Lakehead University

CS 1431 COMPUTER PROGRAMMING II

Assignment No. 2

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Q1: (Spam Scanner) Spam (or junk email) costs U.S. organizations billions of dollars a year in spam-prevention software, equipment, network resources, bandwidth, and lost productivity.

Research online some of the most common spam e-mail messages and words, and check your own junk e-mail folder. Create a list of 30 words and phrases commonly found in spam messages. **Write a C++ application** in which the user reads an e-mail message **from a file**. Then, scan the message for each of the 30 keywords or phrases. For each occurrence of one of these within the message, add a point to the message's "spam score." Next, rate the likelihood that the message is spam, based on the number of points it received. The likelihood is the number of points divided by the total number of words.

Q2: Obesity in America is increasing at an alarming rate.

Check the map from the Centers for Disease Control and Prevention (CDC)atwww.cdc.gov/

nccdphp/dnpa/Obesity/trend/maps/index.htm, which shows obesity trends in the United States over the last 20 years. As obesity increases, so do occurrences of related problems (e.g heart disease, high blood pressure, high cholesterol, type 2 diabetes). Write a program that helps users choose healthier ingredients when cooking, and helps those allergic to certain foods (e.g.,nuts, gluten) find substitutes. The program should read a recipe from a file and suggest the healthier replacements for some of the ingredients. For simplicity, your program should assume the recipe has no abbreviations for measures such as teaspoons, cups, and table spoons, and uses numerical digits for quantities (e.g.,1 egg, 2 cups) rather than spelling them out (one egg, two cups). Some common substitutions are shown below. Your program should display a warning such as, “Always consult your physician before making significant changes to your diet.”

Your program should take into consideration that replacements are not always one-for-one.

For example, if a cake recipe calls for three eggs, it might reasonably use six egg whites instead.

Conversion data for measurements and substitutes can be obtained at websites such as:

chinesefood.about.com/od/recipeconversionfaqs/f/usmetricrecipes.htm

www.pioneerthinking.com/eggsub.html

[www.gourmetsleuth.com/conversions.htm](http://www.gourmetsleuth.com/conversions.htm)

Your program should consider the user’s health concerns, such as high cholesterol, high blood pressure, weight loss, gluten allergy, and soon. For high cholesterol, the program should suggest substitutes for eggs and dairy products; if the user wishes to lose weight; low-calorie substitutes for ingredients such as sugar should be suggested.

Ingredient Substitution

1 cup sour cream 1 cup yogurt

1 cup milk ½ cup evaporated milk and ½ cup water

1 teaspoon lemon juice 1/2teaspoonvinegar

1 cup sugar ½ cup honey, 1 cup molasses

Or 1/4 cup agave nectar

1 cup butter 1 cup margarine or yogurt

1 cup flour 1 cup rye or rice flour

1 cup mayonnaise 1cup cottage cheese

Or 1/8 cup mayonnaise and 7/8 cup yogurt

1 egg 2 tablespoons cornstarch, arrowroot flour

Or potato starch or 2 egg whites

Or ½ of a large banana (mashed)

1 cup milk 1 cup soy milk

¼ cup oil ¼ cup apple sauce

White bread whole-grain bread

Q3: Give the function definition for the function with the following function declaration.

Embed your definition in a suitable test program.

void getDouble(double& inputNumber);

//Postcondition:inputNumber is given a value that the user approves of.

You can assume that the user types in the input in normal everyday notation, such as 23.789, and does not use e-notation to type in the number. Model your definition of the function so that your function calls another function called readAndClean with the following prototype:

void readAndClean(double& n);

Function readAndClean reads a line of input, discards all symbols except the digits then converts the C string to double and sets n equal to the value of this double.

Sample Dialogue

Enter input number: $57.53

You entered 57.53 Is that correct? (yes/no): no

Enter input number: $77\*5xa

You entered 775 Is that correct? (yes/no): no

Enter input number: 77.9

You entered 77.9 Is that correct? (yes/no): no

Enter input number: $75.9987

You entered 75.9987 Is that correct? (yes/no): yes

Final value read in = 75.9987

Q4: Write a simple telephone directory program in C++ that looks up phone numbers in a file containing a list of names and phone numbers. The user should be prompted to enter a first name and last name, and the program then outputs the corresponding number, or indicates that the name isn't in the directory. After each lookup, the program should ask the user whether they want to look up another number, and then either repeat the process or exit the program. The data on the file should be organized so that each line contains a first name, a last name, and a phone number, separated by blanks. You can return to the beginning of the file by closing it an opening it again.   
Use functional decomposition to solve the problem and code the solution using functions as appropriate. Be sure to use proper formatting and appropriate comments in your code. The output should be clearly labeled and neatly formatted, and the error messages should be informative.

Q5: You’ve been asked to write a program to grade a multiple choice exam. The exam has 20 questions, each answered with a little in the range of ‘a’ through ‘f’. The data are stored on a file (exams.dat) where the first line is the key consisting of a string of 20 characters. The remaining lines on the files are exam answers, and consist of a student ID number, a space, and a string of 20 characters. The program should read the key, then read each exam and output the ID number and score to file scores.dat. Erroneous input should result in an error message. For example, given the data:  
  
abcdefabcdefabcdefab  
1234567 abcdefabcdefabcdefab  
9876543 abddefbbbdefcbcdefac  
5554446 abcdefabcdefabcdef  
4445556 abcdefabcdefabcdefabcd  
3332221 abcdefghijklmnopqrst  
  
The program should output on scores.dat:  
  
1234567 20  
9876543 15  
5554446 Too few answers  
4445556 Too many answers  
3332221 Invalid answers  
  
Use functional decomposition to solve the problem and code the solution using functions as appropriate. Be sure to use proper formatting and appropriate comments in your code. The output should be neatly formatted, and the error messages should be informative.  
  
Use at least two functions (properly documented with a header and pre/post conditions) in addition to main(): one function to get the id/answers of one student, and one to compute and output a student’s results. DO NOT use global variables to avoid passing parameters to the functions. When passing an ifstream or ofstream variable, pass it by reference. You do not need to check the answer key in any way (i.e, assume it is always correctly entered.)

**Note: Due date is February 9th**