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/*
  File: freq.cpp
  Created by: Isaiah Green
  Creation Date: 11/14/2017
  Synopsis: computes the frequency of each vowel as well as the number of
consonants that appear in the text.
*/

#include <iostream>
#include <iomanip>
#include <string>
#include <vector>

using namespace std;

// FUNCTION PROTOTYPES GO HERE:

// FUNCTION PROTOTYPE FOR init_vectors
void init_vectors(vector<char> & vowels, vector<int> & frequencies);
// FUNCTION PROTOTYPE FOR read_text
string read_text(const string & prompt);
// FUNCTION PROTOTYPE FOR is_alphabetic
bool is_alphabetic(const char character);
// FUNCTION PROTOTYPE FOR create_list
void create_list(const string & str_text, vector<char> & vec_text);
// FUNCTION PROTOTYPE FOR is_member
bool is_member(const vector<char> & list, char character);
// FUNCTION PROTOTYPE FOR find_index
int find_index(const vector<char> & list, char character);
// FUNCTION PROTOTYPE FOR compute_vowel_freqs
int compute_vowel_freqs(const vector<char> & text, const vector<char> &
vowels, vector<int> & freqs);
// FUNCTION PROTOTYPE FOR display_characters
void display_characters(const vector<char> & characters, const int
colwidth);
// FUNCTION PROTOTYPE FOR display_freqs
void display_freqs(const vector<int> & freqs, const int colwidth);

int main()
{
      // Define local variables and constants
      vector<char> vowels;
      vector<int> freqs;
      string input;
      vector<char> text;
      int consonants(0);

      const int COLUMNWIDTH = 2;

      // Initialize the list of vowels and vowel frequencies.
      // Call function init_vectors with variables vowels and freqs
        init_vectors(vowels, freqs);
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      // Prompt the user for the input text by calling function read_text
      input=read_text("Enter your text: ");

      // Copy the characters (ignoring non-alphabetic characters) in the
input string to the vector of characters in variable text
      // Call function create_list to do this
        create_list(input, text);

      // Compute the frequencies of vowels and consonants from the input
text containing only alphabetic letters
      // Call function compute_vowel_freqs to do this
      consonants = compute_vowel_freqs(text, vowels, freqs);

      // Display the vowels and their frequencies
      // Call functions display_characters and display_freqs
        display_characters(vowels, COLUMNWIDTH);
        display_freqs(freqs, COLUMNWIDTH);
      // Display the number of consonants. No function calls here.
      cout << "There are " << consonants << " consonants" << endl;

  return 0;
}

// FUNCTION DEFINITIONS GO HERE:

//this function is creating the the list for letters
// DEFINE FUNCTION init_vectors HERE:
void init_vectors(vector<char> & vowels, vector<int> & frequencies){
  vowels.push_back('a');
  vowels.push_back('e');
  vowels.push_back('i');
  vowels.push_back('o');
  vowels.push_back('u');
  vowels.push_back('y');
  for (int i(0); i < 6; i++){
      frequencies.push_back(0);
    }
}
// this function reads the string that the user gives
// DEFINE FUNCTION read_text HERE:
string read_text(const string & prompt){
  cout << prompt;
  string input;
  getline(cin, input);
  return(input);
}
//this function will copy the slphabetic characters form the string that
the user gives
// DEFINE FUNCTION create_list HERE:
void create_list(const string & str_text, vector<char> & vec_text){
  for (int j(0); j < str_text.length(); j++){
    if (is_alphabetic(str_text[j])){
      vec_text.push_back(str_text[j]);
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    }
  }
}
//this function will find the characters that are in the alphabet
// DEFINE FUNCTION is_alphabetic HERE:
bool is_alphabetic(const char character){
  if (character >= 'a' && character <= 'z'){
    return(1);
  }
  else if (character >= 'A' && character <= 'Z'){
    return(1);
  }
  else{
    return(0);
  }

}
//thi function will calculate the freqs of vowels
// DEFINE FUNCTION compute_vowel_freqs HERE:
int compute_vowel_freqs(const vector<char> & text, const vector<char> &
vowels, vector<int> & freqs){
  int c(0); //created to increment for consonants
  int find(0); // created to hold find_index in a variable
  for(int k(0); k < text.size(); k++){
    if (is_member(vowels, tolower(text[k]))){
      find = find_index(vowels, tolower(text[k]));
      freqs[find]++;
    }
    else{
      c++;
    }
  }
  return(c);
}
//this function will figure out if the character is in the vector
// DEFINE FUNCTION is_member HERE:
bool is_member(const vector<char> & list, char character){

  bool x(0); // seting a varible equal to false
  for (int l(0); l < list.size(); l++){
    if (character == list[l]){
      x = 1;
    }
  }
  return(x);
  }
//this function will return the position of the character found in the
string
// DEFINE FUNCTION find_index HERE:
int find_index(const vector<char> & list, char character){
  int n = 0;  // created to hold a variable
  for (int i(0); i < list.size(); i++)
     {
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            if (character == list[i])
            {
                 n = i;
            }
     }
  return (n);
}
// this function will display the character of vector vowels
// DEFINE FUNCTION display_characters HERE:
void display_characters(const vector<char> & characters, const int
colwidth){
  for (int j(0); j < characters.size(); j++)
     {
            cout << setw(colwidth) << characters[j];
            if ( j+1 < characters.size() )
            {
                 cout << ", ";
            }
     }
     cout << endl;
}
// this function will display the freqs of vowels in vector
// DEFINE FUNCTION display_freqs HERE:
void display_freqs(const vector<int> & freqs, const int colwidth){
  for (int k(0); k < freqs.size(); k++)
     {
            cout << setw(colwidth) << freqs[k];
            if ( k+1 < freqs.size() )
            {
                 cout << ", ";
            }
     }
     cout << endl;
}
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