

Arrays and ArrayLists

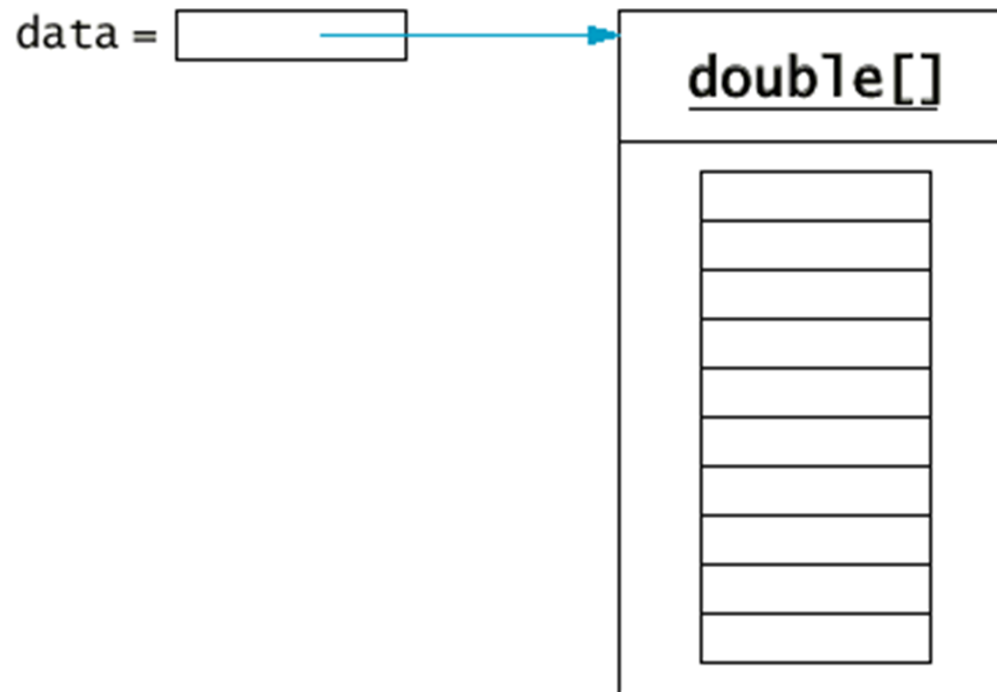
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Introduction

- Array is a useful and powerful aggregate data structure presence in modern programming languages
- Arrays allow us to store arbitrary sized sequences of primitive values or sequences of references to objects
- Arrays allow easy access and manipulation to the values/objects that they store
- Arrays are indexed by a sequence of integers
- classes can use arrays as instance variables to store databases of value/references

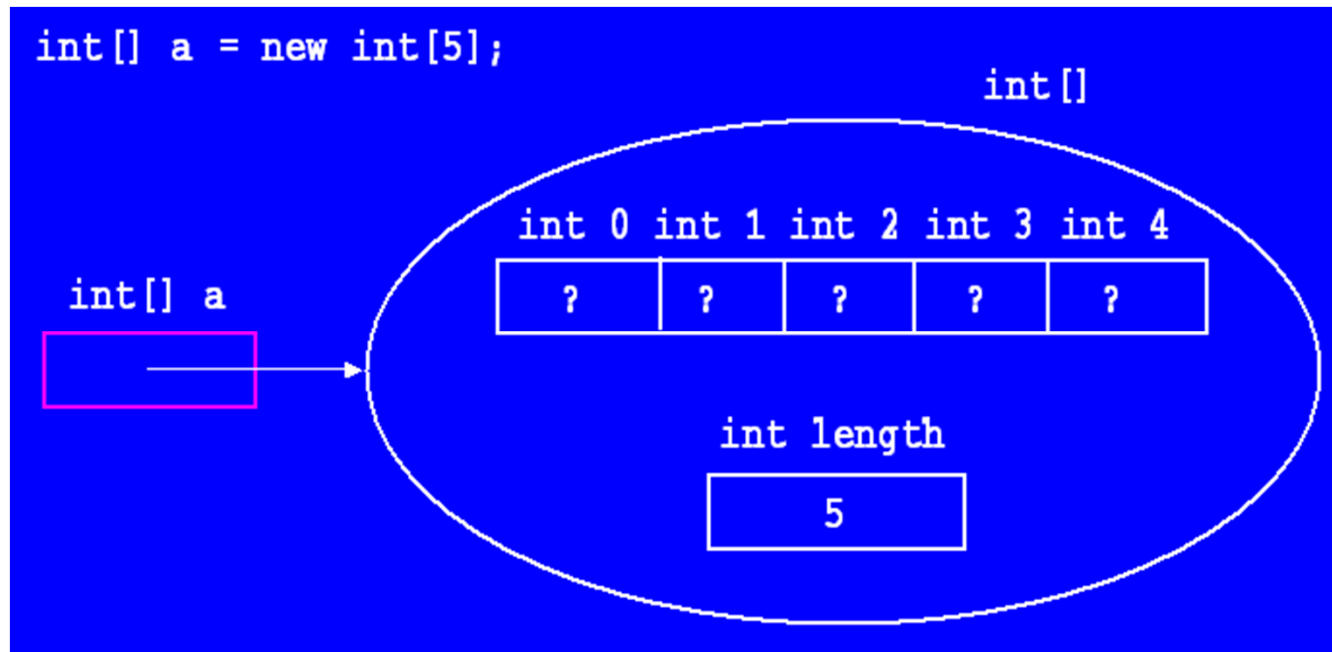
Arrays

- new is used to construct a new array:
new double[10]
- Store 10 double type variables in an array of doubles
double[] data = new double[10];



integer Arrays

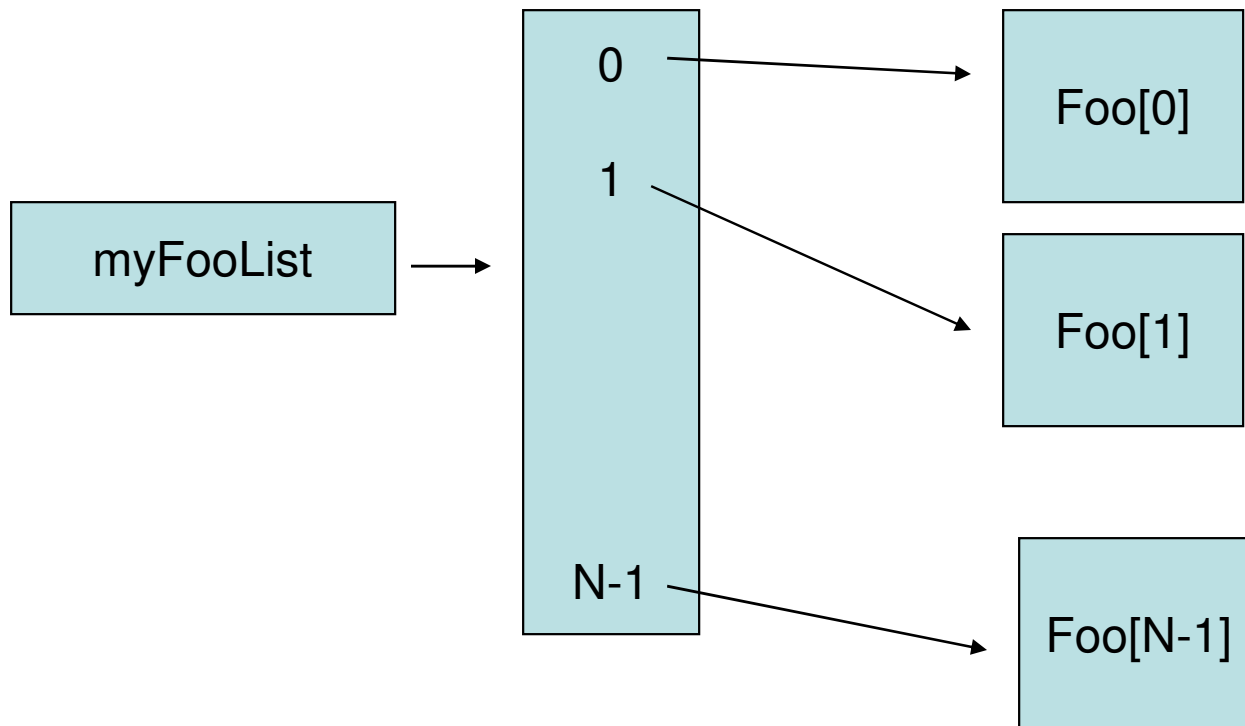
```
int[] A = new int[5];
```



Array of Object References

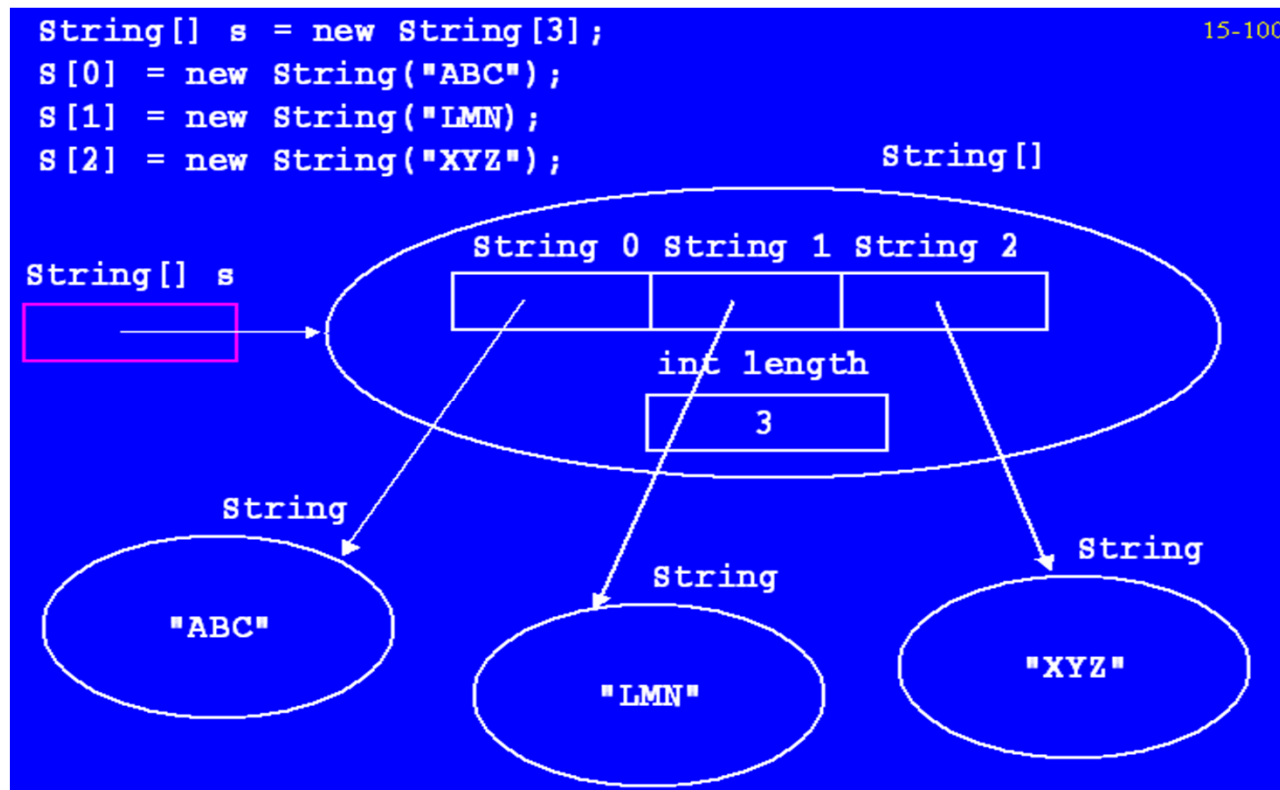
```
class foo() { ....}
```

```
foo[] myFooList = new foo[N];
```



Array of Strings

- **An array of Strings**
 - **String[] s = new String[]{"ABC", "LMN", "XYZ"};**



Array of Bytes

- We can create array of bytes and perhaps return them from a method
- ```
public byte[] foo(){
 byte[] temp = new byte[10];
 for (int i=0;i<10;i++)
 temp[i] = new Byte(i);
 return temp;
}
```

# Arrays

- Arrays have *fixed length*
- Arrays have element of specific type or references to objects
- Operator [ ] is used to access array elements  
`data[4] = 29.95;`
- Use length attribute to get array length.
  - `data.length`. (Not a method!)



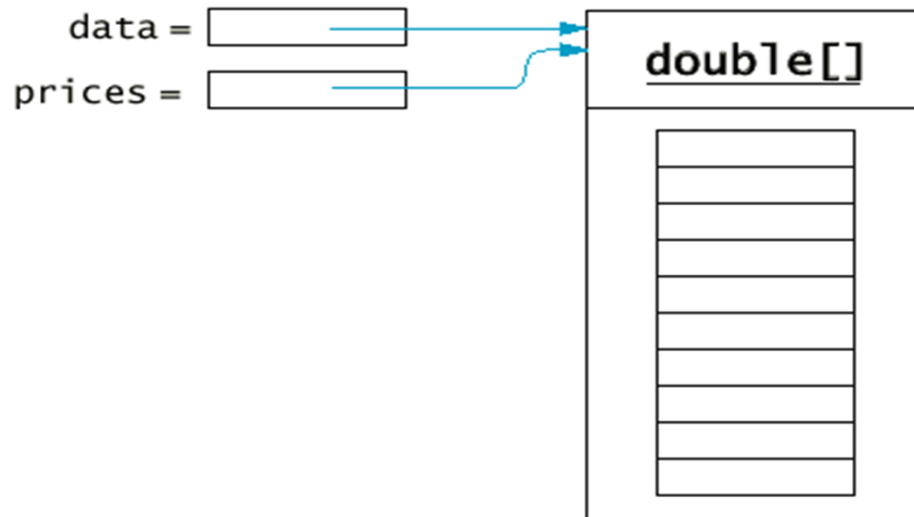
# Array

- is a homogeneous data structure: each of its members stores the same type (either primitive or reference)
- the indices go from 0 to one less than the length of the array
- each array object stores a **public final int length** instance variable that stores the length of the array
- we can access the value stored in this field, in the example above, by writing **a.length**

# Copying Arrays

Copying an array reference yields a second reference to the same array

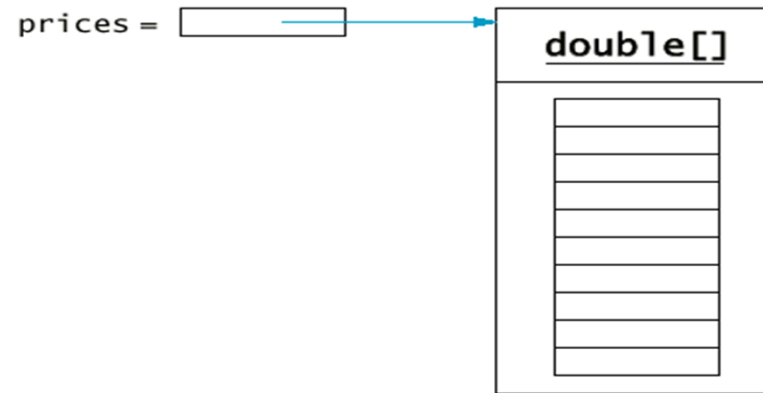
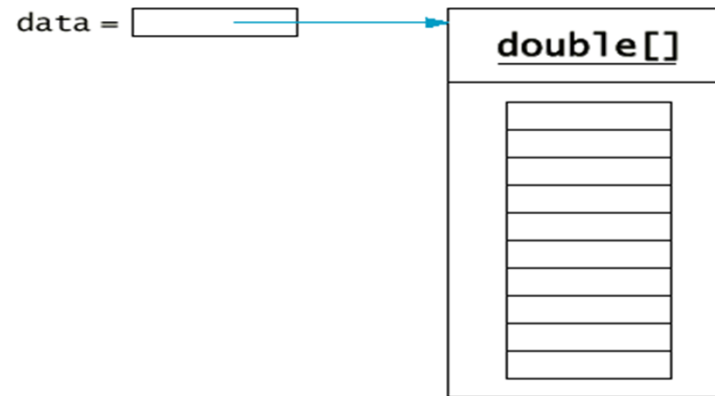
```
double[] data = new double[10];
// fill array . . .
double[] prices = data;
```



# Cloning Arrays

- **Use clone to make true copy**

```
double[] prices = (double[])data.clone();
```



# Copying Array Elements

- `System.arraycopy(from, fromStart, to, toStart, count);`

