Hochiminh City University of Technology
Computer Science and Engineering
[CO1027] - Fundamentals of C++ Programming

Libraries

Lecturer: Duc Dung Nguyen
Credits: 3

Today's outline

- Handle with a File IO
- String library
- Coding convention – header file

File IO

File IO Steps

1. Include the <fstream> library
2. Create a stream (input, output, both):
   - ifstream myfile; (for reading from a file)
   - ofstream myfile; (for writing to a file)
   - fstream myfile; (for reading and writing to a file)
3. Open the file myfile.open("filename");
4. Read or write the file
5. Close the file myfile.close();

ifstream

```
//source: http://www.cplusplus.com/reference/fstream/ifstream/open/
// print the content of a text file.
#include <iostream>      // std::cout
#include <fstream>       // std::ifstream
using namespace std;
int main() {
    ifstream ifs;
    ifs.open(“CO1011.csv", ifstream::in);

    char c = ifs.get();
    while (ifs.good()) {
       cout << c;
       c = ifs.get();
    }

    ifs.close();
    return 0;
}
```

ofstream

```cpp
// ofstream constructor.
#include <fstream>       // std::ofstream
using namespace std;

int main() {
  ofstream ofs("test.txt", ofstream::out);

  ofs << "Welcome to CO1011!\nLecture 4: Libraries.\n";

  ofs.close();
  return 0;
}
```

Common functions

operator<<	Insert formatted output (public member function)
put	Put character (public member function)
write	Write block of data (public member function)
tellp	Get position in output sequence (public member function)
seekp	Set position in output sequence (public member function)
flush	Flush output stream buffer (public member function)
good	Check whether state of stream is good (public member function)
eof	Check whether eofbit is set (public member function)
fail	Check whether either failbit or badbit is set (public member function)
bad	Check whether badbit is set (public member function)

Open mode

member constant	stands for	access
in	**in**put	File open for reading: the *internal stream buffer* supports input operations.
out	**out**put	File open for writing: the *internal stream buffer* supports output operations.
binary	**binary**	Operations are performed in binary mode rather than text.
ate	**at e**nd	The *output position* starts at the end of the file.
app	**app**end	All output operations happen at the end of the file, appending to its existing contents.
trunc	**trunc**ate	Any contents that existed in the file before it is open are discarded.

http://www.cplusplus.com/reference/fstream

String <string>

String input

To retrieve a string, we can use:

- `gets_s()` in <`cstdio`> (learn previous lecture)
- Or `getline()` in `<iostream>`

Example

```
#include<iostream>
#include<string>
using namespace std;

int main()
{
    string userName;
    cout << "Tell me your name? ";
    getline(cin, userName);
    cout << "Hello " << userName << "!\n";
    return 0;
}
```

String functions

- **strlen()** return the length of the string
- **strcat_s()** concatenates a copy of str2 to str1
- **strcmp()** compares two strings
- **strcpy_s()** copys contents of str2 to str1

Example

```
/* strcat example */
#include <iostream>
#include <cstring>
using namespace std;

int main() {
    char str[80];
    strcpy_s(str, "these ");
    strcat_s(str, "strings ");
    strcat_s(str, "are ");
    strcat_s(str, "concatenated.");
    cout<<str<<endl;
    cout << "The length of the string: " << strlen(str)<<endl;
    return 0;
}
```

Coding conversion - header files

Header files

In programming convention:

- Header files (.h) contain information about how to do a task. Header files are declaration.
- The main program (.cpp) contains information about what to do. The cpp file are definition.

Example

main.cpp

```cpp
#include<iostream>
using namespace std;


int main()
{
    cout << "Welcome to C++!\n";
    return 0;
}
```

Example

main.cpp

```cpp
#include"main.h"

int main()
{
   cout << "Welcome to C++!\n";
   return 0;
}
```

Please note
using double quotes here.

main.h

```cpp
#include<iostream>

using namespace std;
```

Summary

- Handle with a File IO
- String library
- Coding convention – header file