**CS2750 System programming and Tools Fall 2018**

**Project #5 [70 points]**

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Due date is Monday, 12/03.

1. [25 points] The purpose of this assignment is to write a makefile. Copy a program ~/piatnitskaiag/CS2750/QE.c, separate its code into individual files, each containing code of just one function. Headers of all functions must be stored in a header file. Write a makefile that will create an executable file named quadreq. Before creating a script file, remove all executable and object files from your current directory. In the script file show the following: (a) contents of your working directory before make works; (b) the text of the makefile; (c) the working process of make; (d) the contents of your directory after make finished its work; (e) the result of work of your executable file. Don’t forget that you have to link the math library when you need a sqrt function.
2. [25 points] Write a program that will call a function to reverse a given string. The prototype of the function should be:

**void** reverse(**char** \* before, **char** \* after);

When your program is ready, run it inside a gdb session (see the sample session of gdb posted in the folder ‘Handouts’ under ‘Modules’. Submit a ‘script’ file that will include your source file, results of compilation and execution and your gdb session.

1. [20 points]

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| Write a program to perform so-called ‘XOR’-encryption on a sequence of characters. Your program is supposed to do the following: (a) define a ‘key’ symbol; (b) read characters one-by-one from a keyboard until the EOF symbol is entered (either ^C or ^D); (c) encode each character using a bit ‘XOR’ operator; (d) check if an encrypted symbol a “control” character (use the function iscntrl from ctype library); if yes, leave the original character unchanged; (d) display a resulting character. Use **specialized functions** to read and display individual characters. For the sample session shown in the right column of this table, the ‘key’ symbol was ‘&’. (Each second character is a result of encoding of the previous character.) | **Enter several characters one-by-one with Ctrl-C or Cntrl-D in the end of a sequence:**  **k**  **M**  **A**  **g**  **l**  **J**  **@**  **f**  **0**  **0**  **=**  **=**  **~**  **X**  **^C** |