums = new int[5][5];

for(int[] rows : nums) {

  for(int col : rows) {

    System.out.print(col + " ");

  }

  System.out.println();

}
```

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Initializing with preset values

We can also initialize our 2D Array with pre-set values using the notation to the right.

```
int[][] nums = { { 1, 2, 3 }, { 4,
5, 6 } };
```

2D Array Practice