Unit Testing: Arrays and Lists

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#prgm-for-qa

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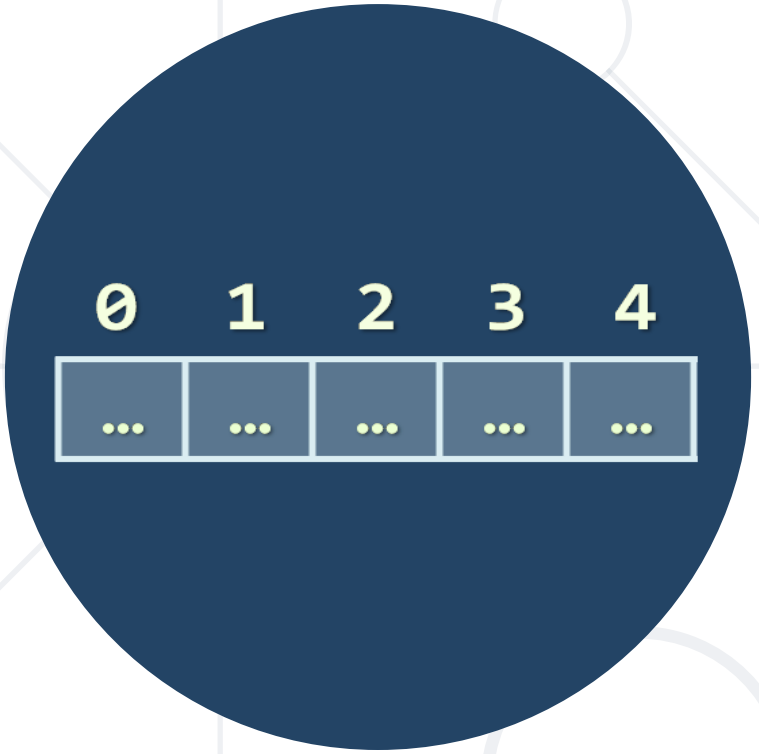


Arrays in C#

Working with Arrays of Elements

What are Arrays?

- An **array** is a **sequence of elements**

  - Arrays have **fixed size** (**array.length**) and cannot be resized
  - Elements are of the **same type** (e. g. integers)
  - Elements are numbered from **0** to **length - 1**

Working with Arrays

- **Creating** an array of 10 integers:

```
int[] numbers = new int[10];
```

All elements are initially 0

- **Accessing** array elements by index:

```
numbers[5] = numbers[2] + numbers[7];
```

The [] operator accesses elements by index

- **Assigning values** to the array elements:

```
for (int i = 0; i < numbers.Length; i++)
  numbers[i] = 1;
```

The Length holds the number of array elements

Array Sum – Example

- We have a method which takes each element in an array and returns the total sum

```
public static int Sum(
  int[] numbers)
{
  int sum = 0;
  foreach (int num in numbers)
    sum += num;
  return sum;
}
```

```
[TestCase(arr: new[] { 1, 2, 10 }, expected: 13)]
[TestCase(arr: new[] { -10, 3, 5 }, expected: -2)]
[TestCase(arr: new[] { 0 }, expected: 0)]
0 references
public void Test_Sum_SumsCorrectly(int[] arr,
    int expected)
{
    // Arrange:

    // Act:
    int actual = ArrayHelper.Sum(arr);

    // Assert:
    Assert.That(actual, Is.EqualTo(expected));
}
```

Lists in C#

Working with Lists of Elements

List<T> – Overview

- `List<T>` holds a list of elements of certain type
  - Like arrays, but can **add** / **insert** / **delete** elements

```
List<string> names = new();
names.Add("Peter");
names.Add("Maria");
names.Add("George");
names.Remove("Maria");
Console.WriteLine(string.Join(", ", names));
// Peter, George
```

List<T> – Overview

```
List<int> nums = new() { 10, 20, 30, 40, 50, 60 };
nums.RemoveAt(2);
nums.Remove(40);
nums.Add(100);
nums.Insert(0, 5);

for (int i = 0; i < nums.Count; i++)
  Console.Write($"{nums[i]} ");
```

Remove by index

Remove by value (slow)

Inserts an element at index 0

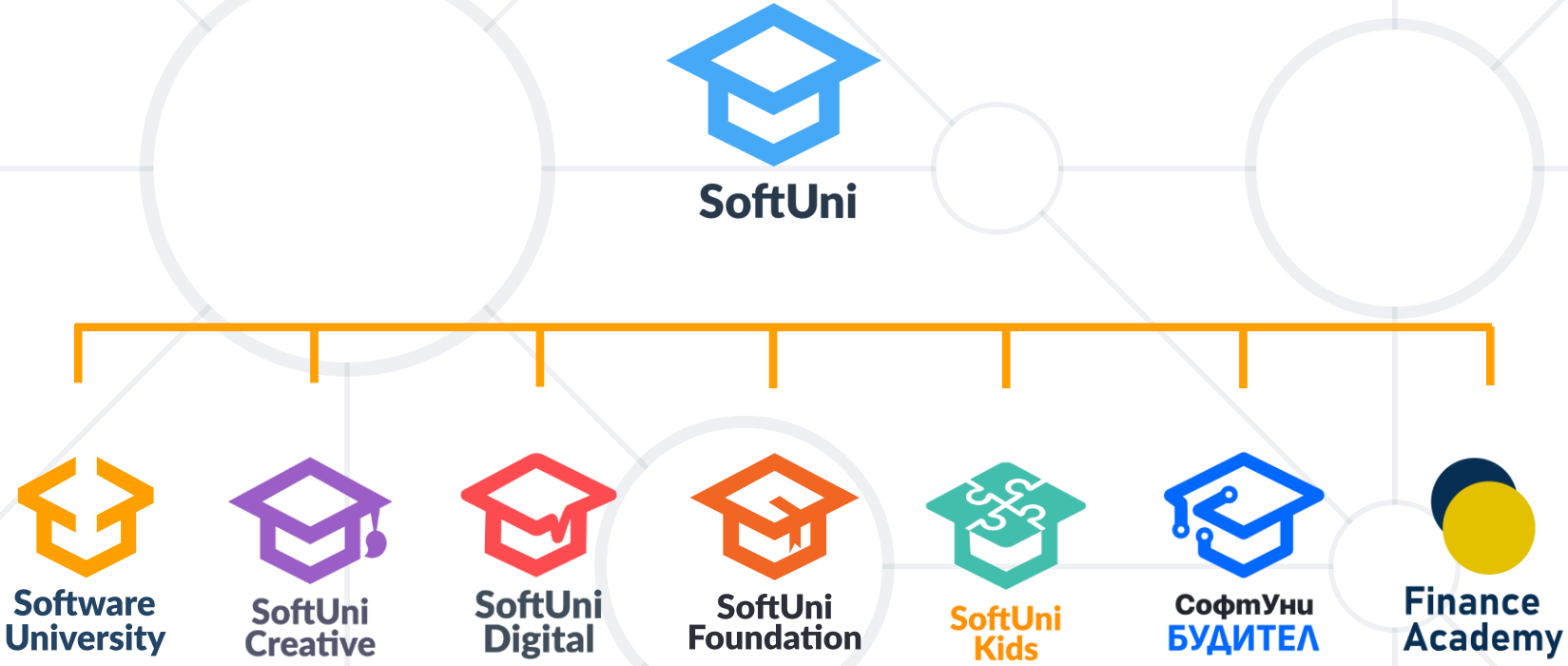
Numbers of items in list

```
5 10 20 50 60 100
```

Summary

- **Arrays** hold a **sequence** of elements
  - Elements are numbered from `0` to `length - 1`
- **Lists** are like arrays, but can add / remove / insert / replace / find elements

Questions?



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