Meeting Planner

1 Overview

In the project it's required to apply some different operations like:

ADD function:

The title, day and hour are passed to the function which calls the insert function in BST.

Note that the conflict message is printed in the BST.cpp in case the day and hour are inserted before.

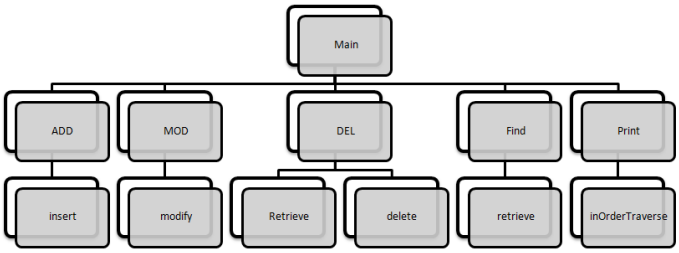


Figure 1: the main functions in project

MOD function:

I added a member function in BST files but its implementation is similar to the retrieve function but in case of nullTree or the entry data = treeData the title of this meeting must be changed to the new passed title.

DEL function:

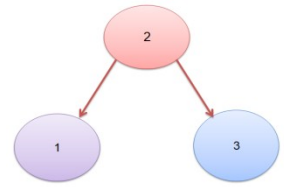
First i used the retrieve function to detect if the node is found in the tree or not.

The retrieve function returns a subtree but we don't know where the root of this sub tree "required node to be deleted" exist.

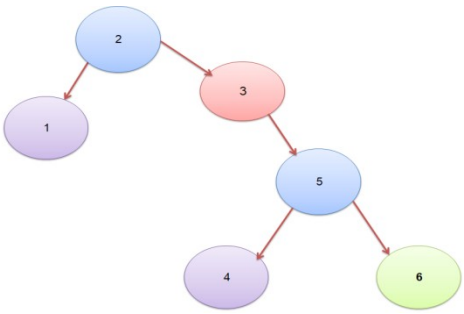
So i implemented a new member function in BST which name is delet.

This function is doing some recursion iteration to find the location of the required node to be deleted, we have four different cases for this location.

- 1^{st} **case (the node has no childs)**
  For example: we need to delete the node (1) or (3) in the tree shown in fig.
  Easily, i make the nullTree to be True.



- 2^{nd} **case (the node has only one child in the right)**
  Lets say we need to delete the node (3) in the tree shown in fig.
  If we did as the previous case we will lost all the subtree starting from node (3) till node (6) , so the solution is to do a tricky way which is equivalent to delete node (3).
  I replaced node (3) by another node in the subTree without damaging the order.
  So, the suitable node to be chosen is node (4) because it is the smallest node in all the subTree.
  The technique is to store the value (4) in a temp then delete the node (4) "by the way of the first case mentioned before" then equalize node (3) by the value of the temp "4".

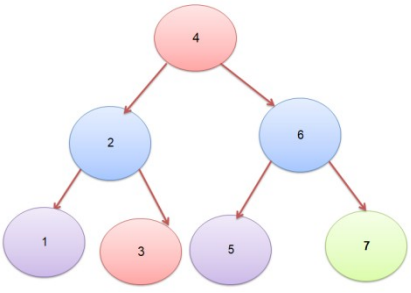


- 3^{rd} **case (the node has only one child in the left)**
  Similar to the second case but instead of getting the minimum value of the right subTree we must get the maximum value in the left subTree.

- 4^{th} **case (the node has both left and right children)**

  Here we have two options to delete node (*4*) in the tree shown in fig.

  First one is to get the maximum node in the left subTree and replace node (4) by it.
  The second option is to get the minimum of the right subTree and replace node (4) by it.
  Note that: in my code i used the first option.



Find function:

the valid function to do this operation is the retrieve function which returns a subTree starting from the node which required to be found in case the node is exist in the Tree .

if not found retrieve will return an empty tree.

Print function:

A function with no arguments. It's just calling inOrderTraverse member function.

Athough print function has no arguments but inOrderTraverse takes the whole tree as an argument.

The function of the inOrderTraverse is to get the minimum node in the tree by going extreme left and print the title ,day and hour

Then make some recursion iteration by passing the right Tree to get the next higher node.

Note that : in all functions the ofstream file is passed by reference to be able to write in it .Also in all functions instead of passing the day and the hour , a new variable which value is (100*day+hour) is passed to these functions .so i could compare its value easily inside the tree

2 Main Flows

The next flow chart shows the flow of the code in the main.cpp without many details to avoid the complexity of the chart.

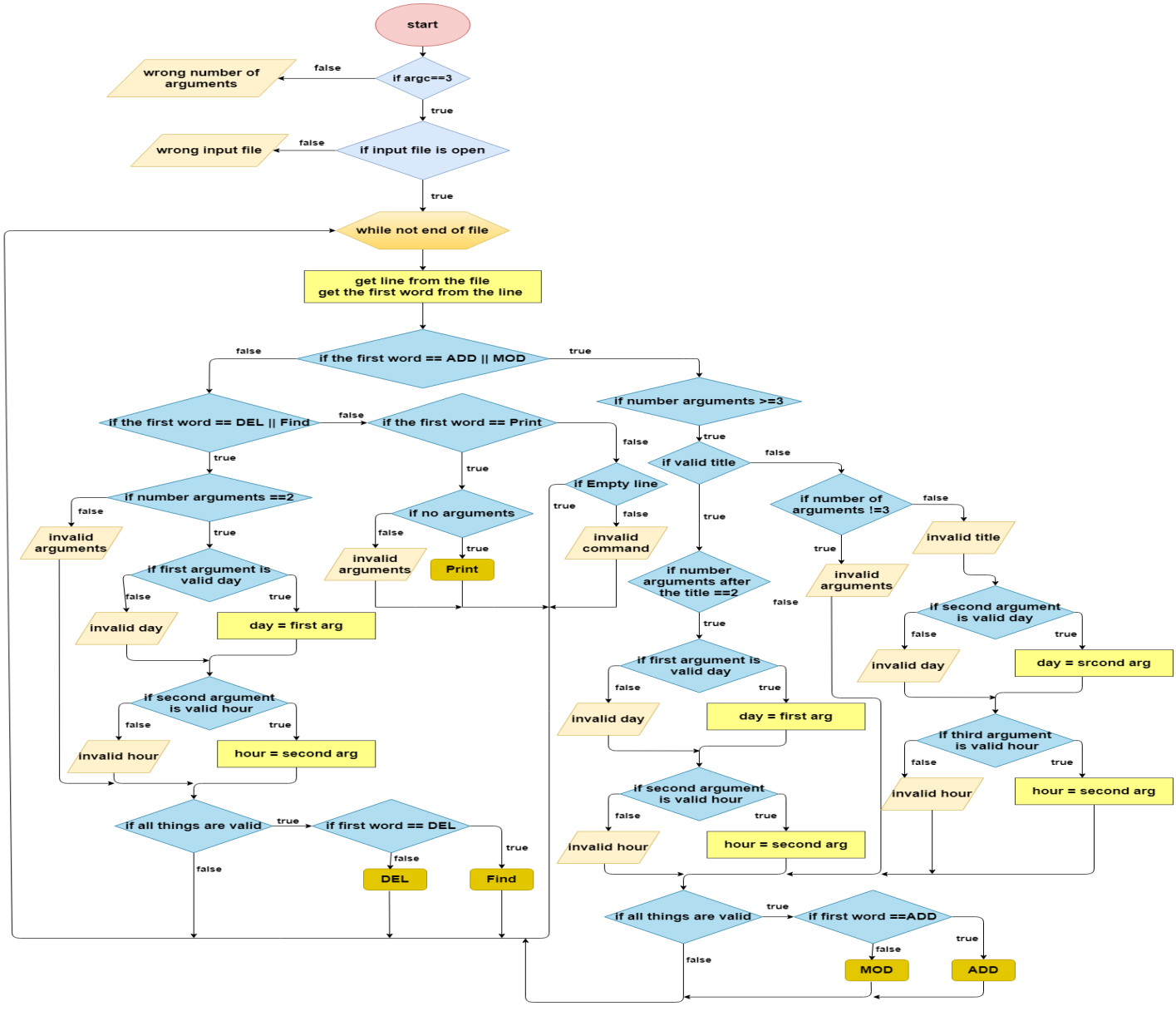


Figure 2: flow chart to chow the flow of the main code

3 Error Handling

Wrong number of files

if argc not equals to 3 this error will printed.

Wrong input file

If the user enter a wrong an invalid name for the input file . this is handled by checking if the correct input file is open or not.

Invalid Command

The input file is read line by line. I used a function which nabe is getfirstWord to get the first word in each line then checked if this word equals to one of the proper required operations or not.

Invalid Arguments

If divided the operations based on the number of arguments into 3 parts and used a function called CountWords to get the number of words in each line and number of arguments.

- 3 arguments (ADD&MOD)
  In this case the code is divided into 2 parts:
  First one is in case the title is not valid: so, if the number of arguments is not equal 2, the invalid arguments error message will be printed.
  Second one is in case the title is valid: i used substr function to subtract a part of the line starting from the first letter till the final quotes in the title , then i used CountWords function to count the number of words in the rest of the line. If the rested words are 2 then it will be a valid arguments, else the invalid arguments error message will be printed.
- 2 arguments (DEL&Find)
  In this case if the number of arguments is not equal 2, the invalid arguments error message will be printed.
- 0 arguments (Print)
  In this case if there is any arguments, the invalid arguments error message will be printed.

Invalid Title

this check is applied only in case the command is ADD or MOD ,to be a valid title ,the whole title must be included between double quotes. Regardless the number of quotes or words inside it.

The best way to get the first quotes and last qouts is to use find and rfind functions "rfind gets the index of the last quotes in the string".

If the 2 qouts are exist and different , the next char after the final qouts is 'space' and theres no letters before the first quotes, then this title is valid, else the invalid title error message will be printed.

Invalid Day

After using substr to get a string which containing the day and the hour only, GetFirstWord is used to get tempDay. Because of this tempDay is string not integer, we need to use isDigit function to check if this string contains numbers only or not.

If isDigit returned False, the invalid day error message will be printed. Else i will use stoi function to convert this string into integers then check if the value is a valid day range or not. If not valid, the invalid day error message will be printed.

Invalid Hour

After using substr to get a string which containing the day and the hour only, GetFirstWord is used two times to get tempHour. Because of this tempHour is string not integer, we need to use isDigit function to check if this string contains numbers only or not.

If isDigit returned False, the invalid hour error message will be printed. Else i will use stoi function to convert this string into integers then check if the value is a valid hour range or not. If not valid, the invalid hour error message will be printed.