Collections

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Managing groups of Objects

Two ways to manage groups of objects:

- Arrays
- Collections

When to use Collections

- Groups of objects can grow and shrink in number dynamically
- Arrays are fixed in size:

```
Int [ ] myArray = new int [5];
```

Kinds of Collections

- System.Collections
- System.Collections.Generic
- System.Collections.Concurrent

Non-Generic Collection

- They are classes in the System.Collections namespace.
- They do not store elements as specifically typed objects, but as objects of type **Object**.
- They need to be instantiated to be used.

Non-Generic Collections

- ArrayList - array of objects whose size is dynamically increases as required:
  - *ArrayList myArray = new ArrayList();*
- Hashtable - key/value pairs that are organized based on the hash code of the key:
  - *Hashtable hashTable = new Hashtable();*
  - *hashTable.Add(“user”, “name”);*
- Queue - first in, first out (FIFO) collection of objects

Generic Collections

- Classes in the System.Collections.Generic namespace
- Strong typing is enforced, only desired data type to be added.
- Provide better type safety and performance than non-generic collections.

Common Generic Collections

- List<T> - a list of objects that can be accessed by index.
  - Provides methods to search, sort, and modify lists:
  - *List<int> myList = new List<int>();*

- Dictionary<TKey, TValue> - a collection of key/value pairs that are organized based on the key:
  - *Dictionary<string, int> myDictionary = new Dictionary<string, int>();*
  - *myDictionary.Add(“first”, 1); myDictionary.Add(“second”, 2);*

Common Generic Collections

- Queue<T> - first in, first out (FIFO) collection of objects.
  - Enqueue method - puts an element to the queue
  - Dequeue method - dequeues the first element

- Stack<T> - last in, first out (LIFO) collection of objects.
  - Push method - pushes an element into the stack
  - Pop method - pops the first element off the stack

Queue and Stack

Queues and stacks are useful when you need temporary storage for information; that is, when you might want to discard an element after retrieving its value.

Microsoft Recommendation

“Whenever possible, you should use the generic collections in the System.Collections.Generic namespace instead of the legacy types in the System.Collections namespace”.

Reference: Collections

Time to some real Demo

Demo in github: https://github.com/GulomjonSaidovRevature/collectionsDemo