CSCI 3320: Data Structures
HW 1: Implementing a Singly Linked List
Due: 09/20 (Wed) 11:59 pm (8 points)

1. Project Details

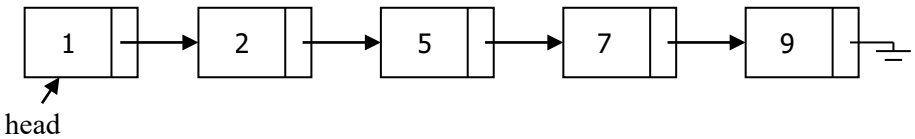
In this project, you will implement a singly linked list that supports the four functions below.

1. `sortedAdd (int value)`
2. `remove(int idx)`
3. `findMax ()`
4. `printReversedList()`

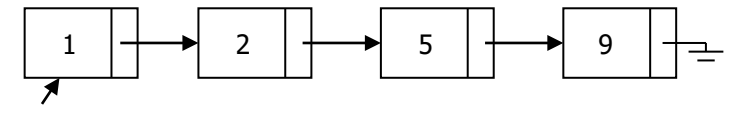
1) The function `sortedAdd()` creates a new list node and adds it to the list in **sorted order**. For example, if your program calls this function five times,

```
list.sortedAdd(5)
list.sortedAdd(2)
list.sortedAdd(9)
list.sortedAdd(1)
list.sortedAdd(7)
```

the list will look like as follows:



2) The function `remove ()` deletes the node at the index. For example, if your program calls this function with 3, i.e., `list.remove(3)`, for the previous list, the list will look like as follows:



3) The function `findMax()` returns the maximum value in the list.

e.g., `print(list.findMax())` returns 9.

4) The function `printReversedList()` prints the list in reversed order. **Note, this function must not change the order of the original list but just print elements in revered order.**

e.g., List: 9 5 2 1

2. Implementation Details

You can use either Python or Java based on your preference. A skeleton code (**LinkedList.py and LinkedList.java**) will be provided. You may want to refer to the **LinkedList_Example.py** available on Canvas.

Implementation requirements:

1. While the class **Node** cannot be changed, the class **LinkedList** can be changed as you want.
2. You must implement the required functions without using any built-in functions or library functions. That is, you are not allowed to use List modules (in Python) and libraries (in Java) to complete this project. For example, using the List sort() function to sort the list is not allowed.
3. You must test your program (functions) thoughtfully to check if the functions are implemented correctly and run without any errors. For example, I will use some test cases like below,

```
list.sortedAdd(100)
printReversedList ()
list.sortedAdd(20)
list.sortedAdd(5)
print (list.findMax())
printReversedList ()
list.sortedAdd(20)
list.sortedAdd(12)
list.sortedAdd(5000)
print (list.findMax())
printReversedList ()
```

   You will lose points if there are any exceptions (crashes) while testing your program.
4. **You must complete the project by yourself**. You can find related information from the Internet, YouTube, and books. You can discuss this project with your classmates to get some hints. However, it is not allowed to 1) share the solution with your classmates, 2) post this project to websites e.g., chegg.com to get solutions, and 3) just copy and paste the code you found on the Internet or other references. The exams will ask for your implementation details.

3. Deliverables and grading

Please submit your code on Canvas by due date. Please put your name in the code.