**CPSC 2150: Week 3 Homework Circular Lists, Skip Lists**

**Due: As indicated by submission link**

**Total Marks: 10**

**Instructions – PLEASE READ**

1. This work is to be done individually.
2. You should submit only one version via D2L. Check instructions from TA regarding what to submit (zip/just code). Code files must always be included.
3. Keep a copy of everything you submit in some online storage that is accessible by you only.

*Copying another student’s work or submitting anything that is not your own work will result in a zero for all parties involved. Academic alert may follow!*

# EXERCISES

1. Download CircularList.h from D2L -> Week 3 and use it to solve the following problem. It would be a good idea to test it first. You may alter the code inside this file as needed by the following problem.
   1. MUST INCLUDE a destructor for the CircularList class
   2. Round Robin Process Scheduling
      1. Review how round robin process scheduling works
         1. <https://youtu.be/0BK-pmYet94>
         2. D2L -> Week 3 -> OperatingSystemsProcessScheduling.pptx
      2. A file named process.txt exists with the following format
         1. Each pairs of lines are as follows
            1. Time slice / quantum – one positive integer
            2. Process execution times – multiple positive integers separated by commas with no comma after the last one
         2. For example, if process.txt has

5

10,20,30

* + - * 1. Then there is one case where time slice is 5 and there are 3 processes with execution times 10, 20 and 30 respectively.
      1. **How to read data from a file in C++?**
         1. <https://youtu.be/hkwcnHhbTGQ>
    1. Write a class named RoundRobinProcessScheduler
       1. That has a data member timeSlice
          1. This is where the time slice is kept
       2. That has a data member named processTimes of type CircularList object of integers
          1. The process execution times are kept in this list in the order they are read from the file (see below)
       3. This class must have a method LoadFromFile(string fileName) that
          1. Populates timeSlice and processTimes by reading the data from the file
          2. **How to read data from a file in C++?**

<https://youtu.be/hkwcnHhbTGQ>

* + - 1. Add a method named Process() that will execute all the processes in processTimes to completion.
      2. This class must have a method named ShowResults that outputs
         1. The turnaround time for each process
         2. The average turnaround time
    1. Test all features by writing a main function

1. Skip Lists
   1. Find and Fix the error in the Insert method in the code posted on D2L -> Week 3 -> SkipListInsert\_WITH\_ERROR.zip
   2. Complete Search and Delete. Hint: fixed Insert method from part a will have elements of the Search and Delete algorithms
   3. Reimplement SkipList class based on the following node class

class Node{

public:

int value; // holds data – DO NOT ALTER

vector<Node\*> next; // next nodes at various levels – DO NOT ALTER

vector<Node\*> prev; // previous nodes at various levels – DO NOT ALTER

Node \*down; // node at the level below – MAY ALTER/REMOVE/ADD MORE LINKS

Node(int val, int level){

value = val;

next = vector<Node\*>(level+1, nullptr);  
 prev = vector<Node\*>(level+1, nullptr);  
 down = nullptr;

};

};