# C++ Files and Streams


We have so far learnt iostream standard library, which provides cin and cout methods for reading from standard input and writing to standard output respectively.

In this session, we will learn how to read and write from a file., which requires another standard C++ library called fstream, which defines three new stream classes:

- ofstream
- ifstream
- fstream

# C++ Files and Streams

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| Stream Class | Description |
|---|---|
| ofstream | ofstream represents the output file stream and is used to create files and to write on files. |
| ifstream | ifstream represents the input file stream and is used to read from files. |
| fstream | fstream represents the file stream generally, and has the capabilities of both ofstream and ifstream which means it can create files, write on files, and read from files. |

# ofstream

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1. Create a file:

ofstream file(filename);

Or

ofstream file;
file.open(filename);

2. Write on file”

using “<<” to write on file

# ofstream

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```
#include"stdafx.h"
#include <fstream>
#include <iostream>
int main()
{
    using namespace std;

    // ofstream is used for writing files

    // Or open a file
    ofstream outf;
    outf.open("Sample.dat");

    // If we couldn't open the output file stream for writing
    if (!outf)
    {
        // Print an error and exit
        cerr << "Uh oh, Sample.dat could not be opened for writing!" << endl;
        exit(1);
    }

    // We'll write two lines into this file
    outf << "Welcome to ENGR-AD-202 Course " << endl;
    outf << "Students: " << endl;
    outf << "Jason " << endl;
    outf << "Tom " << endl;

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

# ifstream

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1. Open a file:

```
ifstream file(filename);
```

Or

```
ifstream file;
file.open(filename);
```

2. Read file

using “>>” to read file

# ifstream

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```
#include"stdafx.h"
#include <fstream>
#include <iostream>
int main()
{
    using namespace std;

    // ifstream is used for reading files

    // Or open a file
    ifstream inf;
    inf.open("numbers.txt");

    // If we couldn't open the output file stream for reading
    if (!inf)
    {
        // Print an error and exit
        cerr << "Uh oh, numbers.txt could not be opened " << endl;
        exit(1);
    }
    int num;
    // We'll read numbers from files
    while(!inf.eof())
        {
        inf >> num;
        cout << num << endl;
        }
    return 0;
}
```

# fstream

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1. Open or Create a file:

```
fstream file(filename, ios::in | ios::out );
```

Or

```
fstream file;
file.open(filename, ios::in | ios::out);
```

2. Input or Output file

using “>>” to read file and

using “<<” to write on file

# fstream (write file)

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```
#include"stdafx.h"
#include <fstream>
#include <iostream>
int main()
{
    using namespace std;

    // ofstream is used for writing files

    // Or open a file
    fstream outf;
    outf.open("Sample3.dat", ios::out);

    // If we couldn't open the output file stream for writing
    if (!outf)
    {
        // Print an error and exit
        cerr << "Uh oh, Sample3.dat could not be opened for writing!" << endl;
        exit(1);
    }

    // We'll write two lines into this file
    outf << "Welcome to ENGR-AD-202 Course " << endl;
    outf << "Students: " << endl;
    outf << "Jason " << endl;
    outf << "Tom " << endl;

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

# fstream (read file)

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```
#include"stdafx.h"
#include <fstream>
#include <iostream>
int main()
{
    using namespace std;

    // ifstream is used for reading files

    // Or open a file
    fstream inf;
    inf.open("numbers.txt", ios::in);

    // If we couldn't open the output file stream for reading
    if (!inf)
    {
        // Print an error and exit
        cerr << "Uh oh, numbers.txt could not be opened " << endl;
        exit(1);
    }
    int num;
    // We'll read numbers from files
    while(!inf.eof())
        {
        inf >> num;
        cout << num << endl;
        }
    inf.close();
    return 0;
}
```

# fstream (get function)

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```
#include"stdafx.h"
#include <fstream>
#include <iostream>
#include <string>
using namespace std;
int main()
{

    // ifstream is used for reading files

    // Or open a file
    fstream inf;
    inf.open("numbers.txt", ios::in);

    // If we couldn't open the output file stream for reading
    if (!inf)
    {
        // Print an error and exit
        cerr << "Uh oh, numbers.txt could not be opened " << endl;
        exit(1);
    }
    char ch;
    // We'll read numbers from files
    while(!inf.eof())
        {
        inf.get(ch);
        cout<<ch;
        }
    inf.close();
    return 0;
}
```

# fstream (put function)

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```
#include"stdafx.h"
#include <fstream>
#include <iostream>
int main()
{
    using namespace std;

    // ofstream is used for writing files

    // Or open a file
    fstream outf;
    outf.open("Sample4.dat", ios::out);

    // If we couldn't open the output file stream for writing
    if (!outf)
    {
        // Print an error and exit
        cerr << "Uh oh, Sample3.dat could not be opened for writing!" << endl;
        exit(1);
    }
     // We'll write two lines into this file
    outf.put('a');
    outf.put(' ');
    outf.put('\n');
    outf.put('a');
    outf.put(' ');
    outf.put('c');
    outf.put('\n');
    outf.close();
    return 0;
}
```

# fstream (getline function)

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```
#include"stdafx.h"
#include <fstream>
#include <iostream>
#include <string>

using namespace std;

int main()
{

    // ifstream is used for reading files

    // Or open a file
    fstream inf;
    inf.open("numbers.txt", ios::in);

    // If we couldn't open the output file stream for reading
    if (!inf)
    {
        // Print an error and exit
        cerr << "Uh oh, numbers.txt could not be opened " << endl;
        exit(1);
    }
    int num;
    string line;
    // We'll read numbers from files
    while(!inf.eof())
        {
        getline(inf,line);
        cout << line<<endl;
        }
    inf.close();
    return 0;
}
```