University of Hong Kong
Faculty of Engineering
Department of Computer Science

CSIS/COMP1117B Computer Programming
Assignment 2
(Due: 24 October 2014)

Program 1.

Pascal's Triangle is the following pattern:

```
                    1
                1       1
            1       2       1
        1       3       3       1
    1       4       6       4       1
    .   .   .
```

in which each integer inside the triangle is the sum of the two integers above it. Write a C++ program which reads in two integers, say *m* and *n*, and then generates rows *m* through *n* of the Pascal's Triangle. Your program should work for $0 < m \leq n < 12$.

Sample Runs.

```
Please input an integer between 1 and 12 (both numbers inclusive): 1
Please input an integer between 1 and 12 (both numbers inclusive): 8
Pascal Triangle: row 1 to row 8
                    1
                  1   1
                1   2   1
              1   3   3   1
            1   4   6   4   1
          1   5  10  10   5   1
        1   6  15  20  15   6   1
      1   7  21  35  35  21   7   1
```

```
Please input an integer between 1 and 12 (both numbers inclusive): 3
Please input an integer between 3 and 12 (both numbers inclusive): 4
Pascal Triangle: row 3 to row 4
    1   2   1
  1   3   3   1
```

```
Please input an integer between 1 and 12 (both numbers inclusive): 1
Please input an integer between 1 and 12 (both numbers inclusive): 0
Error: input outside of range.
Please input an integer between 1 and 12 (both numbers inclusive): 2
Pascal Triangle: row 1 to row 2
     1
  1     1
```

```
Please input an integer between 1 and 12 (both numbers inclusive): 0
Error: input outside of range.
Please input an integer between 1 and 12 (both numbers inclusive): 13
Error: input outside of range.
Please input an integer between 1 and 12 (both numbers inclusive): 10
Please input an integer between 10 and 12 (both numbers inclusive): 11
Pascal Triangle: row 10 to row 11
     1     9    36    84   126   126    84    36     9     1
  1    10    45   120   210   252   210   120    45    10     1
```

Program 2.

The Goldbach Conjecture states that every positive even integer larger than 2 is the sum of two prime numbers. Write a C++ program to help verify the Conjecture by breaking a given even number into a sum of two primes. Your program should keep on asking for numbers to verify until a number less than 4 is given as input. Your program should not hard-code nor pre-compute and store any sequence of prime numbers. Your program only needs to handle **32-bit unsigned** numbers.

Sample Runs.

```
Please input a positive even number: 20
13 + 7
Please input a positive even number: 10
5 + 5
Please input a positive even number: 1
```

```
Please input a positive even number: 2
```

```
Please input a positive even number: 7
Error: input number is odd!
Please input a positive even number: 16
11 + 5
Please input a positive even number: 3
```

Remarks.

1) Use the filenamse **pascaltriangle.cpp** for program 1 and **goldbach.cpp** for program 2 and submit them through Moodle (not the .exe file).

2) Please follow exactly the input/output format (including the wordings).

3) Please make sure that your source code could be compiled in Dev-C++ environment before submission.