EME 152 Discussion 6

November 3, 2021

Agenda

- C++ classes
  - Public vs. private members
  - Declaring member functions
- File system
  - Read
  - Write

Classes

- A class is a data structure in Ch/C++ programs
- Classes are an extension of the C "struct" (structure)
- Ch/C++ classes also support:
  - Public and private members
  - Member functions
- CPlot is an example of a Ch class.
  - `data2d()` is an example of a CPlot member function.

Source: C for Engineers and Scientists

Classes - Access Modifiers

- Like C structs, C++ classes may have members (variables, functions, etc.) However, C++ members may be declared public or private.
    - Public members may be accessed just like C struct members by any function or class.
    - Private members may only be accessed by that class's own member functions.
    - "Public" and "private" are called access modifiers.

Source: C for Engineers and Scientists

Classes - Member Function

- A member function is a function that resides within a class. Member functions have access to all members within a class, including private members.
- To create a class member function, perform the following steps:
  - Declare the function within the body of the class declaration.
  - Define the function using the scope resolution operator, '::'.

Source: C for Engineers and Scientists

Classes - Comparison

Right: C++ class with member functions.

Bottom: The same structure in C.

```cpp
class Student
{
    private:
        int id;
        char name[32];

    public:
        void setDetails(int newId, const char *newName);
        void getDetails(void);
};

void Student::setDetails(int newId, const char *newName)
{
    id = newId;
    strcpy(name, newName);
}

void Student::getDetails(void)
{
    cout << "My ID is " << id << endl;
    cout << "My name is " << name << endl;
}
```

```c
struct Student
{
    int id;
    char name[32];
};
```

Classes - Usage

```c
int main(void)
{
    Student me;

    me.setDetails(4321, "Nicolas");
    me.getDetails();

    return 0;
}
```

Using a third party class in Ch

- If/when you use third party C++ packages, typically you will only have access to the header files: This means you will only have access to the public member variables and functions.
- The header files along with documentation should provide the programmer with enough information to use the provided classes. The actual implementation is hidden from the programmer.

Source: C for Engineers and Scientists

File System

- In C, file manipulation is done via the functions `fopen()`, `fclose()`, and file pointers. Other useful functions are `fprintf()`, `fscanf()`, and `feof()`.
- `fprintf()` and `fscanf()` are analogues of `printf()` and `scanf()`. `feof()` is used to detect if a file pointer is pointing to the end of a file.

Source: C for Engineers and Scientists

File System

`fopen(filename, mode);`	Open a file and return the input stream.
`fclose(stream);`	Close the file. (End the stream.)
`fprintf(stream, format, …);`	Write formatted data to the stream.
`fscanf(stream, format, …);`	Read formatted data from the stream.
`feof(stream);`	Check if the end of file is reached.

Thank you!

Questions?