# **SYST 44288 – Operating Systems & Systems Programming**

# **Assignment 1 – 6.5%**

Complete the following programs in the C programming language. Programs should be commented where necessary.

**1. (2 points)** (Armstrong Numbers) Number n is called Armstrong’s number of order k if it is equal to the sum of k-th powers of its digits.

(For example: 371 = 33 + 7 3 + 13 Armstrong’s number of order 3.)

Write C program which prints all the Armstrong’s numbers of a given order k, within the given interval between p and q, where k, p, and q are integers entered by the user by means of standard input (ie. typed on the command line). Output should consist of a single number per line with no extra or blank lines.

**2. (2 points)** Let n be a positive integer. Euler’s phi-function φ(n) is defined to be the number of positive integers not exceeding n that are *relatively prime* to n.

Write a program that can be used to calculate and display the value of Euler’s phi-function for a series of positive integer, separated by spaces, entered on the command line.

**3. (2 points)** Using pointers and *avoiding unnecessary local variables*, write a function, *rmchr* that takes a string and a character as arguments. The *rmchr* function should remove **all** occurrences of the character from the string. The *rmchr* function should not leave spaces characters in the string where characters have been removed. The resulting string should be returned using an appropriate data type, not printed to the command line.

**4. (2 points)** Using pointers and *avoiding unnecessary local variables*, write a function, *rmstr* that takes two strings as arguments, removing all occurrences of any character from the second string in the first string. The *rmstr* function should not leave spaces characters in the string where characters have been removed. The resulting string should be returned using an appropriate data type, not printed to the command line.

## **Evaluation**

Marks are indicated in the points above. Total: 14 Marks. For each program, 1 mark is awarded if it is “mostly right” and the second mark is awarded if the solution is correct, documented and output appears as indicated with any supplimentary log files.

## **Deliverables**

Submit only source code, log files and other necessary documentation. Do NOT submit compiled code. Please name your files appropriately to make it clear which question you are answering.

Your submission should be in a single zip file in the following format: lastname-firstname-a1.zip

Upload your zip file to the SLATE dropbox.

## **Due Date**

See SLATE.