Atılım University
Department of Computer Engineering

CMPE 226 Data Structures
Fall, 2019-2020
Homework 1
Due Date: November 14, 2019

A process is a scheduled CPU activity caused by a user or system's itself. For example, a word processor, a Web browser, and an e-mail package. Even if a user can execute one program at a time, the operating system may need to support its own internal programmed activities such as memory management, etc. All these activities are similar, so they are called **processes**. Prioritizing processes is crucial for most of the operating systems. In real-time operating systems, some low priority processes (i.e. Web browser) need to be preempted and replaced by some other higher priority processes (i.e. memory management) to guarantee that higher priority processes run firstly. To simplify this process, ready-lists of operating systems are sometimes sorted according to the priority of processes.

In this homework, you are supposed to create a prioritized process ready list. A textbook based Linked List and Process class implementations are provided to assist you.

You should add and implement a function called ***template <typename T> void prioritized_insert(T& new_item)*** to the LinkedList class. **IF THE PROTOTYPE OF YOUR IMPLEMENTATION OF THE FUNCTION DIFFERENT FROM WHAT YOU HAVE BEEN ASKED, YOUR GRADE WILL BE OVER 30.** This function must make some checks before inserting the *element* into the list to keep the list sorted in descending order according to the Processes' priority. High priority means high importance and vice versa.

Your second job is to create a main function that generates an output similar to the sample run by using the provided header files. In other words;

1. you should create a prioritized linked list for processes,
2. add some predefined processes to the list in the main,
3. finally, print the contents of the list according to the sample run.

Do not change anything in the header files except for the function that you have been asked to write!

The grading of the homework will be based on how well your code is running (60) and structure of your code (40). In addition, if your code does not compile, your grade final grade will be over 30% of your total grade.

Sample run (in the next page):

```
Inserting ->
PROCESS NAME: Process 0
PROCESS ID: 0
PROCESS PRIORITY: 54

Inserting ->
PROCESS NAME: Process 1
PROCESS ID: 1
PROCESS PRIORITY: 24

Inserting ->
PROCESS NAME: Process 2
PROCESS ID: 2
PROCESS PRIORITY: 45

Inserting ->
PROCESS NAME: Process 3
PROCESS ID: 3
PROCESS PRIORITY: 63

Inserting ->
PROCESS NAME: Process 4
PROCESS ID: 4
PROCESS PRIORITY: 14

Currently there are 5 processes in the linked list.

Processes in the linked list that are sorted by their priorities are as
follows:
PROCESS NAME: Process 3
PROCESS ID: 3
PROCESS PRIORITY: 63
 PROCESS NAME: Process 0
PROCESS ID: 0
PROCESS PRIORITY: 54
 PROCESS NAME: Process 2
PROCESS ID: 2
PROCESS PRIORITY: 45
 PROCESS NAME: Process 1
PROCESS ID: 1
PROCESS PRIORITY: 24
 PROCESS NAME: Process 4
PROCESS ID: 4
PROCESS PRIORITY: 14
```