CS526 O2 – Spring 2020
Homework Assignment 3

This assignment has 3 parts.

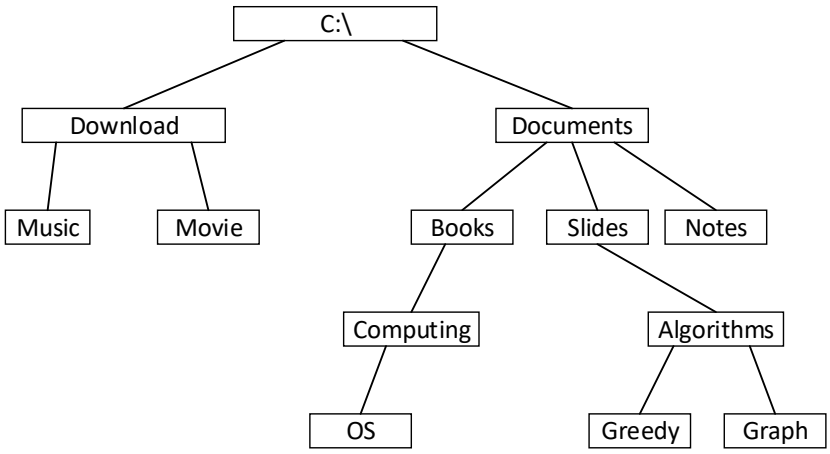
Part 1 (60 points). Part 1 is an implementation of a favorites list with move-to-front heuristic, which is discussed in Section 7.7 of the textbook.

Before you begin writing a program for this part, you must study Section 7.7 carefully.

Code Fragment 7.16 and Code Fragment 7.17 in pages 295-296 define the *FavoritesList* class. This class uses *LinkedPositionalList* as underlying storage. You are required to define the *ItemFsvoritesList* class. This has the same semantics as the *FavoritesList* class but uses Java's *ArrayList* as underlying storage. An incomplete code of *ItemFavoritesList.java* is posted on Blackboard. You need to complete this code. The incomplete code has a main method that is used to test the favorites list. You may want to test with different test strings.

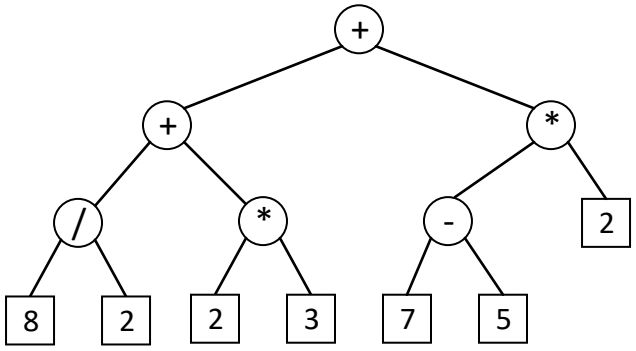
Code Fragment 7.18 in page 299 defines the class *FavoritesListMTF*, which is a favorites list with move-to-front heuristic. This class definition uses *LinkedPositionalList*. You are required to define the *ItemFavoritesListMTF* class, which has the same semantics as the *FavoritesListMTF* class but uses Java's *ArrayList*. An incomplete code of *ItemFavoritesListMTF.java* is posted on Blackboard. You need to complete this code. The incomplete code has a main method that is used to test the favorites list. You may want to test with different test strings.

Part 2 (30 points). Consider the following tree:



Part 2-1. Show the sequence of nodes generated by preorder tree traversal.
Part 2-2. Show the sequence of nodes generated by postorder tree traversal.
Part 2-3. Show the sequence of nodes generated by breadth-first tree traversal.

Part 3 (10 points). Consider the following tree:



This tree represents an arithmetic expression.
Part 3-1. Show the sequence of nodes generated by inorder tree traversal.
Part 3-2. What is the value of the expression?

Documentation

No separate documentation is needed. However, you must include sufficient inline comments within your program.

Deliverables

You must submit three files – *ItemFavoritesList.java*, *ItemFavoritesListMTF.java*, and *Hw3_others.pdf*. The *Hw3_others.pdf* file must include answers to parts 2 and 3. Combine the three files (and other additional files, if any) into a single archive file, name it *LastName_FirstName_hw*3.*EXT*, where *EXT* is an appropriate file extension, such as *zip* of *rar*, and upload it to Blackboard.

Grading

Part 1:

- *ItemFavoritesList* will be tested with 3 test strings and up to 5 points will be deducted for each wrong output.
- *ItemFavoritesListMTF* will be tested with 3 test strings and up to 5 points will be deducted for each wrong output.

Part 2: Up to 5 points will be deducted for each wrong answer.

Part 3:

- Part 3-1. Up to 3 points will be deducted if your answer is wrong.
- Part 3-2. Up to 3 points will be deducted if your answer is wrong.

Up to 20 points will be deducted if your program does not have sufficient inline comments.