COP3014 Programming Project # 4

Due: As listed on E-Learning.

Project Outcomes:

- To develop and compile several interactive C programs.
- To implement algorithms that solve problems involving strings.
- To use functions and pass parameters by reference.
- To write test code.

Prep Readings: Class textbook, chapter 1-11.

Project Requirements:

Your job is to write several C functions performing operations on strings and structures and to write test programs for each function by calling them with different test values.

1. Write a C program *pattern.c* that includes a main program and a function with the following function prototype:

   ```
   int contains ( const char *text, const char *pattern );
   ```

   The main program must test the function by calling it with 5 different values for `text` and `pattern` and printing the results to the screen using the following format string:

   ```
   "Pattern %s occurs in %s at the location %d.\n"
   ```

   The function accepts two text strings, `text` and `pattern` as input. It then determines the location of the specified pattern string in the text string. If the pattern occurs multiple times, it returns the first occurrence of the pattern and if it does not occur, then the function returns -1. For example, if called with the text "Hello, World!" and the pattern "orl", the function returns 8 because the pattern starts at position 8 in the text string. **(25 points)**

2. Write a C program *coding.c* that includes a main program and two functions with the following function prototypes:

   ```
   void encodeStr ( char *input, char *output, CodeT code );

   void decodeStr ( char *input, char *output, CodeT code );
   ```

   The first function takes the input string in `input` and generates the encoded string using the information in `code`. The result is stored in `output`. The second function takes the input string in `input` and decodes it back using the information in `code`. The result is stored in `output` again.

Both functions use the following structure as the key to encode and decode text messages:

```
typedef struct {
   char from[28];
   char to[28];
} CodeT;
```

The main function may then initialize the values as shown below:

```
CodeT code = {   .from = " abcdefghijklmnopqrstuvwxyz",
                 .to = ".172093%@#+!:_-$^*()854=6?>" };
```

The main program must prompt the user repeatedly for a line of text and then generate and print the encoded text string before decoding the encoded text string and printing the result again to the screen to test that the original text string can be retrieved through the decoding function. The program should stop prompting the user for input text when the user enters an empty text as input. Use the program discussed in class to read text lines from the keyboard. **(25 points)**

Submission Requirement:

The project requires 4 source code file to be turned in.

a. `pattern.c` (the source code for solving problem1)
b. `coding.c` (the source code for solving problem 2)

Be sure to follow the Project Submission Instructions posted by your instructor in *eLearning* under Course Materials. The submission requirements are part of the grading for this assignment. If you do not follow the requirement, 5 points will be deducted from your project grade.

Important Notes:

1. Projects will be graded on whether they correctly solve the problem and whether they adhere to good programming practices.
2. Projects must be submitted by the time specified on the due date. Projects submitted after that time will get a grade of zero.
3. Please review UWF's academic conduct policy that was described in the syllabus. Note that viewing another student's solution, whether in whole or in part, is considered academic dishonesty. Also note that submitting code obtained through the Internet or other sources, whether in whole or in part, is considered academic dishonesty. All programs submitted will be reviewed for evidence of academic dishonesty, and all violations will be handled accordingly.