C++ Programming
Files and Streams 1

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Teaching, Training and Coaching since more than a decade!

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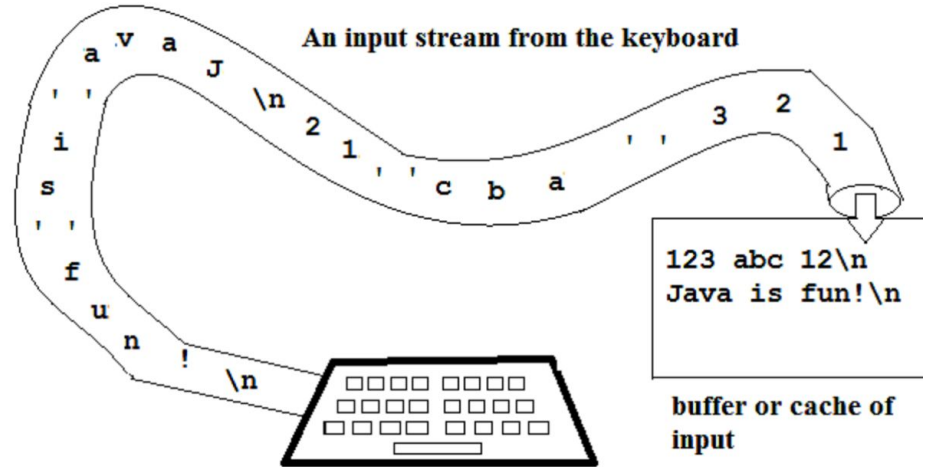*PhD* from Simon Fraser University - Canada
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Console

- So far we read & write to console (the black screen / IDL screen)
  - IO stream from keyboard using cin & cout (objects)
- In practice, we want to save data in disk not memory
- So we need to learn reading & writing to files
-

An input stream from the keyboard

```
J a v a
\n 2 1 ' '
' ' c b a
3 2
1
```

```
123 abc 12\n
Java is fun!\n
```

buffer or cache of input

i
s
' '
f
u
n ! \n

Img src

The easy way: freopen

- You can convert any C++ project from cin/cout reading to read from files using 1 line for reading and another line for writing
- E.g. put freopen in main in any project. Now code reads from file
  - See **16_17_library_v2.cpp**: Notice a commented freopen line to read from **c.in**

```cpp
6  int main()
7  {
8      freopen("read_file.txt", "rt", stdin);
9
10     freopen("my_output.txt", "wt", stdout);
11
12     return 0;
13 }
14
```

Freopen example: read 2 numbers and sum

17_02.cpp	read_file.txt ⊠

```
1  3 6
```

Console ⊠
\<terminated\>
9

17_02.cpp ⊠	read_file.txt

```cpp
1  #include<iostream>
2  #include <bits/stdc++.h>
3  using namespace std;
4
5  int main() {
6      freopen("read_file.txt", "rt", stdin);
7
8      int x, y;
9      cin >> x >> y;
10
11     cout << x + y;
12
13     return 0;
14  }
15
```

Reading using ifstream

```cpp
17_03.cpp

 1  #include<iostream>
 2  #include<fstream>    // for ifstream and ofstream
 3  using namespace std;
 4
 5  int main() {
 6      ifstream fin("read_file.txt");
 7
 8      if(fin.fail())
 9      {
10          cout<<"Can't open the file\n";
11          return 0;
12      }
13      int x, y;
14      fin >> x >> y;
15
16      cout << x + y;
17
18      fin.close();
19
20      // you can read from several files
21
22      return 0;
```

Writing using ofstream

```cpp
int main() {
    ifstream fin("read_file.txt");

    if(fin.fail())
    {
        cout<<"Can't open the file\n";
        return 0;
    }
    int x, y;
    fin >> x >> y;
    fin.close();

    ofstream fout("my_output.txt");

    if(fout.fail())
    {
        cout<<"Can't open the output file\n";
        return 0;
    }

    fout << x + y;
    fout.close();
```

"Acquire knowledge and impart it to the people."

"Seek knowledge from the Cradle to the Grave."