Community College of Philadelphia

CSCI211 – Data Structures and Algorithms
ASSIGNMENT 3

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Hurricane List

Using C++, Java, or Python, design a program that creates a doubly linked list of nodes where each node contains an object with information about a hurricane/tropical storm for a certain year. You may choose any year between 1980 and 2018, for either the Atlantic or Pacific Ocean. (Be sure there were at least 5 named storms during the year you choose.) **You may not use a built-in List ADT**.

Nodes

Each node (implemented as either a struct or a class) will contain one data field:

- s (Storm) – A Storm object (details below)

Since it is a doubly linked list, each node needs a next and previous pointer. For simplicity, the data field and pointers can all be public.

Storm Object/Class/Struct

Design a class/struct named Storm that contains the following data fields:

- name (a String) – The name of the hurricane/tropical storm
- maxWind (int) – The maximum recorded windspeed of the storm
- monthFormed (a String) – The month in which the storm formed
- category (int) – The storm's category (1-5); For tropical storms, use 0 as the category

For simplicity, the data fields can all be public.

The Linked List

Your linked list will need head and tail pointers. It will need a default constructor that sets both the head and tail to null. It will also need the following functions:

void push_front(Storm h)	- Prepends this Storm object h to a new node at the head of the list
void push_back(Storm h)	- Appends this Storm object h to a new node at the tail of the list)
void insert(Storm h, int i)	- Inserts this Storm object h to a new node and places it at position i
void erase(int i)	- Removes the node at position i
void printForward()	- Prints information about each storm from head to tail
void printReverse()	- Prints information about each storm from tail to head

When printing output about a storm, the format to use is (bold text indicates data stored in the Storm objects):

`Hurricane **Michael** - Wind Speed: **160** MPH; Month Formed: **October**; Category **5**`

When printing the name, be sure to print `Hurricane` or `Tropical Storm` depending on the storm's category.

The Driver Class/Main

In a main function, you'll create an instance of your linked list. After researching information about the hurricanes in your chosen year, one at a time you will make a Storm object and add it to the list. Using literal data in your source code is fine (and preferred) when creating Storm objects; The program does not need to rely on user input for names, wind speeds, etc.

You must use/demonstrate your push_front, push_back, and insert functions at least once when filling the list. The ordering of nodes in the list does not matter for this assignment.

After prepending/appending/inserting your Storm objects to the list, use the printForward() and printReverse() methods to print information from each storm in the list.

Then, use your list's erase function to delete one of the nodes. Any node somewhere in the middle of the list is fine. After removing the node, use the printForward() and printReverse() methods to print information from each storm in the list.

Submit any and all related source code files in the Assignment 3 submission link.

Grading

See Assignment Rubric in Canvas.