

# Homework 1

**Due:** October 7, 2019

**Points:** 100

## UNIX/Linux Questions

- (10 points) What do the commands *man(1)* and *apropos(1)* do?
- (10 points) How do I print a text file with each line preceded by the line number, *without* changing the file?

## C Programming

- (60 points) You are to write three functions that print numbers in sequence. The sequence may be increasing or decreasing. The first function, *do\_for*, will use a **for** loop; the second, *do\_while*, will use a **while** loop, and the third, *do\_do*, will use a **do . . . while** loop.

Each function will take 2 arguments; call them *m* and *n*. The first is the starting number; the second, the ending number. If  $m < n$ , then print  $m, m+1, \dots, n$ , each number on a separate line. If  $m = n$ , then just print *m*. If  $m > n$ , then print  $m, m-1, \dots, n$ , each number on a separate line.

The file *hw1\_wrapper.c* is available on the class web site. It calls each of the functions. Please use it to test your functions. Remember to comment them!

*To turn in:* Put all three functions into a file called *hw1\_3.c* (that is, you are to have one file with all three functions). Please submit that. You need not submit a *Makefile* for this assignment.

## C Program Debugging

- (20 points) On the class web page is the source for a C program named *vis.c*. It is supposed to read characters from the standard input and print them on the standard output after expanding any non-printing characters to their C character escape sequence.

The relevant characters, and the C escape sequences to be printed when those characters are encountered, are:

character	print as	character	print as
newline	<code>\n</code>	backslash	<code>\\</code>
horizontal tab	<code>\t</code>	vertical tab	<code>\v</code>
backspace	<code>\b</code>	carriage return	<code>\r</code>
form feed	<code>\f</code>	bell	<code>\a</code>
NUL	<code>\0</code>	<i>anything else</i>	<code>\ooo</code>

The “anything else” entry means that any non-printing character other than the ones named in the table is to be printed as a sequence of three octal digits preceded by a backslash. When the escape sequence for a newline is printed, the program is to skip to the next line.

Unfortunately, the program as saved in *vis.c* will not even compile, let alone run. And the programmer thoughtlessly left off all the comments. Hence, your mission: comment the program, and fix it so it works as described above! You are to turn in a corrected source program, with comments describing the changes you made to get it to work.

*To turn in:* Turn in a corrected, fully commented *vis.c*. Your comments are to *explicitly* say what you changed to make the program compile and work correctly. You need not submit a *Makefile* for this assignment.

## Extra Credit

- (20 points) Redo problem 1, with each function having a *third* argument. This argument is to be the increment or decrement. It must be positive. So, for example, if the function *do\_for* is called as `do_for(3, 10, 2)`, then it would print 3,5,7,9, and if it is called as `do_for(10, 3, 2)`, then it would print 10,8,6,4. If it is called as `do_for(3, 10, -2)`, the function would print `Error: invalid increment -2`.

The file *hw1\_ex\_wrapper.c* is available on the class web site. It calls each of the functions. Please use it to test your functions. Remember to comment them!

*To turn in:* Put all three functions into a file called *hw1\_ex.c* (that is, you are to have one file with all three functions). Please submit that. You need not submit a *Makefile* for this assignment.