Arrays

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Declaring Arrays

- Group data objects of the same type.
- Declare arrays of primitive or class types:

```
char  s[];
Point  p[];

char[]  s;
Point[]  p;
```

- Create space for a reference.
- An array is an object; it is created with new.

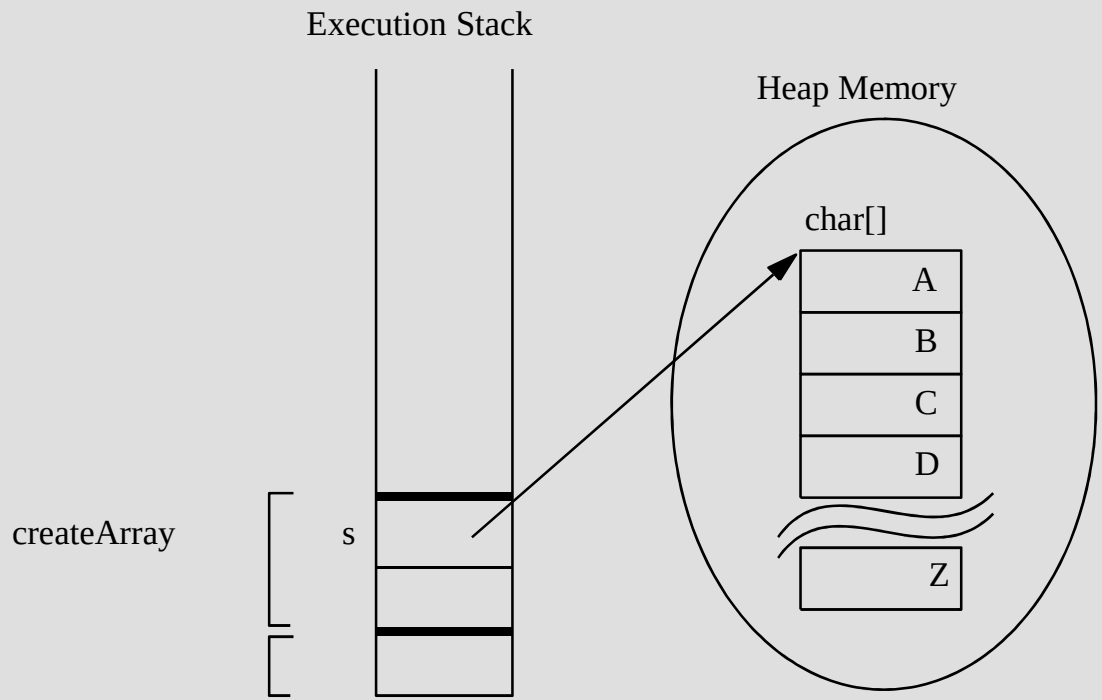
Creating Arrays

Use the new keyword to create an array object.

For example, a primitive (char) array:

```
1     public char[] createArray() {
2        char[] s;
3
4        s = new char[26];
5        for ( int i=0; i<26; i++ ) {
6           s[i] = (char) ('A' + i);
7        }
8
9        return s;
10    }
```

Creating an Array of Character Primitives

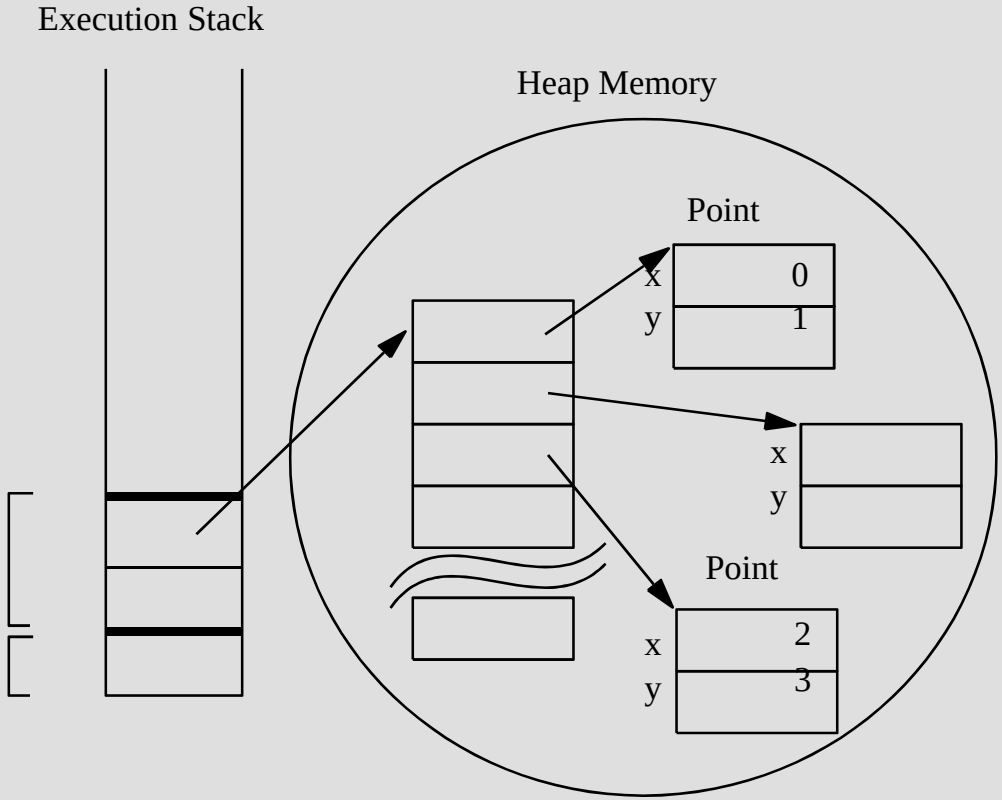


Creating Reference Arrays

Another example, an object array:

```
1     public Point[] createArray() {
2        Point[] p;
3
4        p = new Point[10];
5        for ( int i=0; i<10; i++ ) {
6           p[i] = new Point(i, i+1);
7        }
8
9        return p;
10    }
```

Creating an Array of Character Primitives With PointObjects



Initializing Arrays

- Initialize an array element.
- Create an array with initial values.

```
String[] names;
names = new String[3];
names[0] = "Georgianna";
names[1] = "Jen";
names[2] = "Simon";
```

```
String[] names = {
        "Georgianna",
        "Jen",
        "Simon"
};
```

```
MyDate[] dates;
dates = new MyDate[3];
dates[0] = new MyDate(22, 7, 1964);
dates[1] = new MyDate(1, 1, 2000);
dates[2] = new MyDate(22, 12, 1964);
```

```
MyDate[] dates = {
        new MyDate(22, 7, 1964),
        new MyDate(1, 1, 2000),
        new MyDate(22, 12, 1964)
};
```

Multidimensional Arrays

Arrays of arrays:

```
int[][] twoDim = new int[4][];
twoDim[0] = new int[5];
twoDim[1] = new int[5];

int[][] twoDim = new int[][4]; // illegal
```

Multidimensional Arrays

- Non-rectangular arrays of arrays:

```
twoDim[0]   =  new  int[2];
twoDim[1]   =  new  int[4];
twoDim[2]   =  new  int[6];
twoDim[3]   =  new  int[8];
```

- Array of four arrays of five integers each:

```
int[][]  twoDim  =  new  int[4][5];
```

Array Bounds

All array subscripts begin at 0:

```
public void printElements(int[] list) {
   for (int i = 0; i < list.length; i++) {
      System.out.println(list[i]);
   }
}
```

Using the Enhanced for Loop

Java 2 Platform, Standard Edition (J2SE™) version 5.0 introduced an enhanced for loop for iterating over arrays:

```
public void printElements(int[] list) {
    for ( int element : list ) {
        System.out.println(element);
    }
}
```

The for loop can be read as *for each* element *in* list *do*.

Array Resizing

- You cannot resize an array.
- You can use the same reference variable to refer to an entirely new array, such as:

```
int[] myArray = new int[6];
myArray = new int[10];
```

Copying Arrays

The System.arraycopy()method to copy arrays is:

```
1   //original array
2   int[] myArray = { 1, 2, 3, 4, 5, 6 };
3
4   // new larger array
5   int[] hold = { 10, 9, 8, 7, 6, 5, 4, 3, 2, 1 };
6
7   // copy all of the myArray array to the hold
8   // array, starting with the 0th index
9   System.arraycopy(myArray, 0, hold, 0, myArray.length);
```