

## Lab2

### Sending the output to a printfile

### Data Types

You are required to submit hard copies of all programs and program runs for every assignment given to you. This lab explains how to send the output to a text file which can be printed from any program (such as notepad) or directly from DOS.

Suppose you created a text file called carpet.txt from a program, this file then can be printed by opening it under Word, WordPerfect, or any other program. You can also print it by going to DOS prompt and typing the following: **type carpet.txt > prn**

Program OneA\_1.

```

/*****
    Printing to a file
    By Dr. John Abraham
    Created for 1380 students
    Instructional objective: create print file One_2.txt
    *****/

#include <iostream>
#include <fstream> //to handle files

using namespace std;

int main ()
{
    int i,j,k,l, m,n;
    float a,b,c;
    ofstream outfile; //output file stream handle is outfile
    outfile.open("a:One_2.txt"); //assign a DOS name to the handle
                                //creates a file called One_2.txt in floppy drive A:

    //integer operations
    cout << "INTEGER OPERATIONS\n \n";
    i = 6 + 3;
    l = 6.5;
    m = 3.5;
    j = l + m;
    k = 10 /3;
    n = 10 % 3;
    cout << "6 + 3 = " << i << "\n";
    cout << "l = 6.5, m = 3.5 ----->l + m = " << j << "\n";
}

```

```

cout << "10 / 3 = " << k << "\n";
cout << "10 % 3 = " << n << "\n";
outfile << "6 + 3 = " << i << "\n";
outfile << "l = 6.5, m = 3.5 ----->l + m = " << j << "\n";
outfile << "10 / 3 = " << k << "\n";
outfile << "10 % 3 = " << n << "\n";

//real and mixed operations
cout << "\nREAL AND MIXED OPERATIONS \n \n";
outfile << "\nREAL AND MIXED OPERATIONS \n \n";
a = 10 / 3;
b = 10.0 / 3.0;
c = 10.0 / 3;

cout << "10 / 3 = " << a << "\n";
cout << "10.0 / 3.0 = " << b << "\n";
cout << "10.0 / 3 = " << c << "\n";
outfile << "10 / 3 = " << a << "\n";
outfile << "10.0 / 3.0 = " << b << "\n";
outfile << "10.0 / 3 = " << c << "\n";
outfile.close();
getchar();

return 0;
}

```

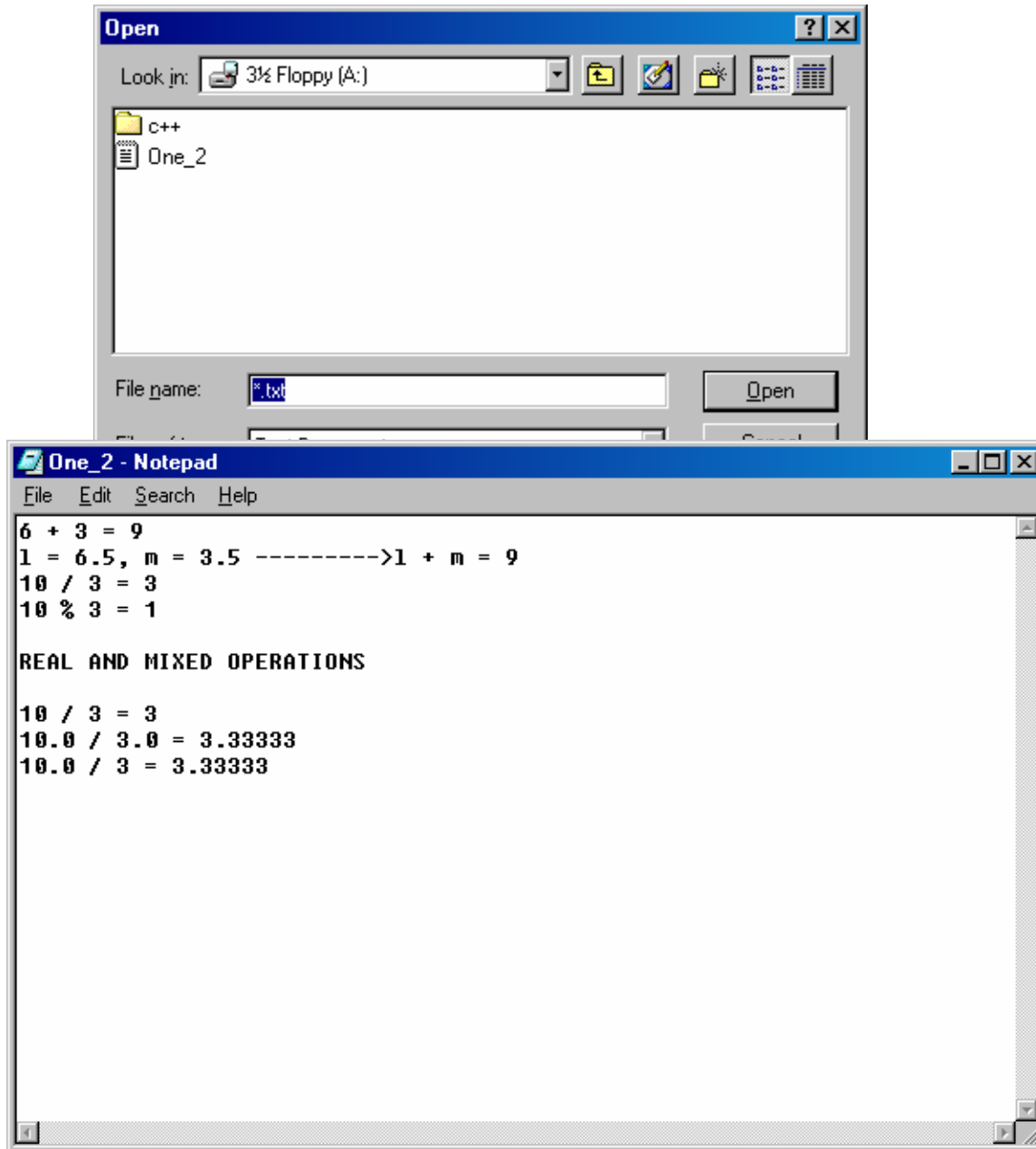
In order to create a textfile follow these steps:

1. Required preprocessor directive: `#include <fstream>`
2. Give a file handle such as `outfile`, `printfile`, `textfile`, or anything you like. Now on the file will be referred to using this name in the program.
3. Assign this handle to an actual DOS file name. DOS file names are 8 character long, a dot, and 3 character extension. You may include the drive letter and path in front of the file name. For example:  
**C:\mydocuments\cprograms\printfiles\carpet.txt**
4. Place any character stream you want in this file by using the `<<` flow director. The easiest way to do this is to make copies of every **cout lines** in the program and change the `cout` to the file handle name. See example Program OneA\_1.
5. Close the file.

To print the textfile created by this program, follow these steps:

1. Open Notepad from Start → Programs → Accessories
2. Open the file you created
3. From file option, choose print

You will be required to follow these steps for all program assignments now on.



Given below is another example of a program that sends output to a file. This program calculates area and perimeter of a circle. In this program, I have placed all file related code in one separate section.

```
***** Program:    Calculate area and perimeter of a Circle
                By:      Dr. John Abraham
                        Prepared for my CSCI 1380 students
                Assignment: number 2
                Due Date:  1-25-05
```

Algorithm:

1. Get the radius of the circle
2. Calculate the perimeter using the equation  
 $\text{perimeter} = 2 * \text{radius} * \text{PI}$
3. Calculate the area using the equation  
 $\text{area} = \text{radius} * \text{radius} * \text{PI}$
4. Print out the perimeter and area

```
                *****/
#include <iostream>
#include <fstream>
using namespace std;
int main()
{
    /*** declarations *****/
    const float PI = 3.14;

    float radius, area, perimeter;

    /**** Input *****/
    cout << "Enter the radius of the circle in cm? " ;
    cin >> radius;

    /**** Process *****/
    area = PI * radius * radius;
    perimeter = 2 * PI * radius;

    /**** output to screen *****/
    cout <<endl << "The area of the circle is: " << area << "cm2"
<<endl;
    cout <<"The perimeter of the circle is: " <<perimeter << "cm"
<<endl;

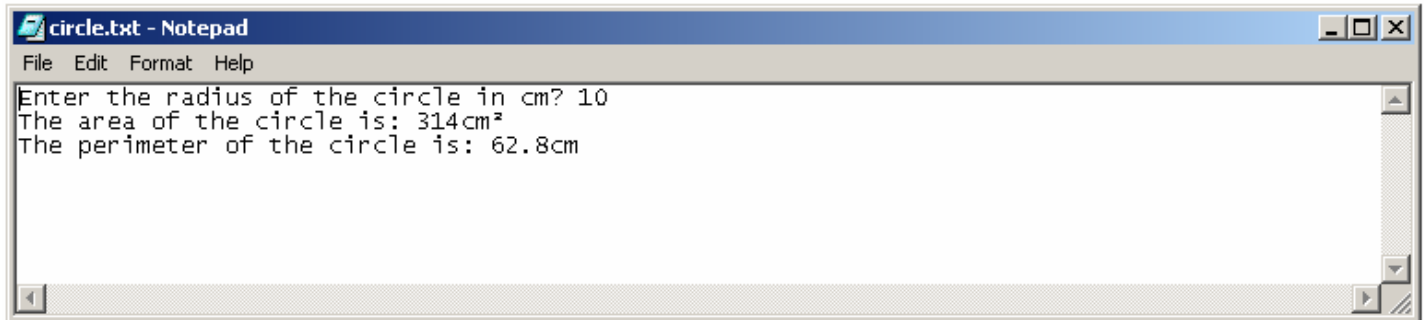
    /*** output to file *****/
    //This output includes data input section as well

    ofstream outfile; //output file stream handle is outfile
    outfile.open("a:circle.txt"); /* assign a DOS name to the handle.
                                   creates a file called
circle.txt in floppy drive A: */

    outfile << "Enter the radius of the circle in cm? " << radius;
    outfile <<endl << "The area of the circle is: " << area << "cm2"
<<endl;
    outfile <<"The perimeter of the circle is: " <<perimeter << "cm"
<<endl;
```

```
        outfile.close(); //close the file
return 0;
}
```

And here is the output.



```
circle.txt - Notepad
File Edit Format Help
Enter the radius of the circle in cm? 10
The area of the circle is: 314cm²
The perimeter of the circle is: 62.8cm
```

## C++ Data Types

There are simple data types such as integer, float, double, char, Bool etc. that can only hold one value at a time. Compound data types can have multiple values such as grades from a test. We will be studying compound data types and user defined data types later. Declaring data types enables the compiler to set aside necessary amount of memory storage. For example, short integer takes 2 bytes of storage and holds any numbers between -32,768 and +32,767 inclusive. If you define a data type as int the compiler will set aside by word of memory (word varies on different machines). A 32 bit machine will set aside 4 bytes for an int that can hold any value from -2,147,483,648 to +2,147,483,647.

A char data type can hold one character and it requires one byte. If you need store a name of a customer in the memory you have to declare an array of characters or use an object of the C++ string class. In order to use the string class you need to add `#include <string>` as a preprocessor directive.

There are three data types than can be used for floating point numbers: float, and double. Float requires 4 bytes and the double 8 bytes. The more bytes used the better the precision of the number.

Since the amount of memory set aside is different on different machines, C++ provides for a way to find the amount of memory set aside: `sizeof(int)` will give you amount of memory saved for an int. You can substitute the data type used inside the parenthesis.

Before manipulating a variable, you must assign a value to it. You can assign a value at the time you declare a variable – we call this initializing a variable. Or you can read a value from a file or the keyboard.

**Homework:**

Write a program to find the average of three grades for a student. Display the name of the student and the average of these three grades. Learn to use the String Class.