

[illegible]

Difference between static class and singleton pattern?

Singleton objects are stored in Heap, but static objects are stored in stack.
We can clone (if the designer did not disallow it) the singleton object, but we can not clone the static class object .
Singleton classes follow the OOP (object oriented principles), static classes do not.
We can implement an interface with a Singleton class, but a class's static methods (or e.g. a C# static class) cannot.

The simplest way to consider things might be :

- use an instantiated class where each object has data on its own (like a user has a name)
- use a static class when it's just a tool that works on other stuff (like, for instance, a syntax converter for BB code to HTML ; it doesn't have a life on its own)

string builder vs string

The main difference is that a `StringBuilder` is *mutable* (meaning that it can be modified), whereas a `String` is *immutable* (meaning that once it is constructed it cannot be modified).

This difference is important for example if you are trying to create a large string from lots of smaller strings. If you use a `StringBuilder` you append the strings without creating a new object, giving $O(n)$ performance. If you use strings you create lots of intermediate strings which are immediately discarded, but all the extra copying means that it becomes an $O(n^2)$ operation.

String

```
string s = "";
for (int i = 0; i < 10000; ++i)
{
    s += "foo";
}
```

```

}
StringBuilder

```

```
StringBuilder sb = new StringBuilder();
for (int i = 0; i < 10000; ++i)
{
    sb.Append("foo");
}
string s = sb.ToString();
```

