Joanna Klukowska
joannakl@cs.nyu.edu

# Homework Assignment 6

Due date: Nov. 4, 11:55PM

## Problem 1

In doubly linked lists there are references to both the first and last elements of the list. The node used for such a list is defined as follows:

```
public class TwoWayNode <E> {
    private E data;
    private TwoWayNode<E> next;
    private TwoWayNode<E> previous;
    public TwoWayNode (E data ) {
        this.data = date;
        next = null;
        previous = null;
    }
}
```

Assume that the class provides all the getters and setters.

Implement

```
void enqueue (E item)
```

and

```
E deque()
```

methods of a Queue <E> class that is based on such a doubly linked list. Your queue keeps private data fields called `head` and `tail` that are both reference variables of type `ToWayNode<E>`.

Make sure to document your code (tell the reader what you are doing).

## Problem 2

Determine if the following prefix + and postfix expressions are valid or not. Evaluate their value, if they are valid. All numbers are single digits.

```
a) 1 2 + 3 *
b) 1 2 3 + *
c) 1 2 + * 3
d) 1 + 2 * 3
e) + 1 * 2 3
f) + * 1 2 3
g) 3 2 1 + 5 * + 4 -
h) 3 + 2 1 * 5 + 4 -
i) - 3 + 2 * 1 + 5 4
j) - 3 + 2 * 1 5 + 4
```

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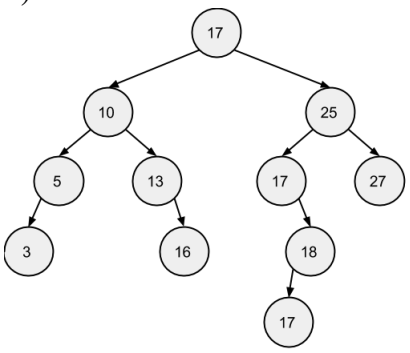
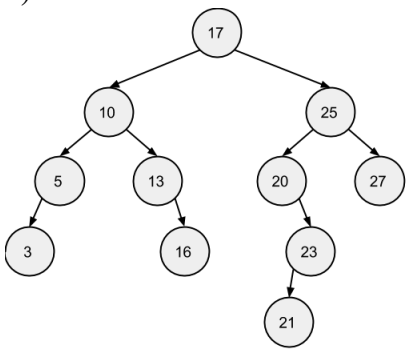
# Problem 3

For each of the following trees state what kind of a tree it is (check all that apply).

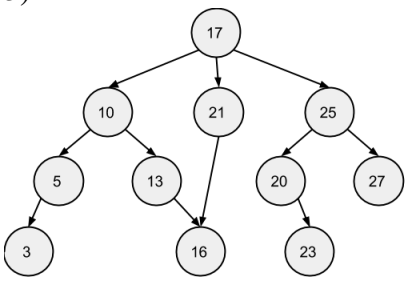
1)



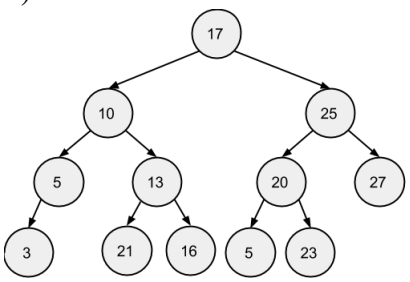

2)



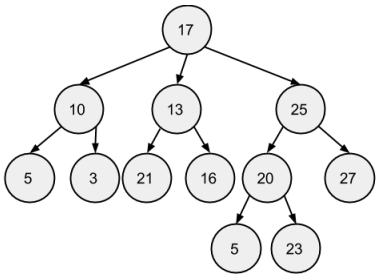

3)



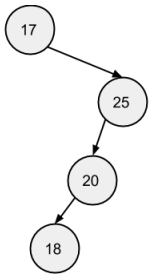

4)




5)




6)




| Tree # | Not a tree | General tree | Binary tree | Binary search tree |
|---|---|---|---|---|
| 1 | | | | |
| 2 | | | | |
| 3 | | | | |
| 4 | | | | |
| 5 | | | | |
| 6 | | | | |

# How and what to submit

You can (but do not have to) use the template provided at

https://docs.google.com/document/d/1-W-JSJRtplba4ykEhuP9PvnQhPInr2yC0b65jXUE9cU/edit?usp=sharing

to complete your solution.

**The completed solutions should be submitted as a single PDF document to NYU Classes.**

**Warning**: Make sure you submit a PDF document. We will ignore any files that are not PDF (that includes text files, Word documents, Google docs, RTF files, etc. ).