ENGR 151

Fall 2024

Lab 11

Cracking the Code

You decide to take on a side job as a spy. In the file **"encrypted_codes.txt"** you will be given a number of codes to decrypt. Based on an algorithm explained below, you will decipher each message using string manipulation and **output the new message to the file** "**decrypted_codes.txt**". Download **decode_message_starter.h** and **decode_message_starter.cpp**.

In **decode_message_starter.h**, you should implement the functions as described. Be sure to rename this to **decode_message.h** before submitting.

In **decode_message_starter.cpp**, you will complete the main function to decode a message using the algorithm described below. Be sure to rename this to **decode_message.cpp** before submitting.

You can check your decryption with the **expected_decrypted_codes.txt** file.

Important notes!

- Each line in the input file is one code.
- The lines may contain whitespace.
- Your program should work for an input file of any size.
- When writing into **decrypted_codes.txt**, make sure the decrypted line is written into the file with a newline character at the end or **endl**.

Here's how you will decrypt each code:
If the first character of the string is "$" or "#" then you will decrypt the string by:

1) Removing the first character (index 0)
2) Calling `remove_duplicates(str)`
3) Calling `shift(str)`
4) Calling `replace_space(str)`

If the first character is **not** "$" or "#", then you will decrypt the string by:

1) Calling `remove_key(str)`

2) Calling `replace_space(str)`
3) Calling `shift(str)`

As you may have guessed, this will require you to write 4 functions with the following definitions:

```
//This function takes a string by reference and
//removes any consecutive duplicate letters from that string
void remove_duplicates(string & code);
      //For example the string "aabccebce" would become "abcebce"
```

```
//This function takes a string by reference and
//removes any instances of the "key"
//The "key" is defined as:
//the first 3 letters of the original string input
void remove_key(string & code);
      //For example, when passing the string "osugoosubluosue"
      //to the function, the "key" would be defined as "osu"
      //and the string would be "goblue" after removing the key
```

```
//This function takes a string by reference and
//shifts every letter in the string up by 3
void shift(string & code);
      //For example, the string "abc" would become "def"
```

```
//This function takes a string by value and
//Returns a string where all spaces are replaced by underscores
//(pass-by-value is used here for the sake of practicing both)
string replace_space(string code);
      //For example, if the string "hello world !" was passed in,
      //"hello_world_!" would be returned
```