USA Tutor

Dishwashing

Analysis by David Yang

Sample

5

4 5 2 3 1

4
5
2
3
1

Step 1

Put the 4 onto a new stack

Why: Only choice

4
5
2
3
1

$-$

4

Step 2

Put 5 onto a new stack

Why: You cannot put a 5 on a 4

Since you keep track of the max of numbers on the Elsie Stack

-> You don’t want to add more plates than necessary

5

2

3

1

45

Step 3

Put 2 on top of 4 stack

Why: You can’t put it on top of 5 or on a new stack

2

3

1

2

45

Step 4

Move 2 to Elsie Stack

Why: Make room for the 3

3

1

2

45

3

2

45

1

2

3

1

45

2

Step 5

Move the 3 on top of the 4 stack

Why: because you can't put it on the 5 or on a new stack

And you don't have to move 4/5 on Elsie, so don't

3 $\times$ 3

45

1 2

STOP

2 is on the Elsie Stack

1 is our current number

$1 < 2$, therefore

we will never have a solution if we decided to take 1

so we quit

1

3
45

2

STOP

3

45

1

2

Implementation Details

Casework:

Put current node on stack

Move node to Elsie

Delete nodes

Put node on stack

What stack should we put it on?

- Only 1 will work

How to pick?

- You can just iterate/binary search

Move node to Elsie

Just do min(curnode, minnode)

You actually do not have to store Elsie’s stack

All that matters is the minnode

Deleting Nodes

We have to delete starting from the leftmost stack (think about this)

And to delete we do the operations listed in previous slide

Coding Nuances

1. Determining the stack to place on
2. Storing a pointer to the leftmost stack
3. Dealing with adjacency lists