

In this assignment you will create two separate programs (**avltree** and **btree**) that have a common theme: to read a file containing ASCII text of names of people. The file name should be specified on the command line as an argument. Each line should contain a name.

**Billy Bob**

**Johnny Sue**

**Sarah**

Each line is considered to only contain a single name (spaces and other ASCII characters are considered valid for that name). I.E. each line can be considered to be unique and no parsin is required.

## 1. (50 Points)

The program should build an AVL Tree from this input. The program would be run as:

**avltree filename.txt**

After the file is read and the tree is constructed, the program should accept user input (case insensitive):

- PRINT
  - Prints all names in tree using breadth first approach. Each name should be printed on a separate line.
- HEIGHT
  - Prints the maximum height of the tree.
- FIND
  - Finds tthe name, and prints the name followed by the balance factor of the node containing the name. The name and the balance factor should be separated by a comma. Right sub-tree heights are always positive.
    - \* Sarah, 1

## 2. (50 Points)

This program should build a B-Tree from this input. This program should also accept the order of the B-Tree as the second argument. The program should be run as:

```
btree filename.txt 4
```

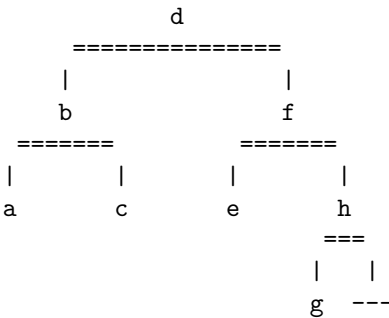
The tree would construct an order 4 B-Tree. After the file is read and the tree is constructed, the program should accept user input (case insensitive):

- PRINT
  - Prints all names in tree using a **depth** first approach (i.e. all the names should be printed in alphabetical order). Each name should be printed on a separate line.
- HEIGHT
  - Prints the maximum height of the tree
- FIND
  - Finds the name, and prints all names contained in the tree node. Names should be displayed on separate lines and in order.

Johnny Sue Sarah Tom

### Questions:

#### Question 1:



In this case, what is the height of the tree? is it of height 4? Or is it of height 3? Which one is it?

**Question 2:**

Are we allowed to use a vector to store variables when reading from a file? Or are vectors just blanket not allowed?