BİL 214 – System Programming

Homework #5

Assigned on 18.10.2022 – Due on 25.10.2022

- Submit one C source file per question.
- If a source file fails to compile with the gcc compiler, you get zero credits for that question.
- Make sure your submission file names are formatted as:
  FirstName_LastName_StudentID_HW#_Q#.c
  For example: **Toygar_Akgun_123456789_HW5_Q1.c**
  Toygar_Akgun_123456789_HW5_Q2.c …

1. [30 points] The availability of computers with string-manipulation capabilities has resulted in some rather interesting approaches to analyzing the writings of great authors. Much attention has been focused on whether William Shakespeare ever lived. Some scholars find substantial evidence that Christopher Marlowe actually penned the masterpieces attributed to Shakespeare. Researchers have used computers to find similarities in the writings of these two authors. This exercise examines three methods for analyzing texts with a computer.
   a. Write a program that reads several lines of text and prints a table indicating the number of occurrences of each letter of the alphabet in the text. For example, the phrase

      To be, or not to be: that is the question:

      contains one “a,” two “b’s,” no “c’s,” and so on.

   b. Write a program that reads several lines of text and prints a table indicating the number of one-letter words, two-letter words, three-letter words, and so on, appearing in the text. For example, the phrase

      Whether 'tis nobler in the mind to suffer

      contains

Word length	Occurrences
1	0
2	2
3	1
4	2 (including 'tis)
5	0
6	2
7	1

   c. Write a program that reads several lines of text and prints a table indicating the number of occurrences of each different word in the text. The program should include the words in the table in the same order in which they appear in the text. For example, the lines

To be, or not to be: that is the question:

Whether 'tis nobler in the mind to suffer

contain the words "to" three times, "be" two times, "or" once, and so on.

2. [20 points] Dates are commonly printed in several different formats in business correspondence. Two of the more common formats are

   07/21/2003 and July 21, 2003

   Write a program that reads a date in the first format and prints it in the second format.

3. [25 points] Standard telephone keypads contain the digits 0–9. The numbers 2–9 each have three letters associated with them, as is indicated by the following table:

Digit	Letter	Digit	Letter
2	A B C	6	M N O
3	D E F	7	P R S
4	G H I	8	T U V
5	J K L	9	W X Y

   Many people find it difficult to memorize phone numbers, so they use the correspondence between digits and letters to develop seven-letter words that correspond to their phone numbers. For example, a person whose telephone number is 686-2377 might use the correspondence indicated in the above table to develop the seven-letter word “NUMBERS.”

   Businesses frequently attempt to get telephone numbers that are easy for their clients to remember. If a business can advertise a simple word for its customers to dial, then, no doubt, the business will receive a few more calls.

   Each seven-letter word corresponds to exactly one seven-digit telephone number. The restaurant wishing to increase its take-home business could surely do so with the number 825-3688 (i.e., “TAKEOUT”).

   Each seven-digit phone number corresponds to many separate seven-letter words. Unfortunately, most of these represent unrecognizable juxtapositions of letters. It’s possible, however, that the owner of a barber shop would be pleased to know that the shop’s telephone number, 424-7288, corresponds to “HAIRCUT.” The owner of a liquor store would, no doubt, be delighted to find that the store’s telephone number, 233-7226, corresponds to “BEERCAN.” A veterinarian with the phone number 738-2273 would be pleased to know that the number corresponds to the letters “PETCARE.”

   Write a C program that, given a seven-digit number, writes to a file every possible seven-letter word corresponding to that number. There are 2187 (3 to the seventh power) such words. Avoid phone numbers with the digits 0 and 1.

4. [25 points] You're the owner of a hardware store and need to keep an inventory that can tell you what tools you have, how many you have and the cost of each one. Write a program that

    a. initializes the file "hardware.dat" to 100 empty records,
    b. lets you input the data concerning each tool,
    c. enables you to list all your tools,
    d. lets you delete a record for a tool that you no longer have and
    e. lets you update any information in the file.

    The tool identification number should be the record number. Use the following information to start your file:

Record #	Tool name	Quantity	Cost
3	Electric sander	7	57.98
17	Hammer	76	11.99
24	Jig saw	21	11.00
39	Lawn mower	3	79.50
56	Power saw	18	99.99
68	Screwdriver	106	6.99
77	Sledge hammer	11	21.50
83	Wrench	34	7.50