CS139 – For Each and Reference Arrays

Looping Over the Contents of an Array

- We often use a for loop to access each element in an array:

```java
for (int i = 0; i < names.length; i++) {
    System.out.println("Hello " + names[i]);
}
```

- If only there were a better way...

Enhanced For Loop (also called a *for each* loop)

- This loop does the same thing as the loop on the previous slide:

This variable will be assigned the elements from this array

```
for (String name : names) {
    System.out.println("Hello " + name);
}
```

- This code is shorter, easier to understand, less error-prone

When To Use an Enhanced For Loop

- <u>Always</u>
- Unless you can't:
  - Need to modify the array
  - Need to know the element index for some reason
  - Need to process the elements out of order
  - ...

Exercise #1

1) What will be printed by the following code?

2) Where is the style problem in this code?

```java
String[] summer = {"June", "July", "August"};

String letters = "";

for (String i : summer) {
   letters += i.charAt(0);
}

System.out.println(letters);
```

Exercise #1

1) What will be printed by the following code?

```
JJA
```

2) Where is the style problem in this code?

```
String[] summer = {"June", "July", "August"};

String letters = "";

for (String i : summer) {
   letters += i.charAt(0);
}

System.out.println(letters);
```

This is *not* an index variable, it requires a meaningful name (like “month”).

Exercise #2

- Complete the following method using an enhanced for loop (reminder: use .equals to compare strings.)

```java
/**
 * This method counts the number of times a target word occurs in
 * an array of words. Comparisons are case-sensitive.
 *
 * @param words  - The array to search
 * @param target - The word to search for
 * @return The word count
 */
public static int countWord(String[] words, String target) {






}
```

Exercise #2

- Complete the following method using an enhanced for loop:

```
/**
 * This method counts the number of times a target word occurs in
 * an array of words. Comparisons are case-sensitive.
 *
 * @param words  - The array to search
 * @param target - The word to search for
 * @return The word count
 */
public static int countWord(String[] words, String target) {

   int count = 0;

   for (String curWord : words) {
      if (curWord.equals(target)) {
         count++;
      }
   }

   return count;
}
```

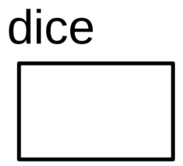
Reference Arrays

```
Die[] dice;

dice = new Die[4];

dice[0] = new Die(6);
dice[2] = new Die(5);

for (Die curDie : dice) {
   if (curDie != null) {
      curDie.roll();
   }
}
```



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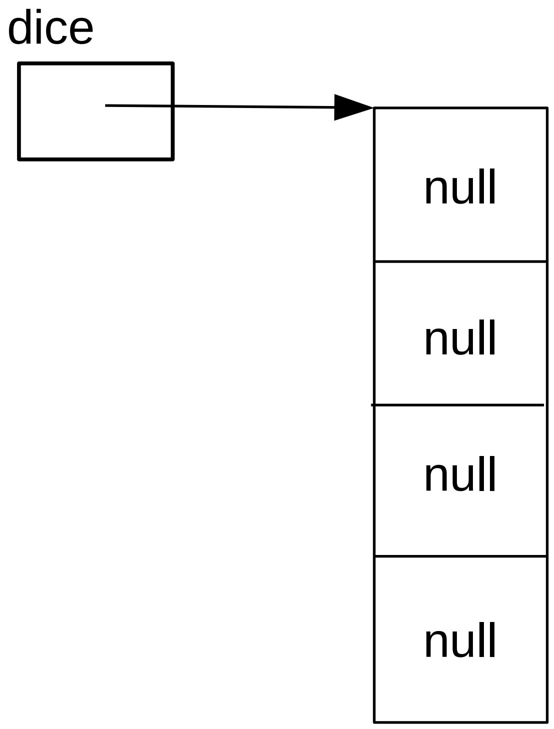

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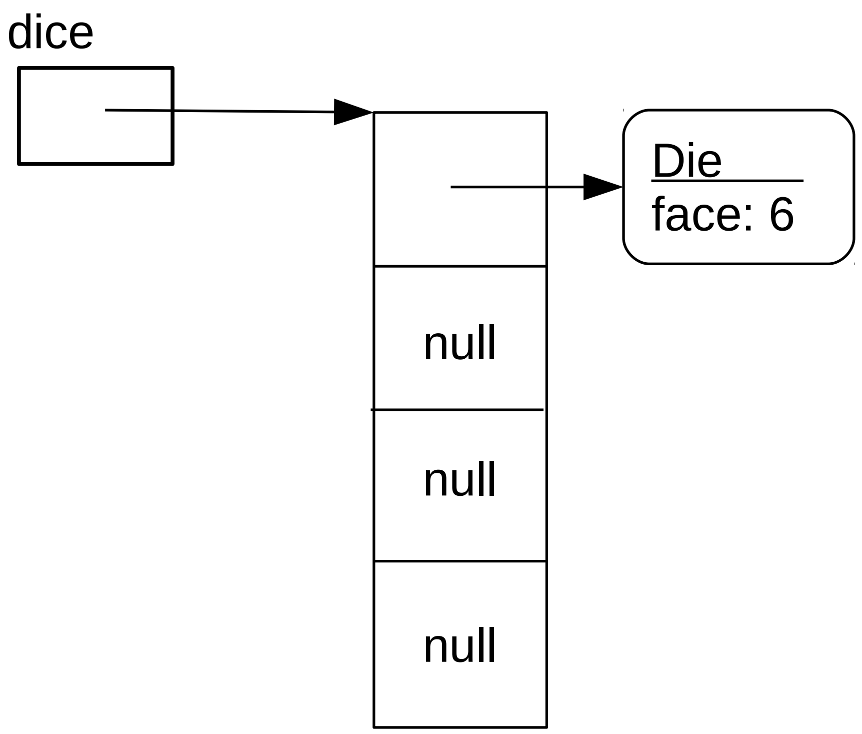

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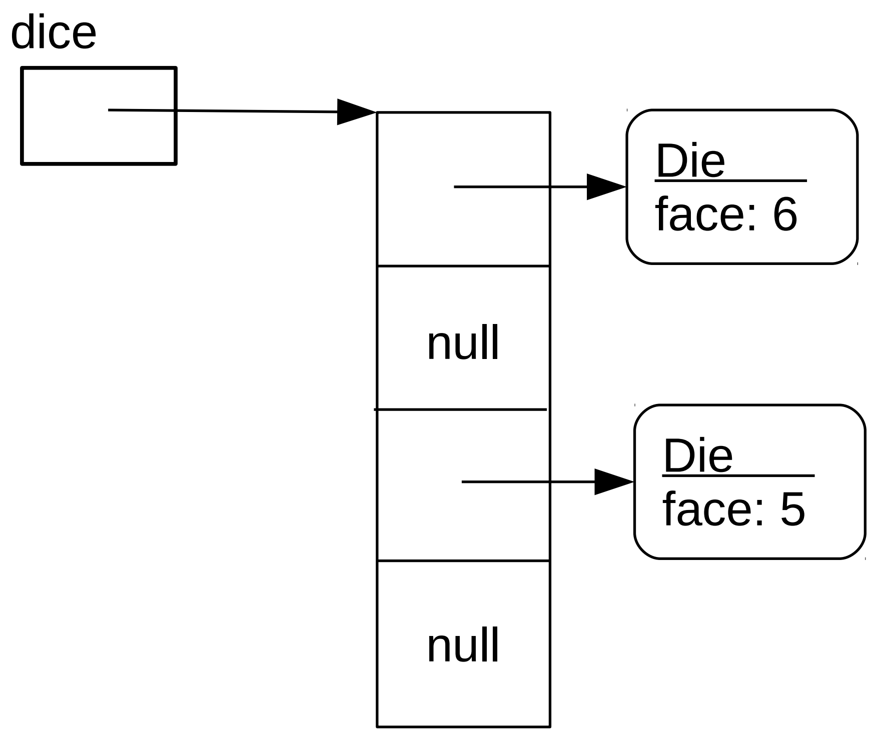

Exercise #3

- Draw the memory diagram and determine output.

```
Die single;
Die[] dice;

dice = new Die[4];

single = new Die(1);

for (int i = 0; i < dice.length; i++) {
   dice[i] = single;
}

dice[0].setFace(3);

for (Die curDie : dice) {
   System.out.println(curDie.getFace());
}
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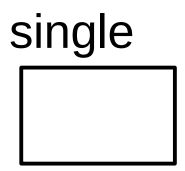

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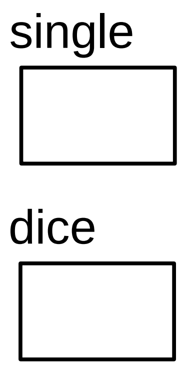

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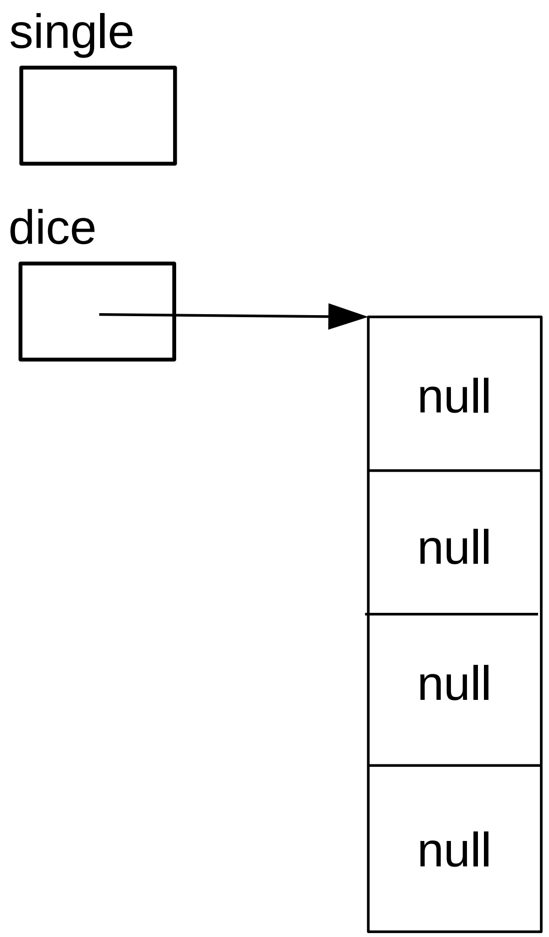

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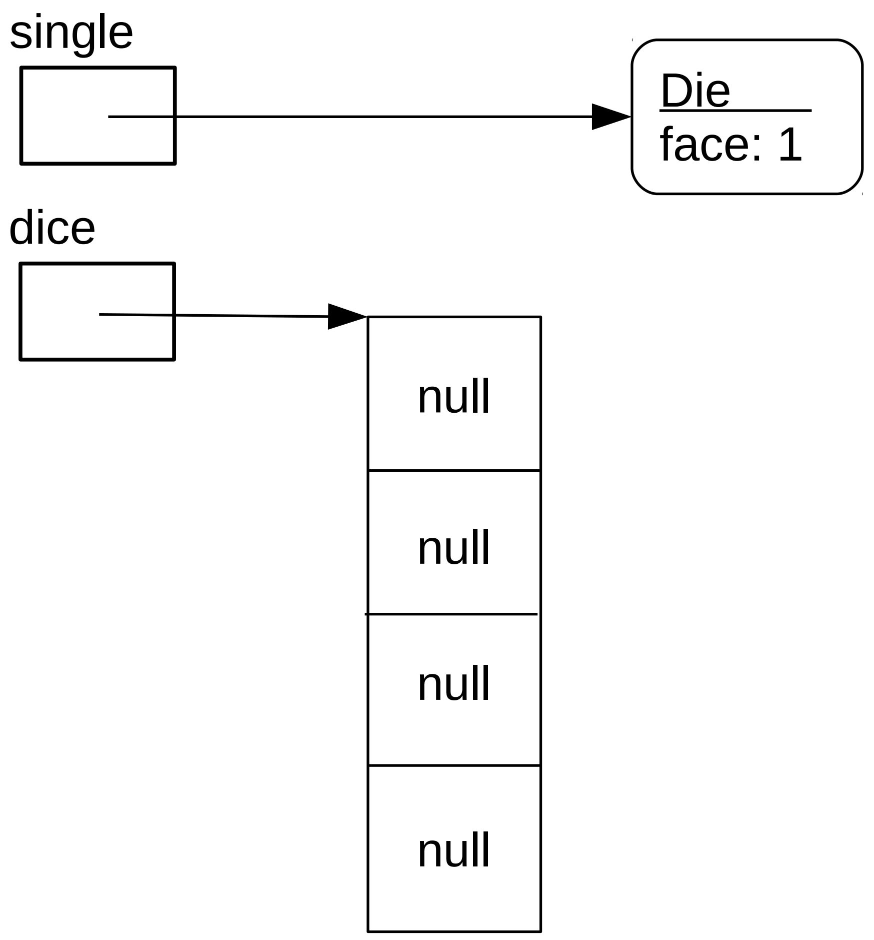

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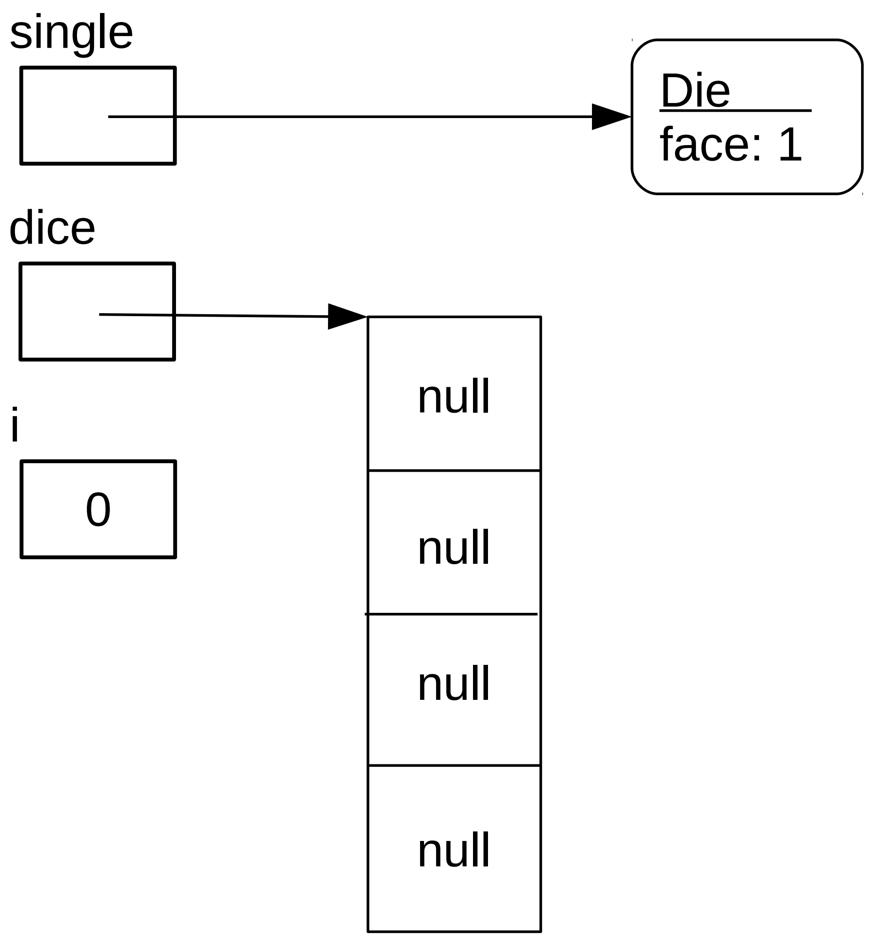

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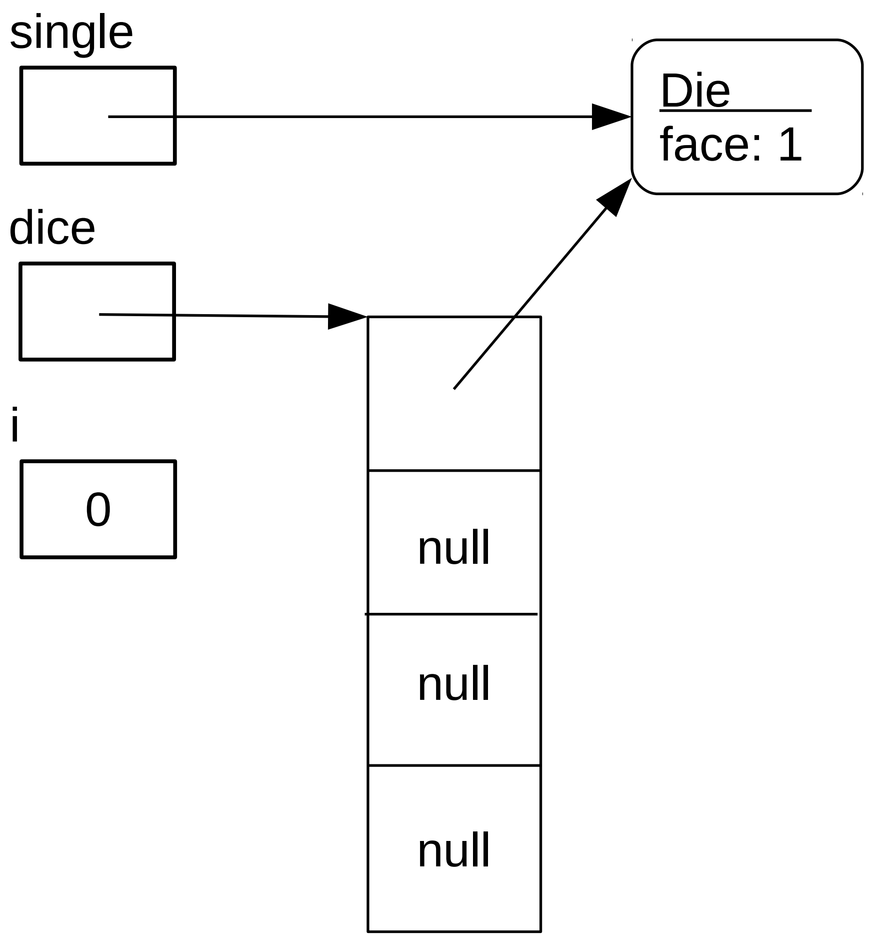

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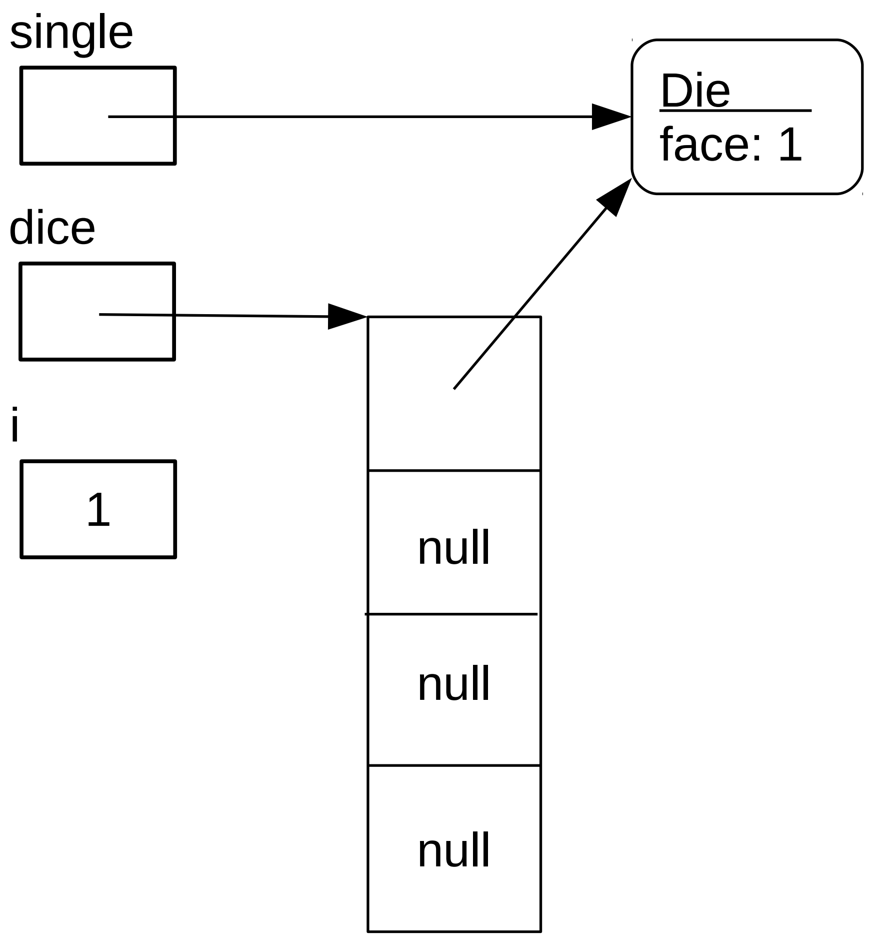

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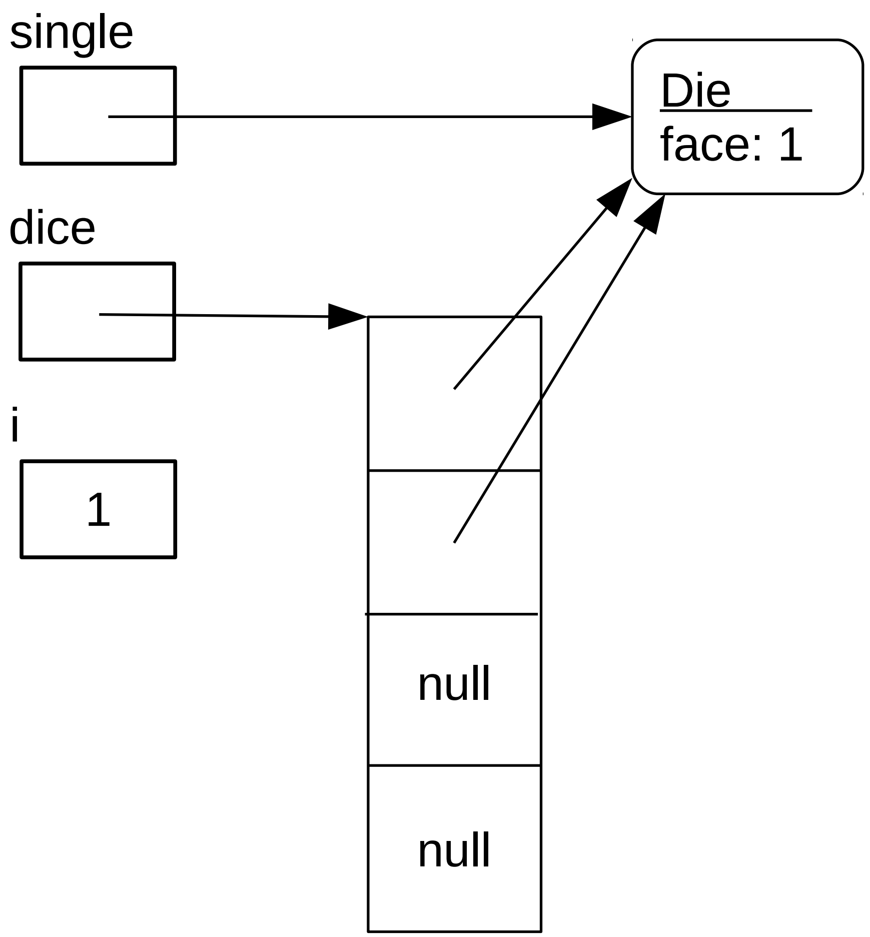

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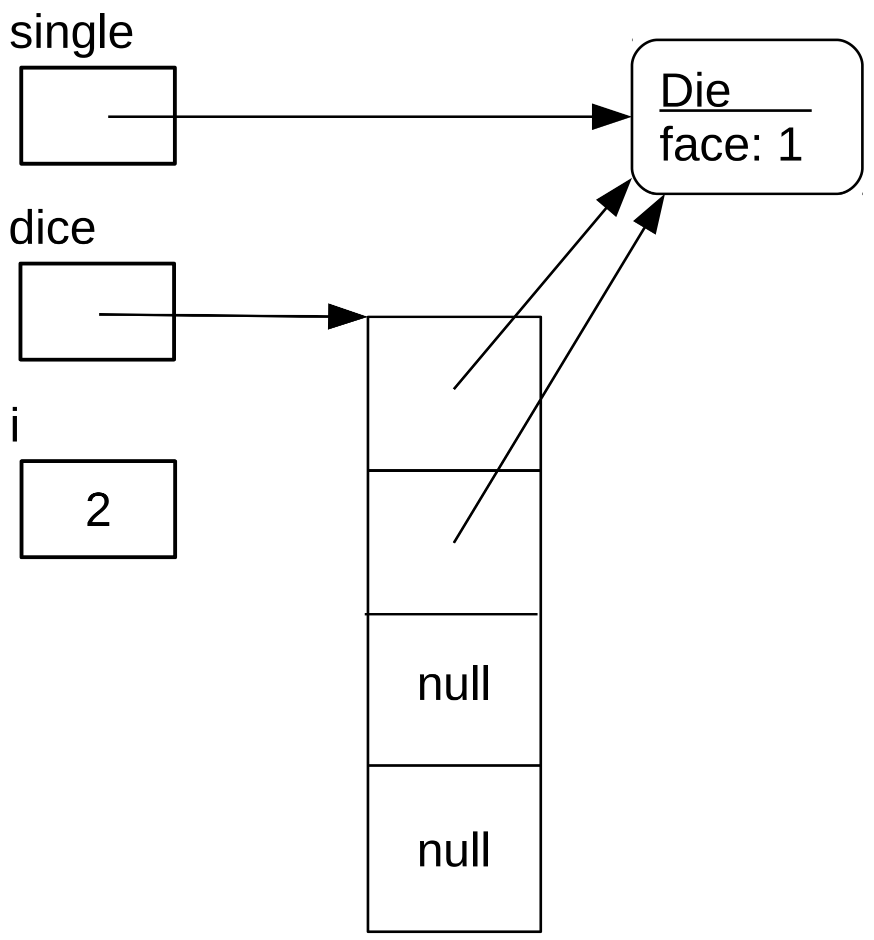

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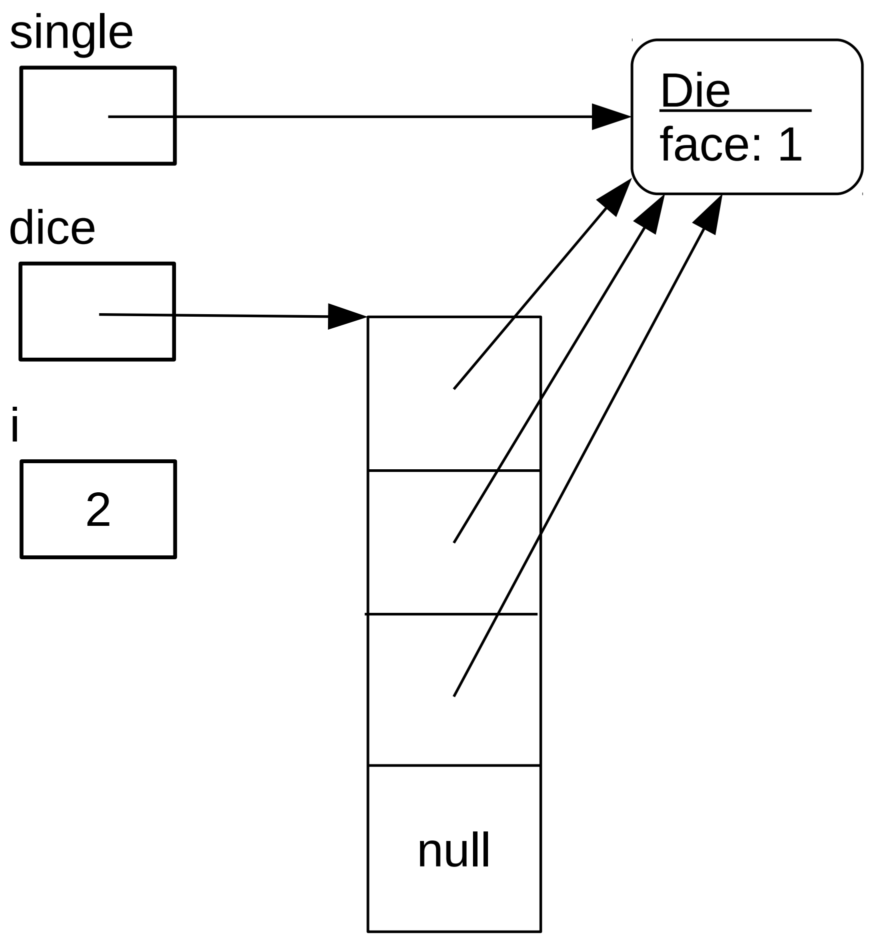

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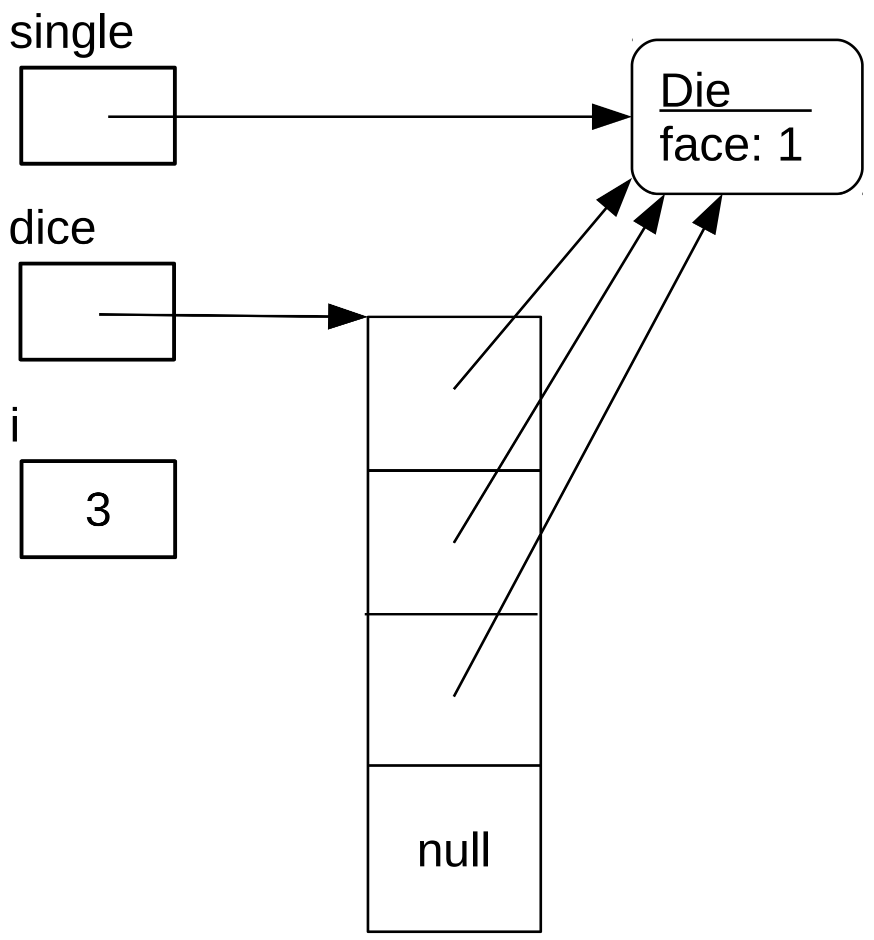

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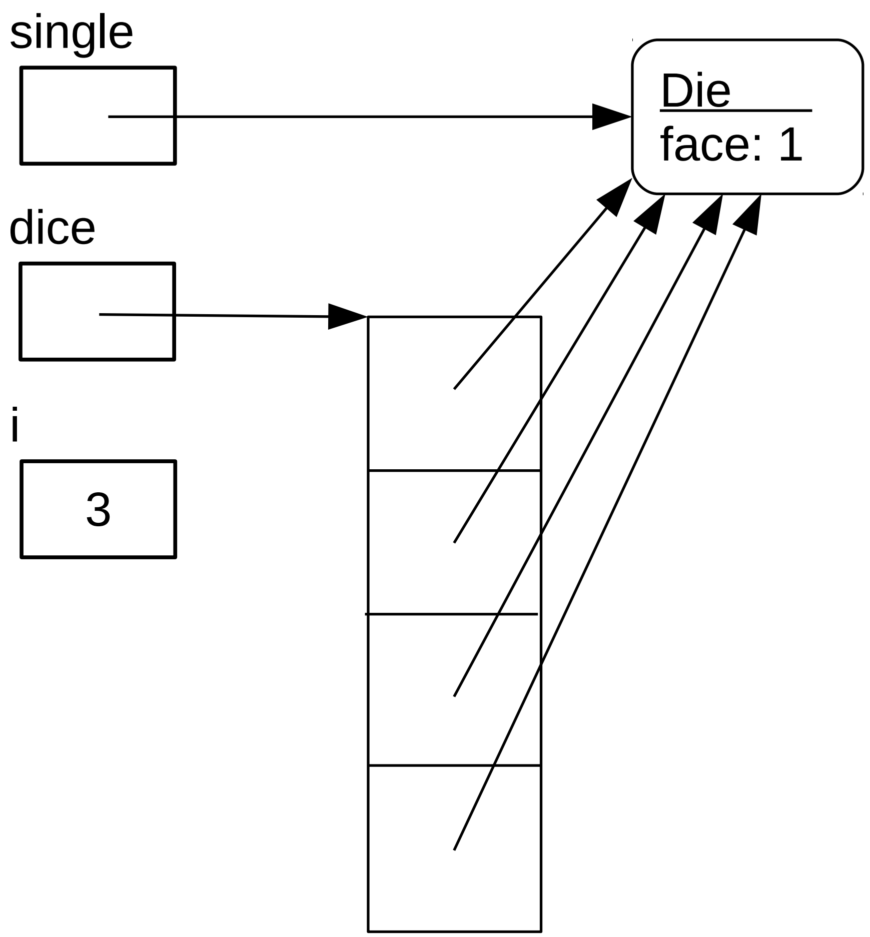

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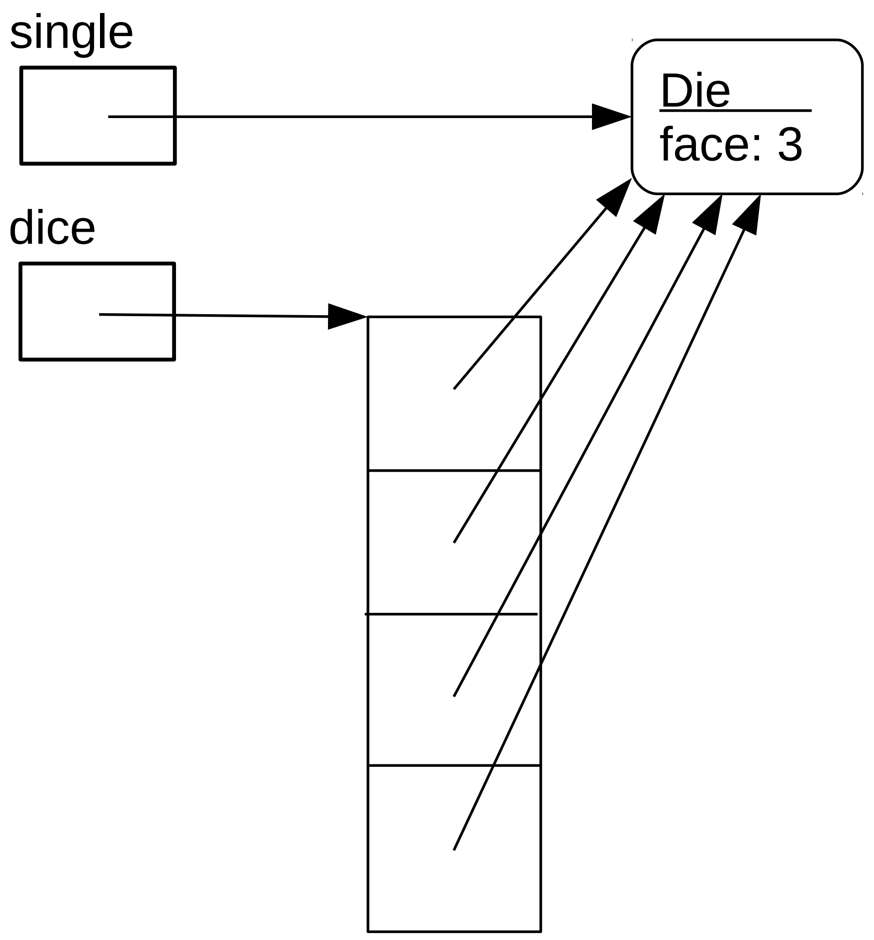

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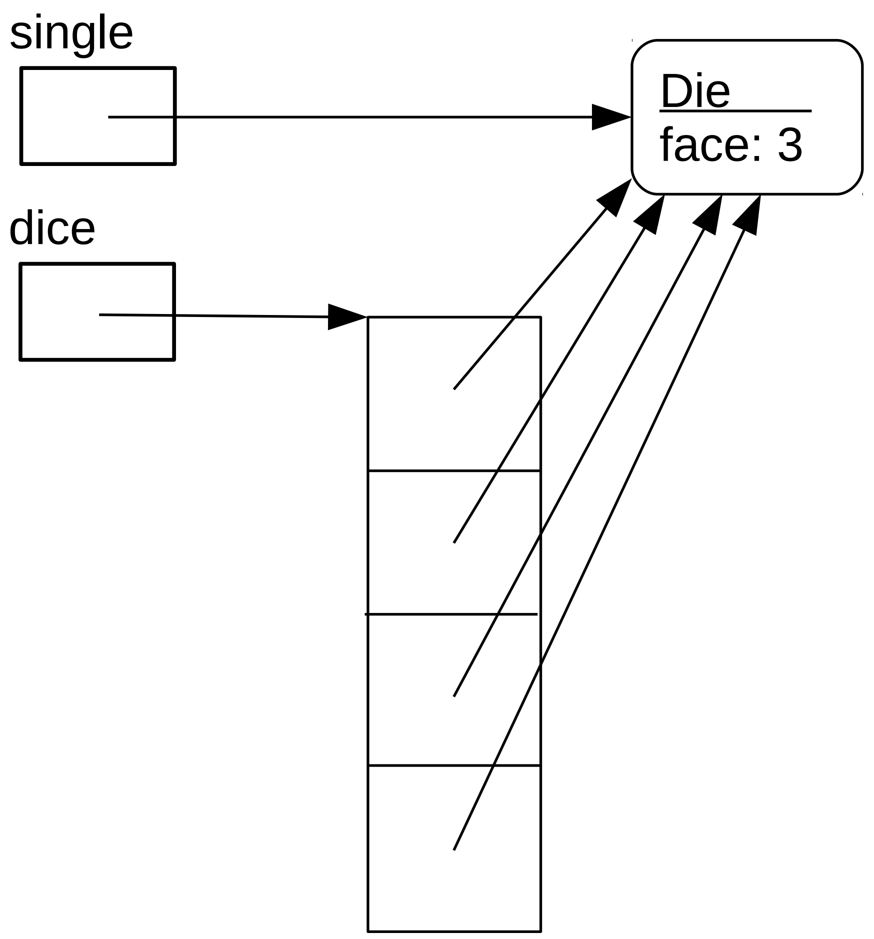

Output:

```
3
3
3
3
```

Exercise #4

- Complete the following method

```java
/**
 * This method creates a Die array, and populates it with
 * Die objects. Each Die object will be initialized with
 * a random face value (using the zero argument constructor).
 *
 * @param numDice - The number of Die objects in the new array
 * @return The array of Die objects
 */
public static Die[] createDice(int numDice) {











}
```

Exercise #4

- Complete the following method

```
/**
 * This method creates a Die array, and populates it with
 * Die objects. Each Die object will be initialized with
 * a random face value (using the zero argument constructor).
 *
 * @param numDice - The number of Die objects in the new array
 * @return The array of Die objects
 */
public static Die[] createDice(int numDice) {
   Die[] dice = new Die[numDice];

   for (int i = 0; i < dice.length; i++) {
      dice[i] = new Die();
   }

   return dice;
}
```