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The C++ Keyword **static**


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What is “static”?

- Storage Class
 - Lifetime, linkage, and treatment of objects and variables
 - Only one storage class per object
 - `extern`, `static`, `auto`, `register`
- Variables, functions, class methods and members can be declared static
 - Static duration: variable is allocated at program start and deallocated at program end
 - **Internal linkage**: symbol isn't visible outside of file in which it is declared



In particular cool!

Uses of “static” (1 / 4)

- A **static class method** is shared by all instances of the class
 - Can be called without instantiation of class
 - Cannot access instance members (directly)
 - Does not have implicit **this** pointer as hidden first parameter

Uses of “static” (2 / 4)

- A single copy of a **static class member** is shared by all class instances
 - Must be **defined** at file scope
 - *Exception: Constant static integral members can have an initializer*

Uses of “static” (3 / 4)

- A **static variable declared in a function** retains its state between calls

```
void DeeplyOffendedFunction()
{
    static bool alreadyCalled = false; // Initialized only once!

    if (!alreadyCalled)
    {
        alreadyCalled = true;
        std::cout << "We don't talk anymore!" << std::endl;
    }
}
```

Uses of “static” (4 / 4) – Your favorite! :-)

- A **static variable** or **function** at **file scope** has internal linkage
 - Variables have also static duration and are default-initialized to 0
- Wait... what? That's all!? – Yes it is, but consider the following:

- Use static functions in your class' .cpp file whenever you can
- Greatly increases readability of your code (even for yourself!)
- Say goodbye to your too long class method implementations
- Reduce code redundancy
- Best for “semi class independent” code snippets
- Better encapsulation than pure OO (one of *the* strengths of C++)
- Keep your class declarations clean (less private stuff in .h file)
- Avoid name clashes - don't forget “static”

Simplify your programmer's life!

- In your interest, use it **from now on...** I promise you'll love it!

