Midterm Exam

Programming Workshop 2 (CSCI 1061U)

Family name: _____

Given names: _____

Student number: _____

Question	Marks
1	_____ /2
2	_____ /2
3	_____ /4
4	_____ /8
5	_____ /16
Total	_____ /32

Instructions

- All code must be written using a text editor, such as vi, emacs, sublime, notepad++, etc. In other words, please do not use an IDE for this exercise.
- You are only allowed to access the following website(s): http://en.cppreference.com/w/
- Please do **not** access any other resource (past exercises, assignments, labs, books, manuals, etc.) on your laptop, and please do not access any other website.
- Submit via Blackboard.
- This exam has two parts. A written part and a programming part. You need to complete the written part and hand it in before attempting the programming part of the exam.

Written Part

Question 1

Write a `do while` loop that prints every even number between `33` and `57`.

Question 2

Change the following piece of code such that it capitalizes the letters passed to it via command line.

```
// filename: capitalize.cpp
#include <iostream>
using namespace std;

int main(int argc, char** argv)
{
  for (int i=0; i<argc; ++i) {
    cout << argv[i] << endl;
  }

  return 0;
}
```

Example usage of the program will be something like this:

```
$ gcc capitalize.cpp -o capitalize
$ capitalize a b f a f
A B F A F
$
```

Question 3

Complete the following function to print every value that is greater than `10`.

```
void print_even(int arr[], int sz)
{
    cout << "Values that are greater than 10 are:" << endl;









}
```

Programming Part

Question 4

Write a program that prints the words stored in a `words.txt` file. We will use the program as follows:

```
$ g++ words.cpp -o words
$ ./words
and
or
this
that
oshawa
$
```

In the above example the `words.txt` file is as follows

```
and
or
this
that
oshawa
```

Starter Code

Use the following starter code for this question

```cpp
//filename: words.cpp
#include <iostream>
#include <fstream>
#include <string>
using namespace std;

int main()
{
    fstream f("words.txt");
    if (!f.is_open()) {
        cout << "Cannot open file words.txt" << endl;
    }

    f.close();

    return 0;
}
```

Question 5

You are asked to develop a c++ program that uses a 2D array to create the following patterns (of height no more than 10).

```
$ g++ pattern.cpp -o pattern
$ pattern 5
1
1 1
1 2 1
1 3 3 1
1 4 6 4 1
$ pattern 2
1
1 1
$ pattern 3
1
1 1
1 2 1
$
```

Test files

You can use the following input and output files to test the accuracy of your program.

The input file is:

```
6
```

The output file is:

```
Enter height (between 1 and 10): 1
1 1
1 2 1
1 3 3 1
1 4 6 4 1
1 5 10 10 5 1
```

If you run the code as follows:

```
$ ./pattern < input.txt > foo.txt
```

The `foo.txt` should be exactly the same as `output.txt`. You can check for differences as follows:

```
$ diff foo.txt output.txt
```

If the above command doesn't output anything then your program works. You can make similar files for any height greater than 0 and less than or equal to 10.

Hint

The following figure (Fig. 1) illustrates the mechanism through which numbers if row i are generated using numbers in the previous row $i-1$. Note that first row is always 1. Each row has one more number than the row before. And the outermost entries at each row is equal to 1.

Starter Code

Use the following starter code for this question

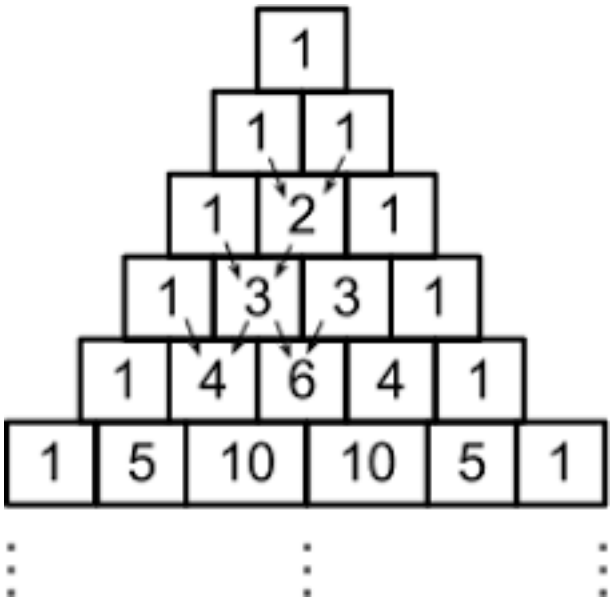

Figure 1: Pattern

```
#include <iostream>

using namespace std;

void reset_pattern(int pattern[][10])
{
    // TO DO
}

void print_pattern(int pattern[][10])
{
  bool row_printed = false;

  for (int i=0; i<10; ++i) {
    row_printed = false;
    for (int j=0; j<10; ++j) {
      if (pattern[i][j] > 0) {
        row_printed = true;
        cout << pattern[i][j] << ' ';
      }
    }
    if (! row_printed) break;
    cout << endl;
  }
}

int main()
{
  int height;
```

```
  cout << "Enter height (between 1 and 10): ";
  cin >> height;

  int pattern[10][10];
  reset_pattern(pattern);

  // TO DO

  print_pattern(pattern);

  return 0;
}
```

Submission

Submit Q4 and Q5 via Blackbaord.