Lab 7 - Introduction to C/C++ Programming

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Due date: Please check on Blackboard

Instruction
Please follow the steps:

1. For each question, please make your code clean and make sure that your code is runnable.
2. Open the provided problem sets (.docx file). For each exercise, please capture screenshots of your work and then paste them into the problem sets (.docx file). DO NOT create a new answer file!
   Please convert this .docx file to .pdf file
3. Submit these files (source code and problem set files) to Blackboard before the deadline.
4. There are a total of 7 Lab Assignments in this course. 3/7 Lab Assignments will be randomly selected to score (~10% of your final score).
5. The final lab exam will be 10% of your final score.

Lab Assignments

Question 1. Write a program in C that can do BOTH:

- To input a string
- Count the total number of words in a string

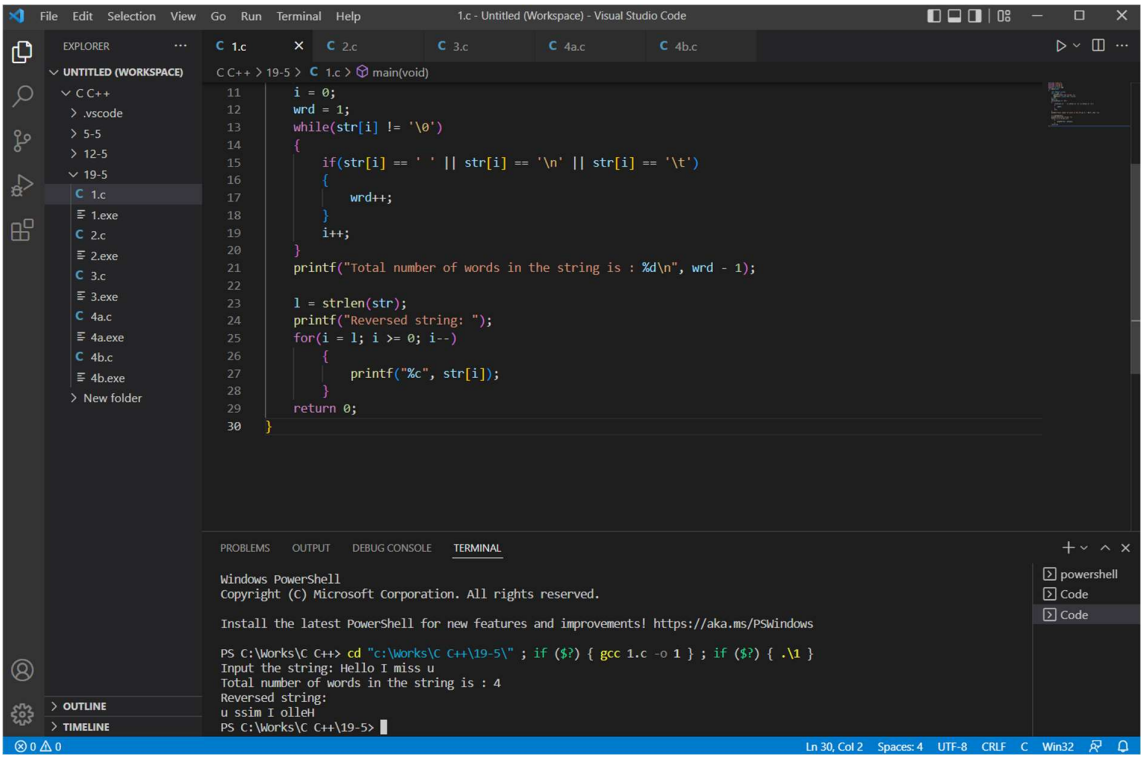
  Input: Hello I miss you

  Output: 4 words

- Print individual characters of string in reverse order.

  Input: Hello I miss you

  Output: uoy ssim I olleH



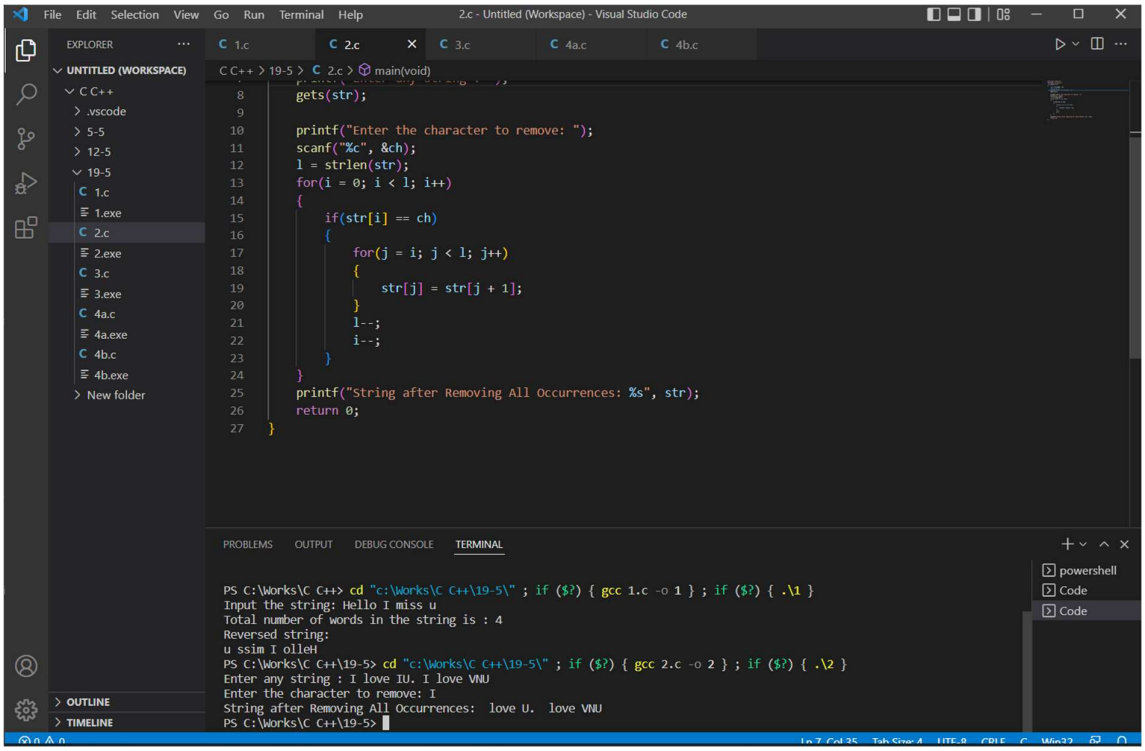
Question 2. C program to remove all occurrences of a character from string.

Input

Input string : I Love IU. I Love VNU.
Input character to remove : 'I'

Output

String after removing all 'I' : Love IU. Love VNU.



Question 3. Write a program that uses random number generation to create sentences. The program should use four arrays of pointers to char called article, noun, verb and preposition. The program should create a sentence by selecting a word at random from each array in the following order: article, noun, verb, preposition, article and noun. As each word is picked, it should be concatenated to the previous words in an array large enough to hold the entire sentence. The words should be separated by spaces. When the final sentence is output, it should start with a capital letter and end with a period. The program should generate 20 such sentences.

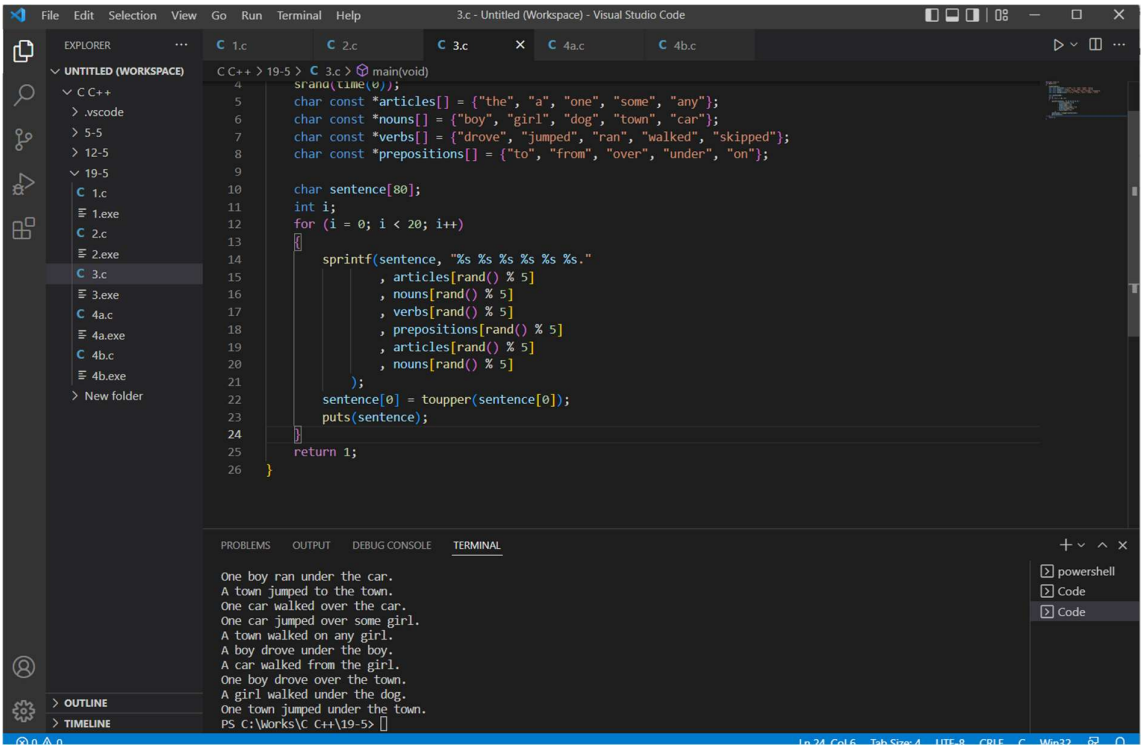
The arrays should be filled as follows: The article array should contain the articles "the", "a", "one", "some" and "any"; the noun array should contain the nouns "boy", "girl", "dog", "town" and "car"; the verb array should contain the verbs "drove", "jumped", "ran", "walked" and "skipped"; the preposition array should contain the prepositions "to", "from", "over", "under" and "on".

After the preceding program is written and working, modify the program to produce a short story consisting of several of these sentences. (How about the possibility of a random term paper writer?)

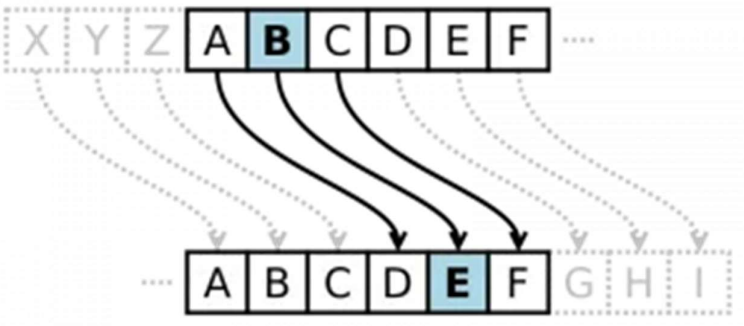
E.g.

A dog skipped to any car.
Some town ran on the boy.
A dog jumped from the dog.
One girl jumped on one town.
One dog jumped from some boy.
One girl jumped under any dog.
One car drove on some girl.
One town walked on a girl.
Some town ran on one dog.
One car walked from any town.
A boy drove over some girl.

The dog skipped under a boy.
The car drove to a girl.
Some town skipped under any car.
A boy jumped from a town.
Any car jumped under one town.
Some dog skipped from some boy.
Any town skipped to one girl.
Some girl jumped to any dog.
The car ran under one dog.



Question 4. Caesar Cipher is one of the simplest encryption techniques in which each character in plain text is replaced by a character a fixed number of positions down to it. For example, if the key is 3 then we have to replace the character by another character that is 3 that down to it. Like A will be replaced by D, C will be replaced by F, and so on. For decryption just follow the reverse of the encryption process.



Write two separate C programs

a) Encrypt and Caesar Cipher.

Input:
Enter a message to encrypt: axzd
Enter key: 4
Output:
Encrypted message: ebdh

b) Decrypt Caesar Cipher.

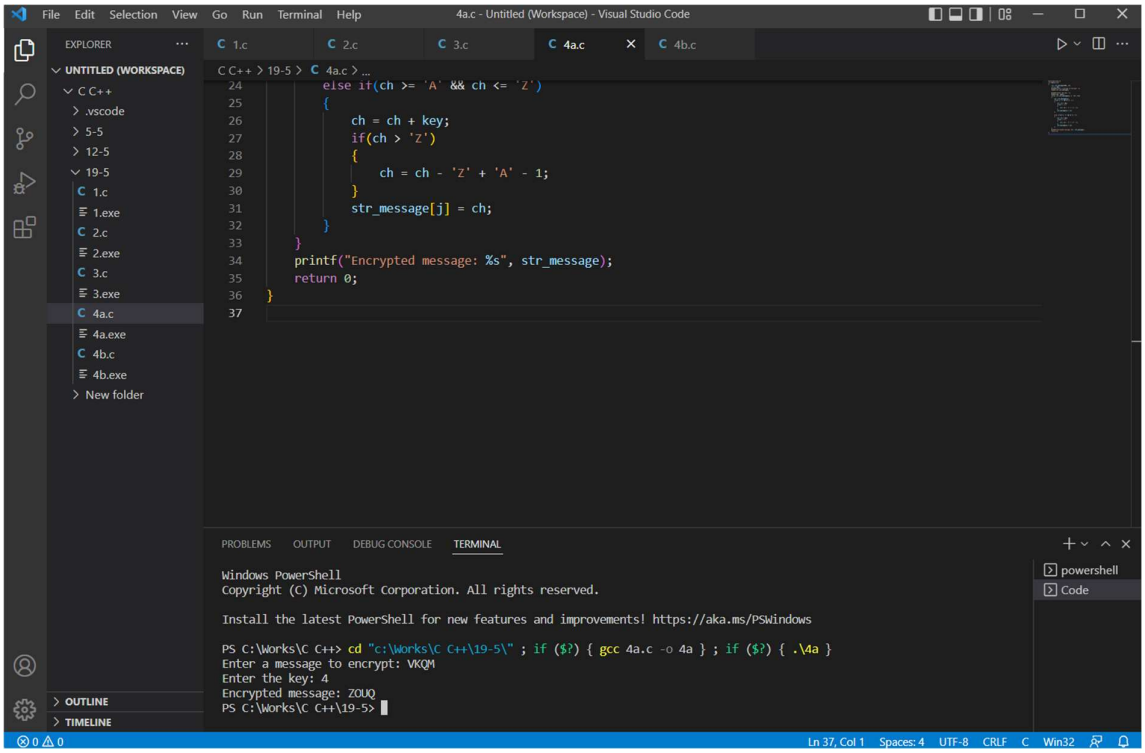
Input:

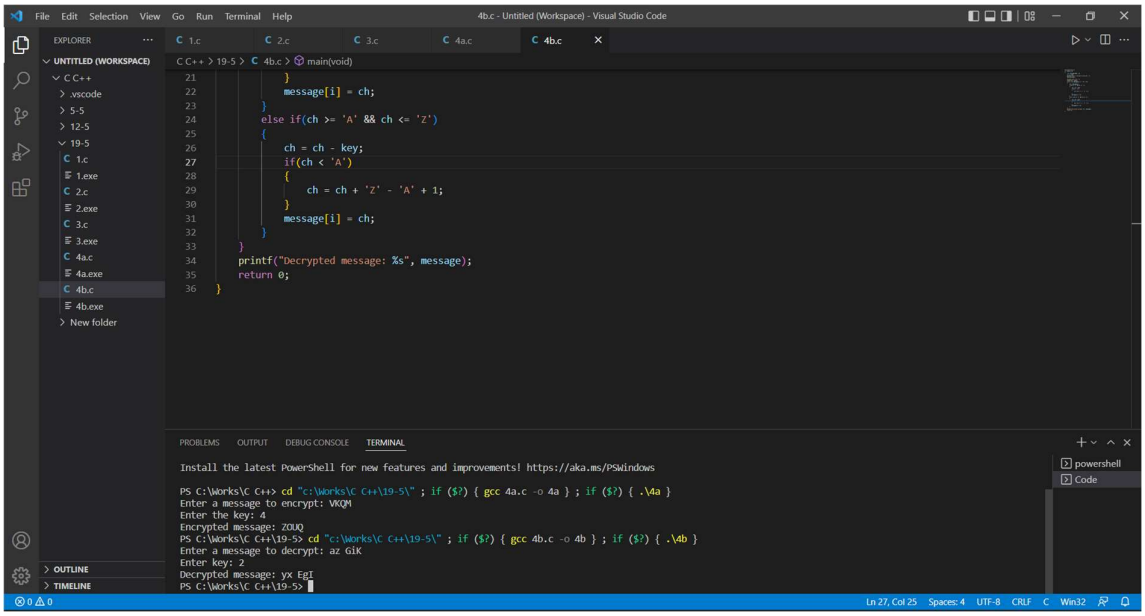
Enter a message to decrypt: az GjK

Enter key: 2

Output:

Decrypted message: yx EhI




File Edit Selection View Go Run Terminal Help
4b.c - Untitled (Workspace) - Visual Studio Code
EXPLORER
UNTITLED (WORKSPACE)
C C++
.vscode
5-5
12-5
19-5
1.c
1.exe
2.c
2.exe
3.c
3.exe
4a.c
4a.exe
4b.c
4b.exe
New folder
OUTLINE
TIMELINE
1.c
2.c
3.c
4a.c
4b.c
C C++ > 19-5 > 4b.c > main(void)
21 }
22 message[i] = ch;
23 }
24 else if(ch >= 'A' && ch <= 'Z')
25 {
26 ch = ch - key;
27 if(ch < 'A')
28 {
29 ch = ch + 'Z' - 'A' + 1;
30 }
31 message[i] = ch;
32 }
33 }
34 printf("Decrypted message: %s", message);
35 return 0;
36 }
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL
Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindows
PS C:\Works\C C++> cd "c:\Works\C C++\19-5\" ; if ($?) { gcc 4a.c -o 4a } ; if ($?) { .\4a }
Enter a message to encrypt: VKQM
Enter the key: 4
Encrypted message: ZOUQ
PS C:\Works\C C++\19-5> cd "c:\Works\C C++\19-5\" ; if ($?) { gcc 4b.c -o 4b } ; if ($?) { .\4b }
Enter a message to decrypt: az GIK
Enter key: 2
Decrypted message: yx EgI
PS C:\Works\C C++\19-5>
powershell
Code
Ln 27, Col 25 Spaces: 4 UTF-8 CRLF C Win32