18 - CLASSES in C++

sexta-feira, 7 de fevereiro de 2025 07:01

CLASSES in C++

- OOP is a styla on how to write your code
- C++ doesn't mipl certain impies but support it
- way to grudata and functionalites together
- Variables made of class are called object variables
  - And a new object is na instance of that class
- Defining a class we define the visibility of the variables and functions
  - By default the visibility is private, need to specif as public to acces or protected
- Fuctions inside classes are called methods
- USEFULL TO GROUP THINGS TOGETHER AND ADD FUNCTIONALITIES TO THE OBJECT

CLASSES vs STRUCTS in C++

- Kind a similar one
- there is no much difference
- the main diference is the visibility options in structures (private, public, protected
  - Class is private by default
  - struct the default is public
- But this is tecnicly, but the use in code may differ
- struct exists by bacward compatibility with previous versions
  - the ompiler wouldn't know wht it was in old codes
- The usage differs
  - That is no right or wrong answer, differ by opinion
- struct used just to represent variables
- Never use a structure with inherence, go to classes

How to Write a C++ Class

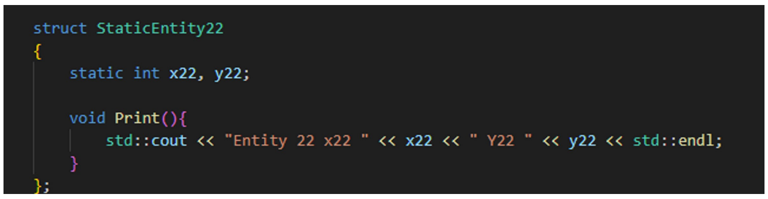
- Log class to manage the log messages, used for debug process
- console is like na information dump
- Defined simple functions, member variables (public and private)
- Instantiated in main and also used the public functions

Static in C++

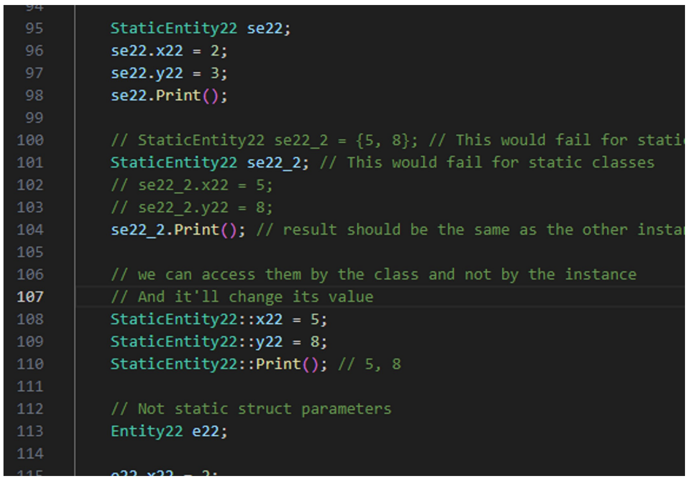
- 2 meanins,
  - outside of a class
    - Linkage of that symbel will be internal, only visible to that transation unit that you are working with (translation unit = file)
  - Inside of a class
    - All instances of that class will share the same memory, will only be one instance of that static variable across all instances of the class
- Focus on static outside of a class

Static for Classes and Structs in C++

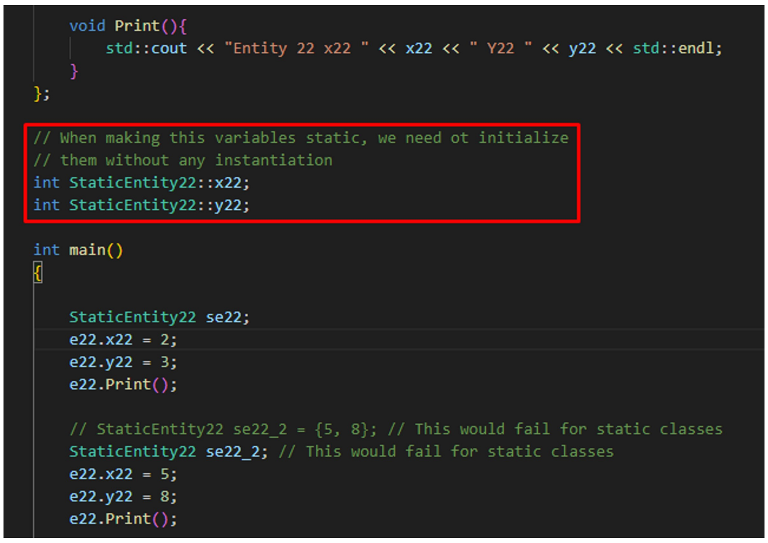
- If used with a variable
  - Only one instance of taht variable across al isntances of that class
  - If one of the entity changes taht variable, it'll affect all other instances
  - Better to update the value by it's class than instance
    - By isntance could cause confusion and bugs
- Static method
  - Don't have access to the class instance
  - call without a class instance
  - canno write code that refer to a class instance



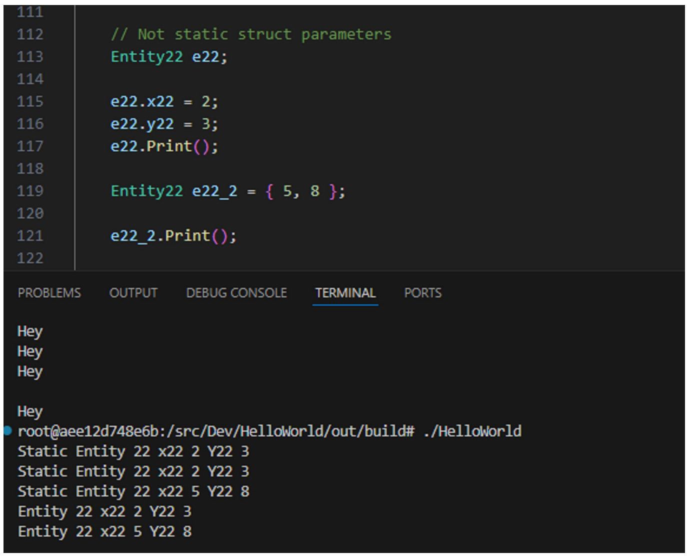
```cpp
struct StaticEntity22
{
    static int x22, y22;

    void Print(){
        std::cout << "Entity 22 x22 " << x22 << " Y22 " << y22 << std::endl;
    }
};
```



```cpp
    StaticEntity22 se22;
    se22.x22 = 2;
    se22.y22 = 3;
    se22.Print();

    // StaticEntity22 se22_2 = {5, 8}; // This would fail for stati
    StaticEntity22 se22_2; // This would fail for static classes
    // se22_2.x22 = 5;
    // se22_2.y22 = 8;
    se22_2.Print(); // result should be the same as the other insta

    // we can access them by the class and not by the instance
    // And it'll change its value
    StaticEntity22::x22 = 5;
    StaticEntity22::y22 = 8;
    StaticEntity22::Print(); // 5, 8

    // Not static struct parameters
    Entity22 e22;

```



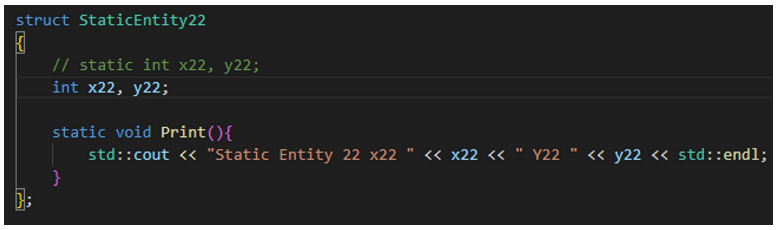
```cpp
    void Print(){
        std::cout << "Entity 22 x22 " << x22 << " Y22 " << y22 << std::endl;
    }
};

// When making this variables static, we need ot initialize
// them without any instantiation
int StaticEntity22::x22;
int StaticEntity22::y22;

int main()
{

    StaticEntity22 se22;
    e22.x22 = 2;
    e22.y22 = 3;
    e22.Print();

    // StaticEntity22 se22_2 = {5, 8}; // This would fail for static classes
    StaticEntity22 se22_2; // This would fail for static classes
    e22.x22 = 5;
    e22.y22 = 8;
    e22.Print();
```



```cpp
    // Not static struct parameters
    Entity22 e22;

    e22.x22 = 2;
    e22.y22 = 3;
    e22.Print();

    Entity22 e22_2 = { 5, 8 };

    e22_2.Print();
```

```
Hey
Hey
Hey

Hey
root@aee12d748e6b:/src/Dev/HelloWorld/out/build# ./HelloWorld
Static Entity 22 x22 2 Y22 3
Static Entity 22 x22 2 Y22 3
Static Entity 22 x22 5 Y22 8
Entity 22 x22 2 Y22 3
Entity 22 x22 5 Y22 8
```

Can access a non-static variable within a class, t generates na error



```cpp
struct StaticEntity22
{
    // static int x22, y22;
    int x22, y22;

    static void Print(){
        std::cout << "Static Entity 22 x22 " << x22 << " Y22 " << y22 << std::endl;
    }
};
```

Constructors in C++

- Special type of method that runs each time we instantiate na object
- When we instantiate a class without initializing the parameters, there is no actual value and they would receive garbage
- To declare it, there is no return type and needs to match the name of the class
  - Can ptionally give parameters
- Has to manually initialize the primitive values, otherwise i'll get garbages in c++
  - Other languages may have different behaviours
- We can write as much constructors as we want, but with different parameters to have diferent signatures
- can defien class with static propertis and methods, and don't want to instantiate nothing (no constructores
  - <Class Name>() = delete;