Arrays of Objects

Using the Array Data Structure with Objects

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Arrays of Objects

You have already seen how arrays can be used to store primitive types:

```
int[] nums = new int[10];
double[] scores = new double[8];
```

Arrays can also be used to store objects of classes that you define.

```
TextMessage[] words = new TextMessage[17];
```

► The following program describes a DiceGame class which contains Die objects in an array.

The Die Class

```
public class Die
   private int faceValue;
   public Die()
      faceValue = 1;
   public int getFaceValue()
       return faceValue;
   public void roll()
       faceValue = (int) (Math.random() * 6) + 1;
```

The DiceGame Class

```
public class DiceGame
   // instance variable
   private Die[] dice;
    // constructor
   public DiceGame()
       dice = new Die[5];
       for (int i = 0; i < dice.length; i++)</pre>
           dice[i] = new Die();
```

The DiceGame Class, Continued

```
// mutator method
public void rollDice()
   for (int i = 0; i < dice.length; i++)</pre>
       Die cube = dice[i];
       cube.roll();
```

The DiceGame Class, Continued

```
// the toString() method
public String toString()
₹
   String result = "";
   for (int i = 0; i < dice.length; i++)</pre>
       Die cube = dice[i];
       result += cube.getFaceValue() + " ";
   return result;
```

The DiceGameTest Class

```
public class DiceGameTest
   public static void main(String[] args)
       DiceGame rack = new DiceGame();
       rack.rollDice();
       System.out.println(rack);
```

An Array as an Instance Variable

Instance Variable

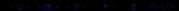
► The following statement describes an object instance variable which is declared with Die as its type. Recall that arrays can store objects.

```
private Die[] dice;
```

Constructor

► The constructor starts by initalizing the array with a length of 5, and it assigns its reference(memory location) to the variable dice.

```
dice = new Die[5];
```



Setting up the Array in the Constructor

Constructor

► The array elements do not contain Die objects yet, so they are assigned a value of null.

dice	null	null	null	null	null
index	0	1	2	3	4

The keyword null is the default value for an object reference that is empty.

Setting up the Array in the Constructor

Constructor

- Next, the constructor instantiates(creates) five Die objects and stores their references in the array.
- ► Each Die object occupies a different array index.

dice	2B94A7	87CD9A	F9371A	31D58E	D295A3
index	0	1	2	3	4

Using a Mutator Method with the Array

The rollDice() Method

- This method uses a for loop to access each Die object within the array.
- Within the for loop, an array index is used to retrieve each Die object's reference and store it in the local variable cube.
- Note that cube is declared with data type Die.

dice	2B94A7	87CD9A	F9371A	31D58E	D295A3
index	0	1	2	3	4

cube 2B94A7



Using a Mutator Method with the Array

The rollDice() Method

- ▶ Then, the roll() method from the Die class is called on the object reference value stored in the Die object cube.
- ► The roll() method assigns a random value to the faceValue instance variable of that object.

Arrays of Objects: End of Notes