

C307 Data Representation

Unit-2, Part B_3 Array Classes

By:



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Elementary Data Structures

- ☐ Simple Array Manipulation
- ☐ Vs.
- ☐ Array as an abstract data type

Arrays

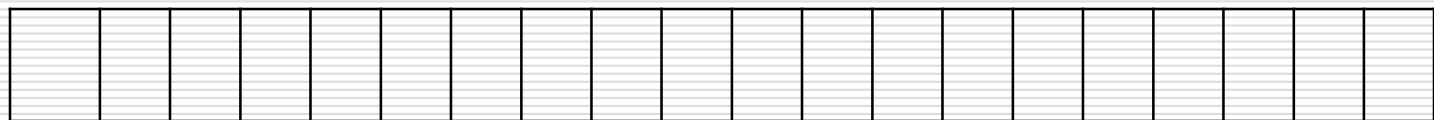
- ❑ A homogeneous aggregate of data elements.
- ❑ A collection of objects of the same type.
- ❑ A collection of similar variables which are identified under the same name.

- ❑ **Creating an Array of 20 integers:**

- `int test_scores = new int[20];`

or

- `int[] test_scores = new int[20];`



0 1 2 3 4 19

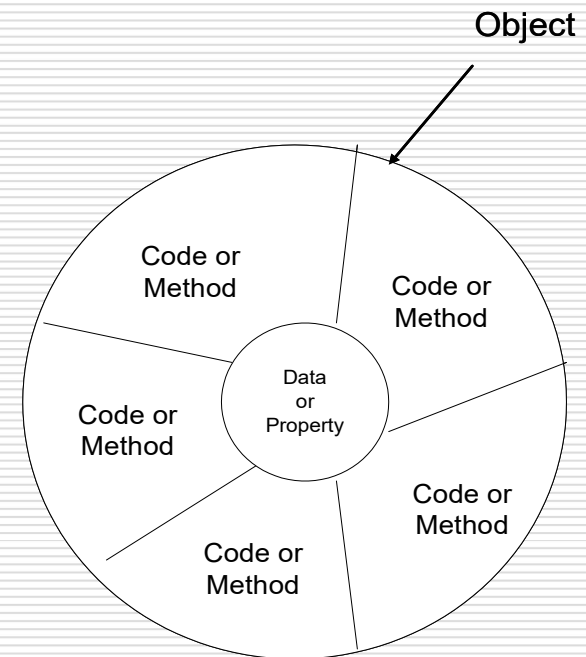
Creating an Array Class

- ❑ To encapsulate the array data structure in a class and create a new abstract data type.

Array Operations or Methods:

Insert()
Delete()
Find()
Display()
Search()

Sort()
Mean()
StdDev()



```

class HArray {

    private int[] anArray;      // ref to array a
    private int nElems;        // number of data items
    //-----

    public HArray(int max) // constructor
    {
        anArray = new int[max];    // create the array
        nElems = 0;                // no items yet
    }

    public void insert(int value) // put element into array
    {
        anArray[nElems] = value;    // insert it
        nElems++;                  // increment size
    }
    //-----

    public boolean delete(int value) {
        int j;
        for (j = 0; j < nElems; j++) // look for it
        {
            if (value == anArray[j]) {
                break;
            }
        }
        if (j == nElems) // can't find it
        {
            return false;
        } else // found it
        {
            for (int k = j; k < nElems; k++) // move higher ones down
            {
                anArray[k] = anArray[k + 1];
            }
            nElems--;              // decrement size
            return true;
        }
    } // end delete()
}

```

```

    public boolean find(long searchKey) {
        // find specified value
        int j;
        for (j = 0; j < nElems; j++) // for each element,
        {
            if (anArray[j] == searchKey) // found item?
            {
                break;                // exit loop before end
            }
        }
        if (j == nElems) // gone to end?
        {
            return false;            // yes, can't find it
        } else {
            return true;             // no, found it
        }
    } // end find()
    //-----

    public void display() // displays array contents
    {
        for (int j = 0; j < nElems; j++) // for each element,
        {
            System.out.print(anArray[j] + " "); // display it
        }
        System.out.println("");
    }
    //-----
} // end class HArray

```

Using the Array Class:

```
public class Array_2_CreatingArrayClass {  
  
    public static void main(String[] args) {  
        int maxSize = 100;           // array size  
        HHArray myArray;             // reference to array  
        myArray = new HHArray(maxSize); // create the array  
  
        System.out.println("-----");  
        System.out.println("- Insert 10 numbers in the array--");  
        myArray.insert(77);           // insert 10 items  
        myArray.insert(99);  
        myArray.insert(44);  
        myArray.insert(55);  
        myArray.insert(-1);  
        myArray.insert(88);  
        myArray.insert(11);  
        myArray.insert(0);  
        myArray.insert(66);  
        myArray.insert(33);  
  
        System.out.println("-----");  
        System.out.println("----- Print Array -----");  
        myArray.display();           // display items  
    }  
}
```

```
        System.out.println("-----");  
        System.out.println("----- Search Array for 35 -----");  
        int searchKey = 35;          // search for item  
        if (myArray.find(searchKey)) {  
            System.out.println("Found " + searchKey);  
        } else {  
            System.out.println("Can't find " + searchKey);  
        }  
  
        System.out.println("-----");  
        System.out.println("----- Delete 55, 99, 33, 77 -----");  
        myArray.delete(55);           // delete 3 items  
        myArray.display();           // display items  
        myArray.delete(99);  
        myArray.display();           // display items  
        myArray.delete(33);  
        myArray.display();           // display items  
        myArray.delete(77);  
        myArray.display();           // display items  
  
        System.out.println("-----");  
        System.out.println("- Insert 2 numbers in the array --");  
        myArray.insert(647);  
        myArray.insert(49);  
        myArray.display();  
    }  
}
```