CSE 331
Software Design & Implementation

Summer 2024

Section Squares – Debugging

Administrivia

- HW Squares released later Thursday, due Wednesday at **11pm**
- Can resubmit as many times as you'd like until the deadline.
  - Use the autograder as a tool if you're not sure if your code/tests have bugs

Question 1

Recall our definition of a binary search tree from HW Weave:

$$\begin{aligned} \textbf{type}\ \text{BST} := \quad & \text{empty} \\ \mid \quad & \text{node}(x : \mathbb{Z},\ S : \text{BST},\ T : \text{BST}) \quad \text{with conditions A and B} \end{aligned}$$

Suppose that we wanted to have a way to refer to a specific node in a BST. One way to do so would be to give directions from the root to that node. If we define these types:

$$\begin{aligned} \textbf{type}\ \text{Dir} &:= \text{S} \mid \text{T} \\ \textbf{type}\ \text{Path} &:= \text{List}\langle\text{Dir}\rangle \end{aligned}$$

then a Path tells you how to get to a particular node where each step along the path (item in the list) would be a direction pointing you to keep going down the left (S) or right (T) branch of the tree.

For example, $\text{cons}(\text{S}, \text{cons}(\text{T}, \text{nil}))$ says to select the "S" (left) child of the parent and then the "T" (right) child of that node, giving us a grand-child of the root node.

(a) Define a function "find(p : Path, T : BST)" that returns the node (a BST) at the path from the root of T or undefined if there is no such node.

(b) Define a function "remove(p : Path, T : BST)" that returns T except with the node at the given path replaced by empty.

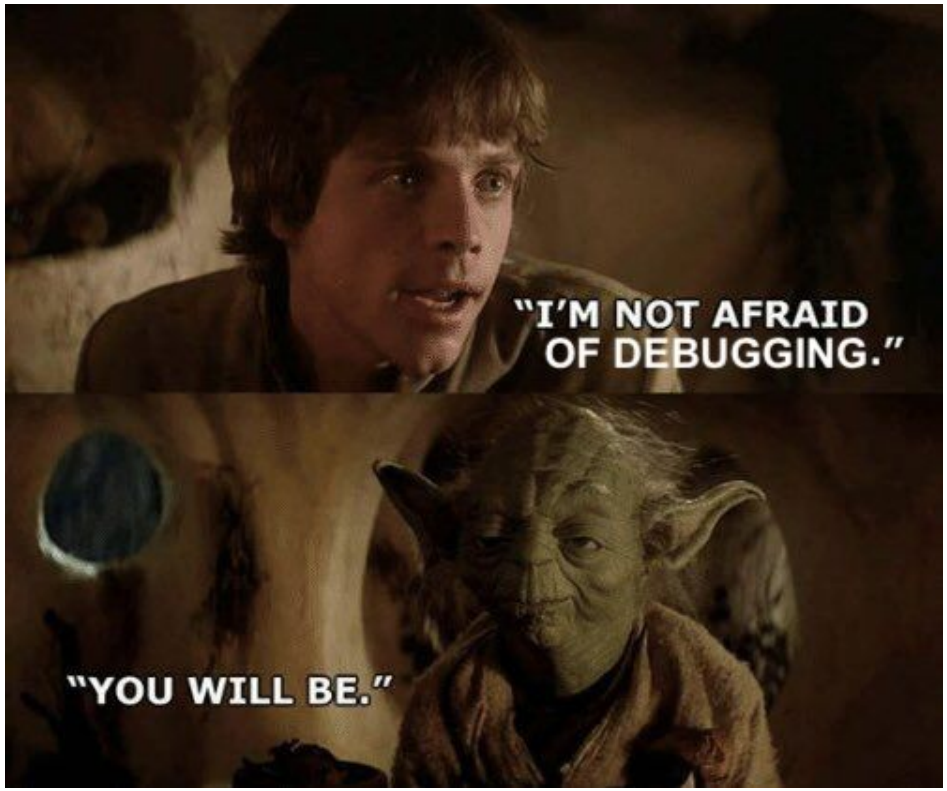
Question 1a

(a) Define a function "find(p : Path, T : BST)" that returns the node (a BST) at the path from the root of T or undefined if there is no such node.

Question 1b

(b) Define a function "remove(p : Path, T : BST)" that returns T except with the node at the given path replaced by empty.

Debugging!



- **Don't stay stuck on the same bug**
  - Continuing isn't helpful
  - Get help!
  - Take a break!
- **Turn bugs into test cases**
  - In case they come back again
- Utilize `console.log()` and the network tab

Client-Server Communication Debugging Steps

1. **Do you see the request in the Network tab?**
   - the client didn't make the request

2. **Does the request show a 404 status code?**
   - the URL is wrong (doesn't match any `app.get` / `app.post`)
     or
     the query parameters were not encoded properly

3. **Does the request show a 400 status code?**
   - *your* server rejected the request as invalid
   - look at the body of the response for the error message **or** add `console.log`'s in the server to see what happened
   - the request itself is shown in the Network tab

Client-Server Communication Debugging Steps

4. **Does the request show a 500 status code?**
   - the server crashed!
   - look in the terminal where you started the server for a stack trace

5. **Does the request say "pending" forever?**
   - your server forgot to call `res.send` to deliver a response

6. **Look for an error message in browser Console**
   - if 1-5 don't apply, then the client got back a response
   - client should print an error message if it doesn't like the response
   - client crashing will show a stack trace

coding exercise

debugging practice !!