

CS150 Intro to CS I

Fall 2017

Chapter 5

File Input and Output

- Reading: pp. 265-284
- Good Problems to Work: p.284[5.16, 5,17 (six steps), 5.20, 5.21, 5.22]

Files

- Data stored in variables is temporary
- We will learn how to write programs that can
 - Create files
 - Write to files
 - Read from files

Steps to Using Files

- There are six steps that must be taken in order to use files in C++
 1. Include proper header files
 2. Create a variable to communicate with a file (Define a file stream object)
 3. Open the file
 4. Check that the file opened correctly
 5. Use the file
 6. Close the file

1. Header Files

- To access files you will need

```
#include <iostream>
```

```
#include <fstream>
```

2. File Stream Objects (Variables)

```
ifstream inputFile;
```

```
ofstream outputFile;
```

```
fstream inAndOut;
```

3. Opening Files

```
inputFile.open ("filename");
```

- Same syntax for both input and output files
- Filename is a string literal
- Example:

```
ifstream inputFile;  
inputFile.open ("grades.txt");
```

4. Check File Opened Correctly

```
inputFile.open ("grades.txt");  
if (inputFile.fail())  
{  
    cout << "Error opening input file ";  
    exit (EXIT_FAILURE);  
}
```

5. Using File Variables

- Use the input file variable wherever you would use **cin**

```
inputFile >> num;
```

- Use output file variable wherever you would use **cout**

```
outputFile << num;
```

- Can read/write double, char, int, string

6. Closing Files

- Any files that have been opened must be closed at the end of the program

```
inputFile.close ();
```

```
outputFile.close ();
```

Problem: Input File

- A datafile "numbers.txt" exists with one double per line. The final value in the file is -99.0 which is called the **sentinel value**. The sentinel value is not part of any calculation.
- Write a C++ program that calculates the average of all numbers in the file "numbers.txt"

Problem: Output File

- Write a C++ program that writes to a file "squares.txt" the **squares** of the numbers from 1 to 10, one per line.