CSC465/665: Operating Systems
Spring 2019
Due Date: March 8, 2019 -- Due Time: 23:59

Question 1 [50 points]

Implement a C solution to the following problem using the Pthreads POSIX Standard.

Question 2: [50 points]

Implement a Java solution to the following problem by defining a class that implements the Runnable interface.

Problem Description

Write a multithreaded program that identifies the row or the column of an array that contains the largest repetition of a letter, whatever that letter is. Taking as input a 7x7 two-dimensional array of characters, your program is to count, for each row and each column, how many occurrences of each letter it observed. Once all the rows and all the columns have been accounted for, the algorithm outputs the winner (or winners, in case of a tie).

The parent thread will create 14 worker threads, each of which will search a row or a column of the array and store the count for each letter in each row and in each column in a common data structure. Once all the threads have completed their computation, the parent thread will search the common data structure for the largest count(s) and output the identity of the winning row(s)/column(s) as well as the letter(s) they won on.

Have Fun and Good Luck!!!!!!

(See the next page for an illustration)

Illustration

Consider the following 7x7 array:

T	C	L	A	S	Q	U
R	L	E	T	T	U	S
E	A	T	R	E	E	S
E	S	K	A	T	U	T
C	S	Q	U	A	E	A
A	R	R	A	Y	M	C
C	R	S	Q	Y	V	K

Your program must output:

Row 3: 3 occurrences of letter E
Column 4: 3 occurrences of letter A