Problem Set 3

Submission Instruction and Requirement:

Due date: 2:30pm 26th April 2018

1) Create respective folders for C++ source codes of each question and zip the folders of tasks you have attempted in one zip file. **Do not** include any Microsoft Visual Studio solution files in your submission.
2) Name the file in the pattern of studentid.yourname.ps3.zip OR. studentid.yourname.ps3.rar
3) Write a report (at least 1 page for each task attempted, including screenshots, if you've attempted both tasks your report should be at least 2 pages long) on the codes you have created and include the report in the zip/rar file mentioned in 2) with screenshots of successful running of your codes. If the code does not work as expected, please provide justifications.
4) The codes should be neat and be well-commented.
5) You code should be workable and without any error, warning message, infinite loop or any malicious function.
6) Submit the zip/rar file to Blackboard on time.

Task 1 (14 marks)

```
template<class DataType>
class DoublyLinkedNode
{
public:
	typedef DoublyLinkedNode<DataType> Node;

private:
	DataType fValue;
	Node* fNext;
	Node* fPrevious;

	DoublyLinkedNode()
	{
		fValue = DataType();
		fNext = &NIL;
		fPrevious = &NIL;
	}

public:
	static Node NIL;

	DoublyLinkedNode(const DataType& aValue);

	void prepend(Node& aNode);
	void append(Node& aNode);
	void remove();

	const DataType getValue() const;
	const Node* getNext() const;
	const Node* getPrevious() const;
};

template<class DataType>
DoublyLinkedNode<DataType> DoublyLinkedNode<DataType>::NIL;
```

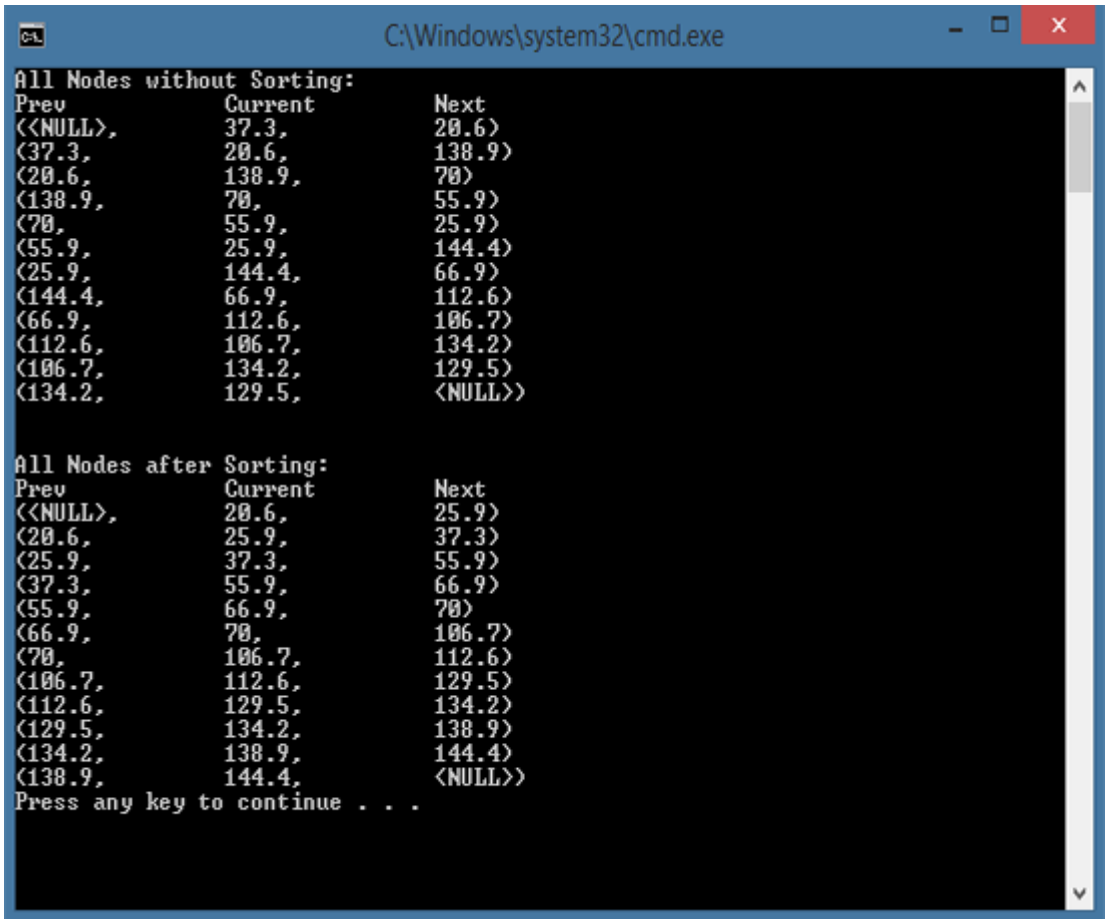
The specification of class `DoublyLinkedNode` from Lab 6 is given above. Based on your implementation of `DoublyLinkedNode` class in Lab 6, develop an application that can construct a sorted doubly linked list from the unsorted double array below.

```
double lData[] = { 37.3, 20.6, 138.9, 70.0, 55.9, 25.9, 144.4, 66.9, 112.6,
106.7, 134.2, 129.5 };
```

The application will print a comparison of each node (previous, current, and next) in the non-sorted doubly linked list vs each node (previous, current, and next) in the sorted (in ascending order) doubly linked list.

Requirement: You must make use of the `DoublyLinkedNode.h` from Lab 6 in your solution. You may choose to separate the implementation to `DoublyLinkedNode.cpp`. You are allowed to add new methods, classes or iterator to support your solution (not compulsory).

Task 1 Output Example Screenshot:



Task 2 (6 marks)
Similar to Task 1, develop an application that construct a sorted doubly linked-list (based on alphabetical order) from the following strings of name:

```
"Emma", "Zack", "Wade", "Liam", "Kyle", "Mason", "Fiona", "Sam", "Ava",
"Mike", "Diana", "Paul", "Ryan", "Aidan", "Beth", "Noel", "Tina", "Harry",
"Cyril", "Jean"
```

The application will print the sorted names from the doubly linked-list.

Requirement: You must make use of the `DoublyLinkedNode.h` from Lab 6 in your solution. You may choose to separate the implementation to `DoublyLinkedNode.cpp`. You are allowed to add new methods, classes or iterator to support your solution (not compulsory).

Hint: You may use the `compare()` from string class to compare two strings.

Task 2 Output Example Screenshot: