Programming Fundamentals – Spring 2013
(BS-SE-F12 Morning & Afternoon)

Lab # 7

Instructions:

- Indent your code properly.
- Use meaningful variable names. Follow the naming conventions.
- Use meaningful prompt lines/labels for all input/output that is done by your programs.

Task # 1

a) Write a C++ program which prints all integers between 1 and 1000 (both inclusive) that have *exactly* seven divisors.

b) Now, modify the program written in part (a) so that it prints all prime numbers between 1 and 1000.

Task # 2

Write a C++ program which prints a hollow rectangle of the dimensions (height and width) provided by the user. For example, if the user specifies height to be **6** and width to be **10**, the following output should be produced:

```
**********
*        *
*        *
*        *
*        *
**********
```

In order to display the above pattern, your program should use ONLY following THREE cout statements:

```
cout << "*";   cout << " ";   cout << endl;
```

*Input validation: Your program should make sure that both height and width are **even numbers**. Moreover, the value of **height should be at least 4** and value of **width should be at least 6**. In case of invalid input, your program should keep prompting the user again and again till the user provides valid input.*

Task # 3

Now repeat Task # 2 using functions. Implement a function:

```
void getInput ()
```

This function should take the height and width of the pattern from the user and validate it. After validation this function should call another function:

```
void printRectangle (int height, int width)
```

to print the hollow rectangle of the specified dimensions.

Task # 4

Write a C++ program for solving **Programming Challenge # 8** (Chapter 6) on Page 367 of your textbook.

Task # 5

Write a C++ program for solving **Programming Challenge # 17** (Chapter 5) on Page 294 of your textbook.