Programming Assignment 2

Modify the BST-based dictionary to be a Threaded BST-based dictionary.

Files You're Given

- BinNode.h
- book.h
- BSTNode.h
- BST.h
- dictionary.h

Steps (1:5)

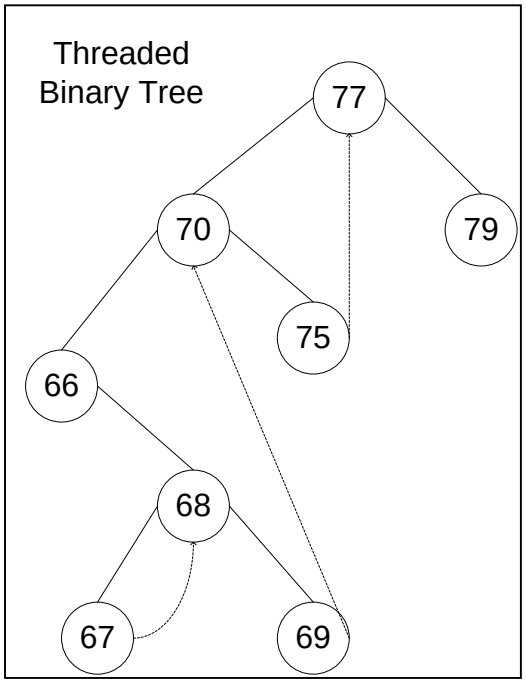
1. Make sure that you can compile and run the files you've been given. You'll have to create a .cpp file with main() and create a BST object.
2. As part of your "approach" determination, determine what objects must be modified to create a threaded-BST.
   - BinNode – what change do we need to make to BinNode relative to threads?
   - BSTNode implements BinNode – what changes are required?

Steps (2:5) – Approach (cont.)

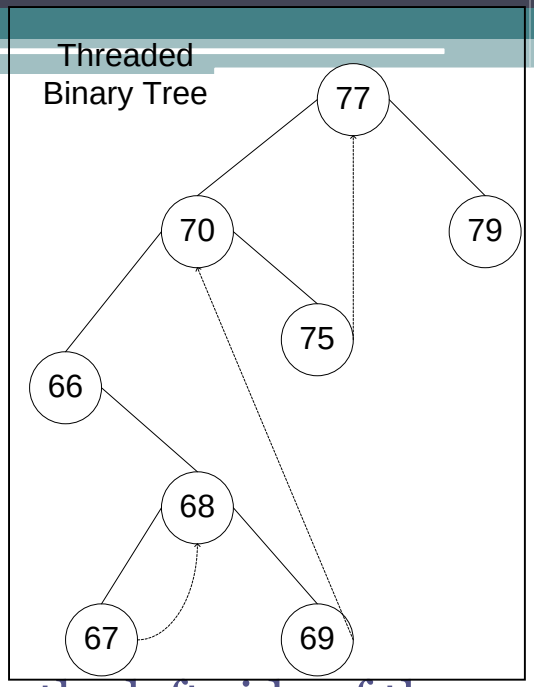
- BST.h – this is where most of the work is done
- Focus on inserthelp() first, since it must work or nothing else will
  - You can use recursion here
  - Question – when I insert a new node, what is the state of the "root" I pass into inserthelp and how does that affect the insert?
    - Is "root" empty, in which case I merely append my new node to the left or right side as appropriate?
    - Is one of the "root" pointers a regular pointer or a thread and is it the side I need to insert on?
  - Figure out the possible states of "root" and then determine what action you need to take to do an insert when root is in that state

Steps (3:5)

- inserthelp example
  1. "root" is 79 and "newNode" (78) is less than root
     a) root->setleft(newNode, regular)
     b) nowNode->setright(root, thread)
  2. "root" (69) has a right thread, no children, and "newNode" (69.5) is greater than root
     a) newNode->setright(root->right(), thread)
     b) root->setright(newNode, regular)



Steps (4:5)



- inorderPrint()
  - Do this next, so that you can print your tree using threads
  - Rules
    - Start at root and use a loop to go as far down the left side of the tree as you can following **regular** pointers. You are now at the smallest node – print it
    - Now follow the node's right pointer until you can go left again using the following rules
      - If following a **thread** don't go left even if the left subtree is not empty
      - If following a **regular** pointer go left if the left subtree is not empty
- reverseOrder() – rules exact opposite of inorderPrint()

Steps (5:5)

- printhelp()
  - Uses recursion and threads break its current implementation
  - Your last task is to modify it so that it will continue to work as designed and ignore threads

Programming Assignment Tip

- You can create a text file of your programs output using the “>” redirect operator rather than taking a lot of screen shots to do the same thing.
- You still need to turn in a screen shot so that I can see you ran your program but instead of more screen shots you can include your program’s output.
- I must be able to run your program myself to verify your program. If it doesn’t run on my Windows PC you won’t get credit for it.