**Questions: (5 marks)**

In this question you should complete some methods in **BSTree.java** file.

The class Cat with 3 data members: place, weight and color is given and you do not need to edit it. The BSTree class is a binary search tree of Cat objects. The following methods should be completed:

- void insert(String xPlace, int xWeight, int xColor) - The variable **weight is the key** of the BSTree, thus it must be unique.

- void f1() – Your task is to add statements in the **insert**(...) method so that any node with xPlace.charAt(0) == 'F' is not inserted to the tree. The output in file f1.txt should be as follows (line 1: Breadth first traversal, line 2: In-order traversal)

(X,5,2) (N,3,6) (M,9,5) (P,1,3) (R,4,8) (Q,8,7)
(P,1,3) (N,3,6) (R,4,8) (X,5,2) (Q,8,7) (M,9,5)

- void **f2()** – Perform pre-order traversal for the **right branch** of the BST, but display to file f2.txt nodes with **color<8** only.
  Hint: Copy the function preOrder(...) to function preOrder2(...) and modify it.
  Output in the file f2.txt must be the following (line 1: Breadth first traversal, line 2: pre-order traversal)

(P,7,9) (D,4,3) (G,9,6) (H,2,5) (B,6,4) (X,8,9) (L,1,8) (N,3,1)
(G,9,**6**)

- void **f3()** - Perform a new traversal method to visit all nodes in the BST with the constraint: visit the nodes with **weight>2** and in the **descending order of weight**. Output in the file f3.txt must be the following:

(T,**8**,-5) (M,**7**,2) (P,**6**,3) (R,**5**,9) (S,**4**,1)

- void **f4()** - Print out **leaf nodes** of the tree. Output in the file f4.txt must be the following: (line 1: pre-order traversal, line 2: leaf nodes (by pre-order traversal))

(A,6,5) (B,2,7) (P,1,9) (C,3,-8) (D,5,-3) (E,8,3) (G,7,4) (Q,9,1)
(P,1,9) (D,5,-3) (G,7,4) (Q,9,1)

- void f5() – How many **internal nodes** are there in the BST? Output in the file f5.txt must be the following: (line 1: in-order traversal, line 2: the amount of internal nodes)

(L,1,5) (H,2,6) (Q,3,1) (D,4,3) (B,6,-4) (M,7,9) (X,8,7) (G,9,-6)
4

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**Trước khi nộp:**
- **Clean and build** project để tạo ra thư mục ***dist***
- Đổi tên thư mục ***dist*** thành ***run***

**Nộp bài**
- Nén thư mục Q2 thành Q2.zip hoặc Q2.rar
- Nộp file vừa nén lên lms

===== End =====