



FALMOUTH
UNIVERSITY

COMP140-GAM160: Game Programming

9: Events and Decoupling

Learning outcomes

- ▶ **Understand** the Static and Singletons
- ▶ **Apply** decoupling strategies to your own code base

Static Keyword & Singletons



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<https://softwareengineering.stackexchange.com/questions/163457/understanding-the-static-keyword>

Static Example - C++

```
class PlayerStats
{
private:
    float currentHealth;

    static int Score;
public:
    static void AddScore(int Amount)
    {
        //Can't do this will get a compiler warning, can't reference a
        //non static variable in a static function
        //currentHealth += 2.0f

        //Can do the following because we are working with a static ←
        variable
        Score += Amount;
    };

    static int GetScore()
    {
        return Score;
    };
public:
    static int Deaths;
};
```

Static Usage - C++

```
//Notice we use :: (scope operator) to access the variable  
PlayerStats::Deaths = 0;
```

```
PlayerStats::Deaths++;
```

```
PlayerStats::AddScore(100);  
int score = PlayerStats::GetScore();
```

Static Example - C#

```
public class PlayerStats : MonoBehaviour
{
    private static int Score;
    public static int Deaths;

    public static void AddScore(int Amount)
    {
        //Can do the following because we are working with a static variable
        Score += Amount;
    }

    public static int GetScore()
    {
        return Score;
    }
}
```

Static Usage - C#

```
PlayerStats.Deaths = 0;  
PlayerStats.Deaths++;  
  
PlayerStats.AddScore(10);  
int score = PlayerStats.GetScore();
```

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- ▶ Creating Utility functions which don't require to be part of a class instance

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- ▶ C++ - <https://www.youtube.com/watch?v=zGPefqkwBK0>

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- ▶ Used for manager classes which track some sort of Global State
- ▶ **Warning!** Some consider Singletons to be an anti-pattern
- ▶ Singleton: an anti-pattern? - <https://stackoverflow.com/questions/12755539/why-is-singleton-considered-an-anti-pattern>

Unity Implementations

- ▶ Singleton - <https://unity3d.com/learn/tutorials/projects/2d-roguelike-tutorial/writing-game-manager>
- ▶ Better Singleton? - <https://stackoverflow.com/documentation/unity3d/2137/singletons-in-unity>

C++ Implementations

- ▶ Singleton - <http://gameprogrammingpatterns.com/singleton.html>

Events



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- ▶ Some of this function is already built into C#(delegates & Events) and Unity(Unity Events)

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- ▶ Unity (event system) - <https://unity3d.com/learn/tutorials/topics/scripting/events-creating-simple-messaging-system>

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- ▶ C++ (Observer Pattern) - <http://gameprogrammingpatterns.com/observer.html>

Coffee Break

