C# Review

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CPT S 422

C# Language

- Managed
  - Dynamically allocated content automatically freed
  - Cannot directly free memory on your own (like you could do with free or delete in C++). Need to remove all references to an object and then “some time after that” the garbage collector will free it.
- Supported on a variety of platforms
  - Windows -> Development through Visual Studio
  - Mac OS, iOS -> Development through Xamarin Studio
  - Linux -> Development through MonoDevelop

Reference Types and Value Types

- Classes are reference types
  - Support inheritance from 1 other class
  - Can implement any number of interfaces
- Structs are value types
  - Do not support inheritance
  - Can implement any number of interfaces
- Arrays are classes
  - int[] nums = new int[256];
  - The variable “nums” is a reference to an array
  - The statement: (nums is Array) evaluates to true

Some Keywords

- Inheritance-related
  - virtual
  - abstract
  - Access modifiers
    - public
    - protected
    - private
    - internal
    - protected internal
  - override
- Other
  - static
  - const
  - readonly

.NET Framework

- Lots of prewritten code
- A nice string class
- Lists and hash tables in System.Collections.Generic namespace
- System.Net and System.IO namespaces are where a lot of the relevant stuff for this class is
- Everything written in this class will run from the command line
  - Don’t need to know WinForms or WPF

String Class

- What's the value of s1, s2, and s3 when this code finishes executing?

```
string s1 = "Hello World";
string s2 = s1;
string s3 = s1;
s1.Replace("Hello", "Goodbye");
s2.Replace("World", "Universe");
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- Answer: all are "Hello World"
  - Recall that string are immutable

Streams

- Linear sequence of bytes
- System.IO.Stream is an abstract base class
- Read, write, seek
- FileStream, NetworkStream, GZipStream, PipeStream