C# and Microsoft .NET

Generics and Extension Methods

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Last time…

- Exceptions and Examples
  - Handling
  - Throwing
  - Wrapping
  - Debugging (**not really**)
  - Custom Exceptions (**not really**)
- After parties with hints about your homework
- Bonus lectures
- Any questions and/or feedback?

OOP Exercise

Car Garage (~45 min)

Generics

“A concept of type parameters, which make it possible to design classes and methods that defer the specification of one or more types until the class or method is declared and instantiated by client code”

Microsoft Documentation

“Generic classes and methods combine reusability, type safety and efficiency in a way that their non-generic counterparts cannot. Generics are most frequently used with collections and the methods that operate on them”

Microsoft Documentation

Generics Declaration

- Methods

```
access_modifier return_type MethodName<T>(T item) [where T: class | struct | type_name | etc]
{
    // do something with item
}
```

- Classes and Interfaces

```
access_modifier interface|class TypeName<T> [where T: class | struct | type_name | etc]
{
    T _item;

    // other class / interface members like methods, constructors, properties, etc.
}
```

- More about generic type constrains in Microsoft Docs

.NET Framework Generic Types

- System.Collections.Generic namespace
  - List<T>
  - Dictionary<TKey, TValue>
  - Stack<T>
  - Queue<T>
  - etc.
- System.Linq namespace
  - Where<T>(…)
  - Max<T>()

Extension Methods

- Static methods that extend a given type (class / interface) without changing its declaration (e.g. code)
- Must reside in static class
- Their first parameter is of the target type (class / interface) and is prefixed with **this** keyword
- Standard / usual naming convention is to use *Extensions* as suffix
- The usage of the extension methods requires their parent namespace to be explicitly added as **using** statement
- .NET Framework Extension Methods
  - System.Linq namespace


Questions?