Object Oriented Programming with C++

2024 Spring Semester

21 CST H3Art

Introduction

Grade distribution

- Homework assignments: 10%
- Attendance: 10%
- Midterm exam:20%
- Final exam: 60%

C++: A federation of languages

- C
  - C is the base of C++
- Object-Oriented C++
  - C with classes: **classes（类）**, **encapsulation（封装）**,**inheritance（继承）**, **polymorphism（多态）**, **virtual functions（虚函数）** et al.
- Template（模板） C++
  - **Generic programming（泛型编程）**
- STL
  - **Standard Template Library（标准模版库）**

Chapter 2 Beginning with C++

- C++ has **two conventions** for comment:

```
//

/* */ C-syntax
```

- A line beginning with a **pound sign(#)** is called a **preprocessor directive**

```
#include <iostream>
```

  - Header files contain constant, variable, data type,classes and function **declarations** needed by a program (**no definitions**)

Type of header file	Rule	Examples
C style	With suffix .h	string.h, iostream.h
C++ style	Without suffix .h	string, iostream
Converted c style	With affix c and without suffix .h	cstring, cmath

- C++ provides **namespaces** to prevent name conflicts.
  - Namespace defines a scope for the identifiers that are used in a program.

- Namespace is the mechanism for supporting module programming paradigm (模块编程范式).
- **std** is the namespace where identifiers in ANSI C++ **standard libraries** are declared.

```
using namespace std;
```

- An identifier declared within a namespace block **can be accessed directly** only by statements within that block.
- To access an identifier that is **"hidden" inside a namespace**, the programmer has several options. We describe two options here.
  - The first option is to **use a qualified name for the identifier**. A qualified name consists of the name of the namespace, then the **:: operator** (**the scope resolution operator**), and the desired identifier:

```
std::cout
```

  - The second option is use a statement called a using directive:

```
using namespace std;
```

- **Output & Input**
  - For standard output, use **cout**
    - **cout** is a predefined object of the standard output stream

```
cout << S1 << ' ' << S2 << ' ' << S3 << endl;
```

    - The reserved word, **endl**, ensures that the next cout command prints its stuff on a **new line**.
    - The identifier **endl** is a special C++ feature called a **manipulator**.
    - New lines can also be added using '**\n**'.
  - For standard input, use **cin**
    - **cin** is a predefined object of the standard input stream

```
cin >> V1 >> V2 >> V3;
```

    - Split the input elements by **space** or **return**.