IT179

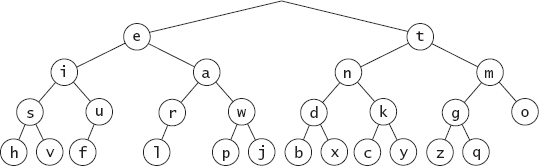
Lab5 part 2

Chapter 6 Review Programming Projects 9 (simplified)

The Morse code (see Table 6.11) is a common code that is used to encode messages consisting of letters and digits. Each letter consists of a series of dots and dashes; for example, the code for the letter a is •− and the code for the letter b is −•••. Store each letter of the alphabet in a node of a binary tree of level 5. The root node is at level 1 and stores no letter. The left node at level 2 stores the letter e (code is •), and the right node stores the letter t (code is −). The four nodes at level 3 store the letters with codes (••, •−, −•, −−). To build the tree (see Figure below), read a file in which each line consists of a letter followed by its code. The letters should be ordered by tree level. To find the position for a letter in the tree, scan the code and branch left for a dot and branch right for a dash. Your program should read an encoded message and decode it using the Morse code tree. Make sure you use a delimiter symbol between coded letters. (a space works)

**TABLE 6.11Morse Code for Letters**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| a | •– | b | –••• | c | −•−• | d | −•• | e | • | f | ••–• |
| g | – –• | h | •••• | i | •• | j | •– – – | k | –•– | l | •–•• |
| m | – – | n | –• | o | – – – | p | •– –• | q | – –•– | r | •–• |
| s | ••• | t | – | u | ••– | v | •••– | w | •– – | x | –••– |
| y | –•– – | z | – –•• |  |  |  |  |  |  |  |  |



Classes:

* MorseTree
  + Includes:
    - The node inner class.
    - Default constructor.
    - Add methods to add a character to the tree. (starter method and a recursive method)
    - Decode methods to retrieve the character from the tree using the Morse code value. (starter method and a recursive method)
* MainClass.java
  + Includes
    - The main method
      * Controls the flow of the program
      * Prompts the user for the encoded message
    - buildTree method
      * builds the tree using the file the contains the letters and their codes
    - decode method
      * decodes the message entered by the user

**Sample output:**

Please enter encoded message or stop to exit: .... . .-.. .-.. ---

The decoded message is: hello

Please enter encoded message or stop to exit: hello

Please enter a valid Morse Code!

Please enter encoded message or stop to exit: stop

Thank you for using our decoder!

**Notes**

* You can format your output in any way you want. You can add any more variables or methods that you need as long as you have the above methods and variables.
* Good program design is expected. Consider using private methods to break up longer methods into smaller pieces of functionality. Make sure everything has appropriate access control (private or public).
* Good commenting is expected with correct Javadoc style comments.
* Grading criteria:
  + MainClass(40%)
  + MorseTree Class (60%)
* Deductions
* Late (-10% per calendar day)
* (-40) Syntax Errors
* (-30) Runtime Errors
* (-10) Style and Organization
* Reading material related to the assignment:
  + From Data Structures (IT179 book):
    - Chapter 6

**Submission**

Zip your .java files with the text file you use to build the tree and submit the .zip file to the Program 4 assignment on ReggieNet.

* + Email submissions will not be accepted
  + Follow the late policy in the syllabus
  + Corrupt files, empty files, invalid format files will result a zero