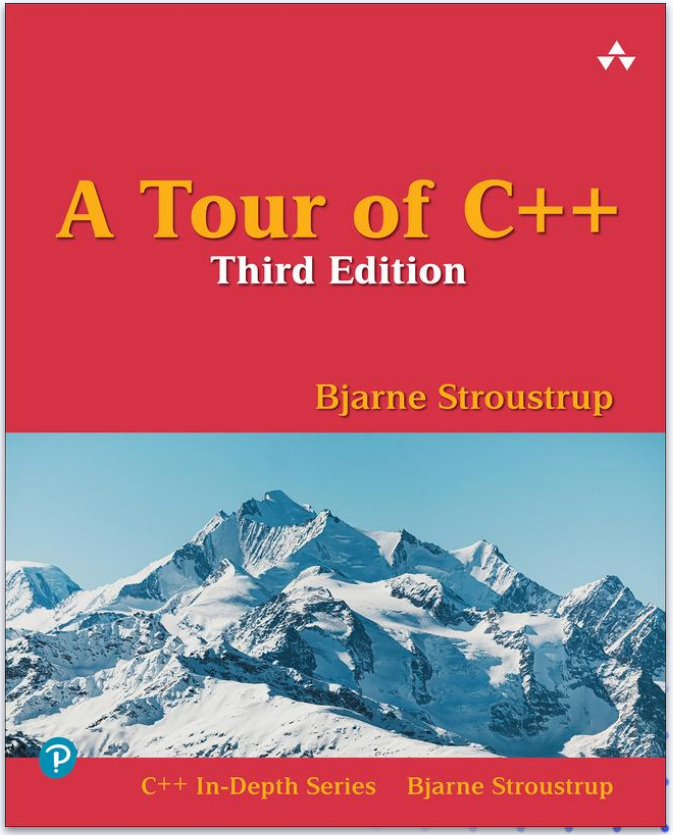
Friends

CSE 232 - Dr. Josh Nahum

Reading:

No Reading



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Encapsulation

Object Oriented Programming

Classes

Keep the data and operations on that data together (encapsulation)

Access

Ensure that only that class (or closely related others) are able to access sensitive data and operations

Extensibility

Allow classes to be extended through inheritance (not taught in CSE 232)

01

Access Control

private versus public

Data members and function members should be made **private** if other parts of the project should not directly access them. Accessors (like getters and setters) can be provided for controlled access.

“But what do we do if we want a specific function to be able to access private data?”

—Inquisitive Mind

Example operator==

```
// login.h
class Login {
public:
  std::string username;
private:
  std::string password;
  // ...
};
bool operator==(Login const &, Login const &);

// login.cpp
bool operator==(Login const & a, Login const & b) {
  return a.username == b.username && a.password == b.password;
  // error: password is private
}
```

02

Friend Functions

Example operator==

```
// login.h
class Login {
public:
  std::string username;
private:
  std::string password;
  // ...
  friend bool operator==(Login const &, Login const &);
};

// login.cpp
bool operator==(Login const & a, Login const & b) {
  return a.username == b.username && a.password == b.password;
}
```

Friend Functions

Private Access

Friend functions can access private data members of a class

Declaration

To make a function a friend, you must declare the function inside the class and prefix it with the `friend` keyword.

Common Friend Functions

Comparison Operators

operator==, operator!=, operator<, etc.

IO Operators

operator<< and operator>>

Factory Functions

Functions that are used to create and return objects

Iterators

Objects used to provide access to elements of an object

03

Friend Classes

You've got a friend in me!

You can make entire an entire class a friend. If so, that class can access all your private data.

Note: this isn't necessarily reciprocated.

Live Demo

Attribution

Please ask questions via Piazza

Dr. Joshua Nahum
www.nahum.us
EB 3504

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