IT306 Take Home Assignment 6

Assignment Directions

It is mandatory that you attempt this assignment on your own. You may use any printed resources you would like (text, notes, Internet – not recommended!). You may ask your instructor and TA questions on a limited basis. This is **not** a group assignment; however, limited discussion with your classmates is permitted. You may not work with a tutor or receive assistance on this assignment from outside resources. Sharing your work with a classmate or receiving assistance from someone outside of the course is considered a violation of the Mason Honor Code and results in 0 for the assignment in the first attempt and F in the course for the second attempt.

- **LATE ASSIGNMENT IS NOT ACCEPTED after 11:59 p.m. on the due date. Please don't send your late assignments to me or TA via emails as they will be discarded. You need to submit the softcopy to the myMason Portal on or before 11:59 p.m. If not submitted on time, it is classified as LATE.**
- **All the naming conventions used have to be followed the guidelines:**
- **All the variables have to be declared and initialized inside the method before they are used.**
- **No global variables are allowed to be used in your application class.**
- **All methods must be structured programs.**

Programming:

1- (20 points) In a complete binary tree with K nodes, what is the number of levels (n)? Explain. Submit your answer in a .pdf file.

2- (30 points) Access the java files under "Course Content> Module 7> Trees" folder on BB. BinarySearch.java provides traversal methods discussed in the class for traversing a binary tree (i.e., in-order, pre-order, and post-order). Study the recursive implementation for *inorder* and *preorder* methods. Then complete the following tasks:

   a. (20 points) Develop a recursive solution for the *postorder* method. Submit your modified BinarySearchTree.java file. Do not make any changes to the rest of the provided java classes. Document your code.
   b. (10 points) Compute the Big-O complexity of this recursive method by showing how the time function (i.e., T(n)) is calculated.

3- (50 points) Study Junit using the following tutorials:

   https://www.tutorialspoint.com/junit/

   https://www.tutorialspoint.com/junit/junit_writing_tests.htm

Then watch this video: https://www.youtube.com/watch?v=I8XXfgF9GSc

To set up JUnit with eclipse, follow the steps given in the link below:

https://www.tutorialspoint.com/junit/junit_plug_with_eclipse.htm

After reviewing the tutorials, review MyTests.java test cases developed for the binary tree traversal application under "Course Content> Module 7> Trees" folder on BB, as an example.

Finally, develop your own test cases for the application class that you developed for Lab 3 (i.e., FlightImplementation.java) and submit your Junit test class. Note that you have to design your test cases in such a way that it does not fail. Document your code.

Final Submission: Archive your files and submit to BB before the deadline.