

CMPE – 211

Preliminary Work (Pre-Lab Activity)

Laboratory Experiment #2

Textbook Material: Chapters 1-4 pp.1-85 [see Laboratory Experiment #1]
 Chapter 5 «Functions» pp.87-108
 Chapter 6 «Arrays» pp.126-132, 137-140

● ● ● TASK 1

Write, Compile and Execute a C++ program that calculates and displays the **sum of all prime numbers** in a user-defined closed interval $[a,b]$ of **positive integers** using both **pre-defined** (standard) and **user-defined** (written by a programmer himself) functions.

- **NOTE:** Interval bounds a and b of the interval are a user's input (keyboard); input values should be verified (checked) – e.g. a and/or b should not be negative or equal to zero. For this and all following tasks you are free to use any basic constructions and data types (*scalar*, i.e. integral, floating-point, pointers; *compound*, e.g. enumerations, arrays) of C++ the most appropriate for the implementation. We assume that a core of these topics is already known from previous C language-based courses.

● ● ● TASK 2

Write, Compile and Execute a C++ program based on a user-defined function that computes the sum of first and last digits of a given number that is composed of two or more digits (e.g. 23, -145, 3900, etc.).

● ● ● TASK 3

Write, Compile and Execute a C++ program that is based on a **user-defined function**, which performs **pair wise swapping** of those one-dimensional (1D) integer array's elements, one of which has an even index and the following number having an odd index (i.e. 0th \leftrightarrow 1st, 2nd \leftrightarrow 3rd, ..., 8th \leftrightarrow 9th). Declared size of the array is 10. Call by reference is used. The result of swapping is displayed on the screen.

● ● ● TASK 4

Write, Compile and Execute a C++ program that displays exactly 8 (eight) **Fibonacci numbers** starting and ending from user-specified numbers (program's input). For example, if a user inputs index 3 and 10, then numbers (values) $F_3 - F_{10}$ are shown on the screen. Erroneous user's input (e.g. negative number) or a smaller ending number than the first, should lead to warning and automatic repetition of the input. Fibonacci numbers are explained on pages 62-63 of the textbook.

● ● ● Appendix

- Check **Review Questions** at the end of textbook's **Chapters 5-6** (pp. 112 and 142),
- Use **debugging** facilities of the Visual C++ compiler while preparing programs for TASKS 1-4 (follow tutorial «**Dive Into Microsoft Visual C++ 6**» by *Deitel & Associates*, Lab Experiment #0). You are free to use any other C++ compiler in your work.

● ● ● Sources

- *John R. Hubbard*. Schaum's Outline of Programming with C++, 2nd edition, McGraw-Hill, 422 p., 2000
- *Harvey M. Deitel, Paul J. Deitel*. C++ How To Program, 4th edition, Prentice Hall, 1320 p., 2002
- C++ in the Lab : Lab Manual to accompany C++ How To Program, 4th edition, 2003