Using Arrays and Lists

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Agenda

Understanding arrays

Working with arrays

Working with collections

Understanding Arrays

The Need for Lists of Data

List of

- Employees
- Songs
- Records in a database
- ...

Impossible to just use variables

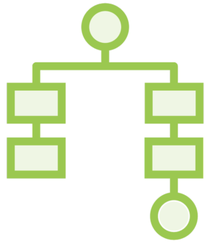
- Amount of items coming in is unknown

Working with Lists of Data

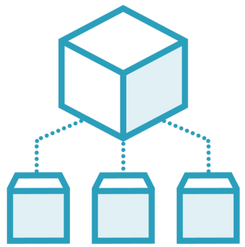
Arrays

Collections

Arrays in C#



Data structure to store multiple variables



All variables must have the same type (can be object)

[1,2,3]

Accessed through use of index

Creating an Array Variable

Type of array

Variable name

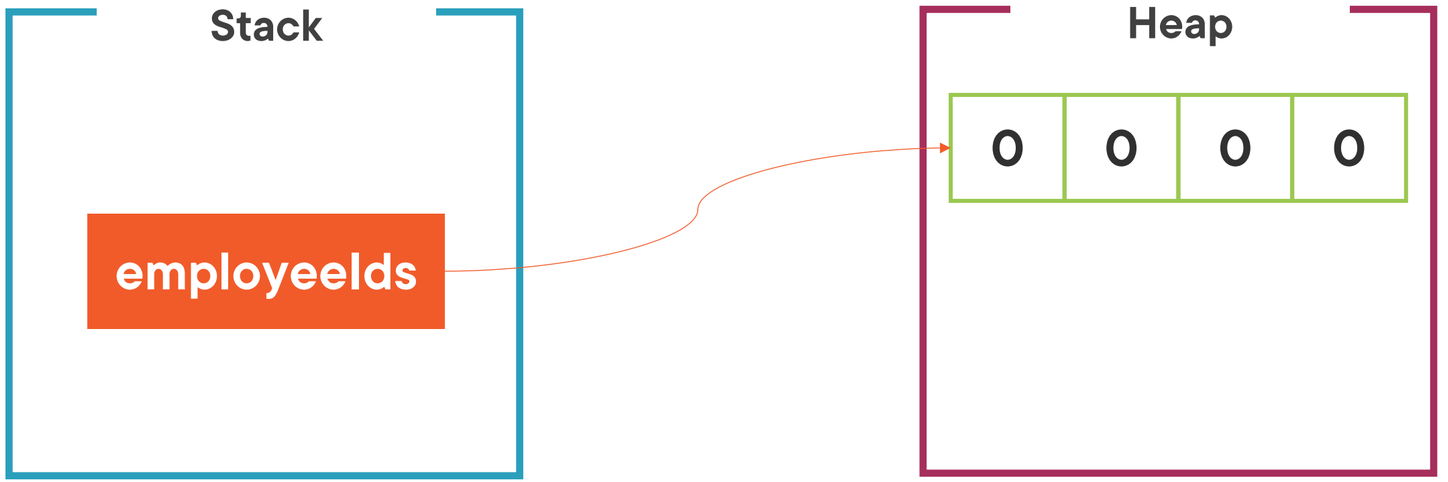
```
int[]      allEmployeeIds;

DateTime[] startDates;
```

Instantiating the Array

Array to contain 4 ints

```
int[] allEmployeeIds = new int[4];
```



Instantiating the Array

Arrays are reference types, even for value types used in the array

Creation happens upon using new

Size is set upon creation of the array, but can be at runtime

Arrays are zero-based

```
int size = int.Parse(Console.ReadLine());

int[] employeeIds = new int[size];
```

Determining the Array Size at Runtime

Populating the Array

```
int[] allEmployeeIds = new int[4] {11, 44, 179, 161};

int[] managerIds = new int[4] {11, 44, 179};

int[] supportStaffIds = new int[] {11, 44};
```

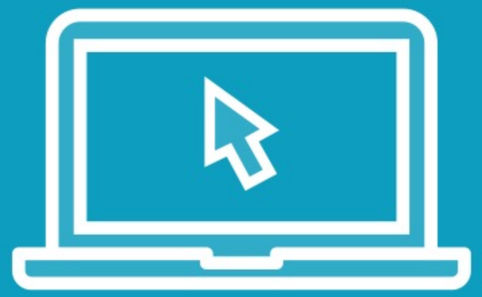
Accessing Elements within the Array

```
allEmployeeIds[0] = 123;

int firstEmployeeId = allEmployeeIds[0];
int secondEmployeeId = allEmployeeIds[1];

allEmployeeIds[2] = 33;
allEmployeeIds[7] = 33;//runtime error
```

Demo

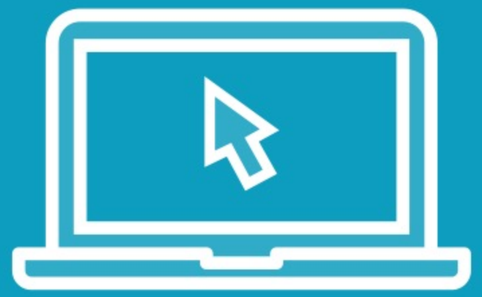


Creating an array

Accessing elements in an array

Looping through an array

Demo



Working with an array of Employee objects

Working with Arrays

The Array Base Class

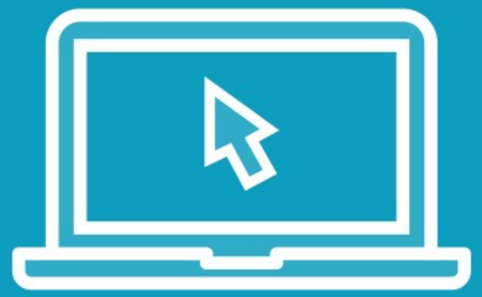
CopyTo()

Sort()

Reverse()

Length

Demo



Working with arrays

Working with Collections

Arrays are somewhat limited...

Changing the size is hard

Accessing the items is limited

Collections can be a better solution!

```
List<int> employeeIds = new List<int>();
```

Creating a List

Can contain int values

```
List<int> employeeIds = new List<int>();

employeeIds.Add(1);
employeeIds.Add(99);
employeeIds.Add(458);

employeeIds.Remove(1);

int selectedId = employeeIds[2];
```

Working with the List<T>

Adding items is done using a method

```
int length = employeeIds.Count;
```

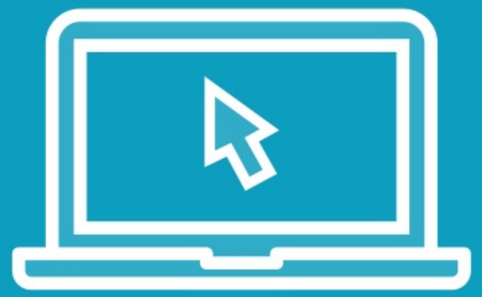
Lists Know Their Length

Lists are Type-safe

```
List<int> employeeIds = new List<int>();

employeeIds.Add(new Employee());
```

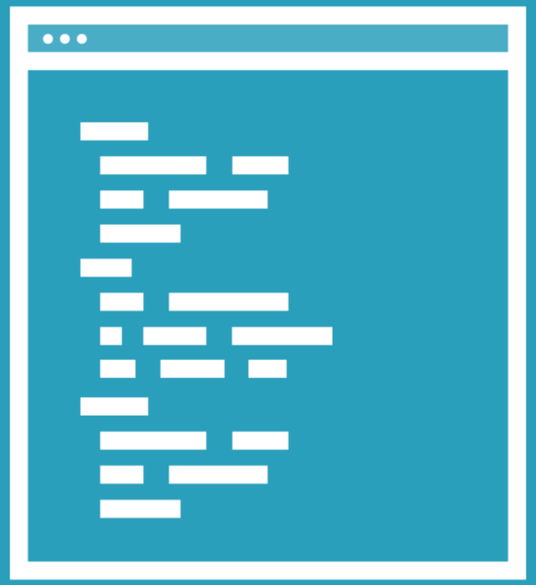
Demo



Working with the Collection classes

Summary

- Arrays allow us to work with simple sequences
- Are reference types
- Collection classes are more flexible



Up next:

Introducing inheritance and other OO principles