

Tower of Hanoi - Solution

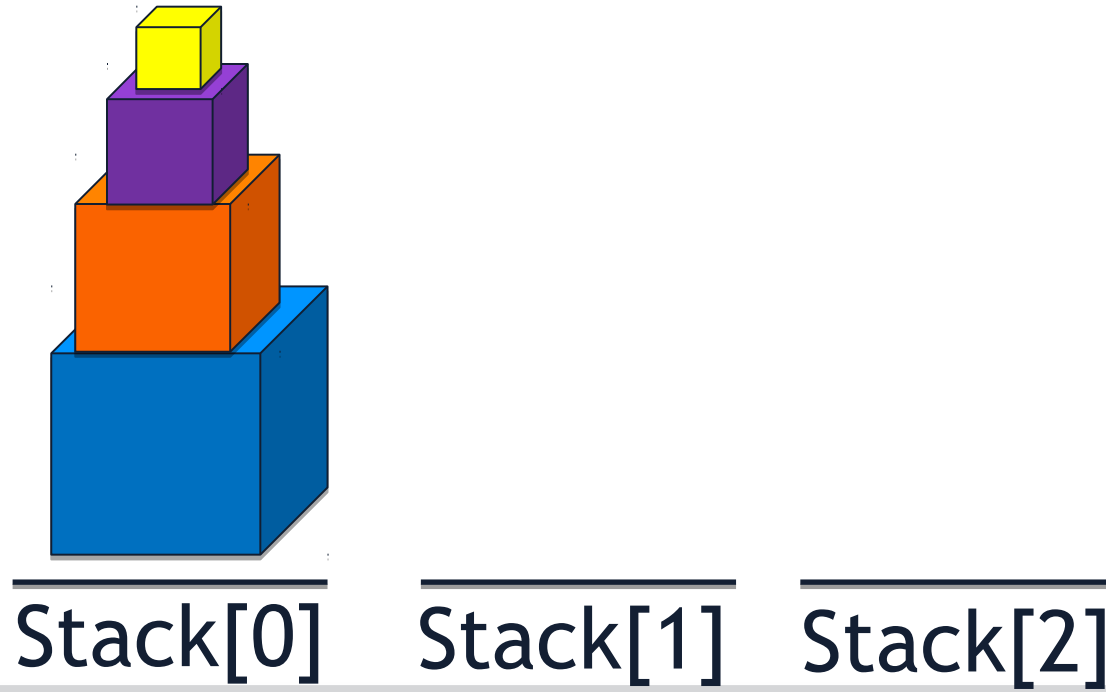
Prof. Wade Fagen-Ulmschneider

I ILLINOIS

ALMA MATER

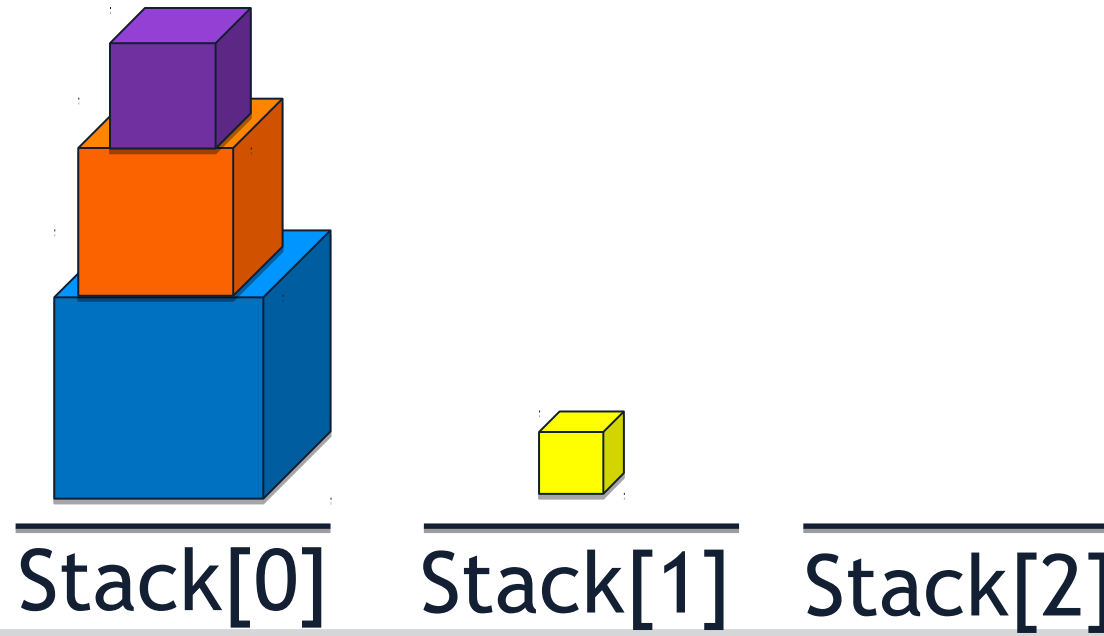
TO BRIGHT CHILDREN
OF THE FUTURE

Moves Made:



Moves Made:

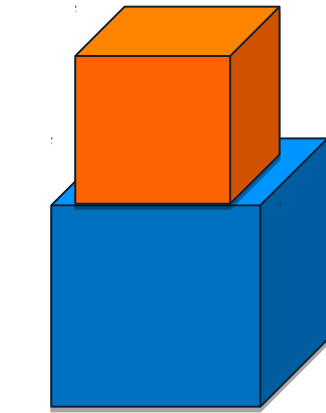
0  1



Moves Made:

0  1

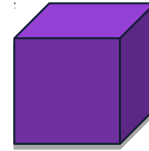
0  2



Stack[0]



Stack[1]



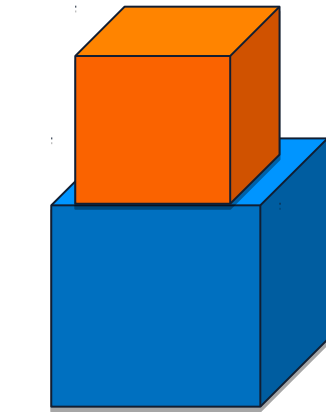
Stack[2]

Moves Made:

0  1

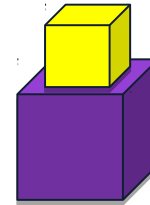
0  2

1  2



Stack[0]

Stack[1]



Stack[2]

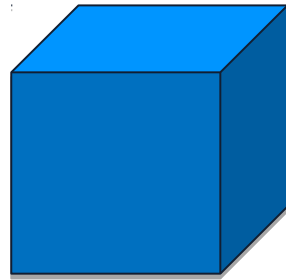
Moves Made:

0  1

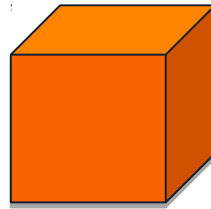
0  2

1  2

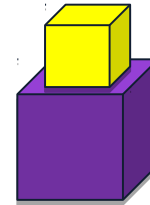
0  1



Stack[0]



Stack[1]



Stack[2]

Moves Made:

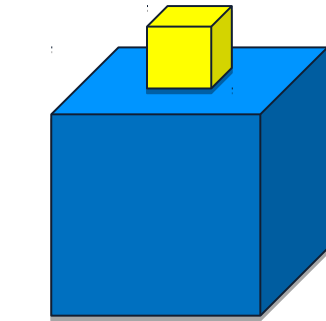
0  1

0  2

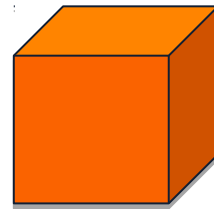
1  2

0  1

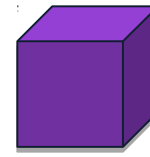
0  2



Stack[0]



Stack[1]



Stack[2]

Moves Made:

0  1

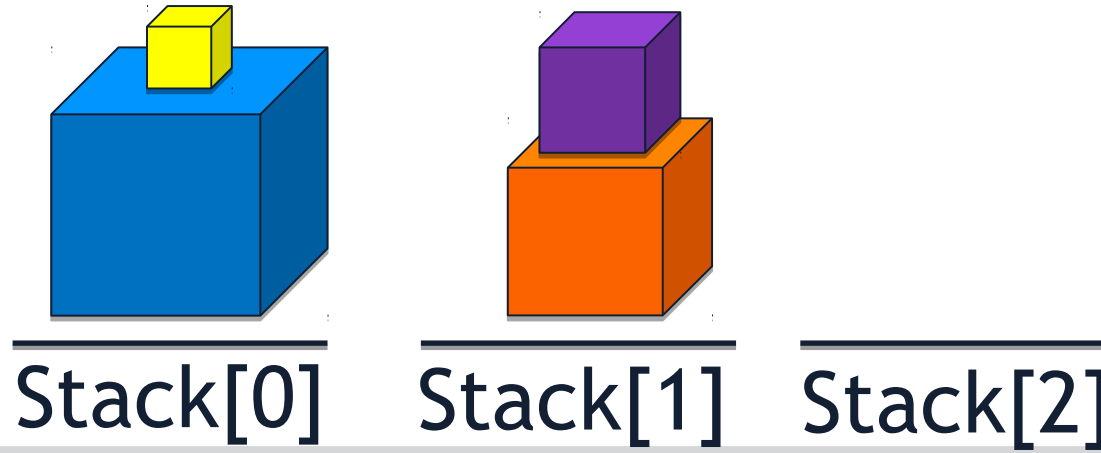
0  2

1  2

0  1

0  2

1  2



Moves Made:

0  1

0  2

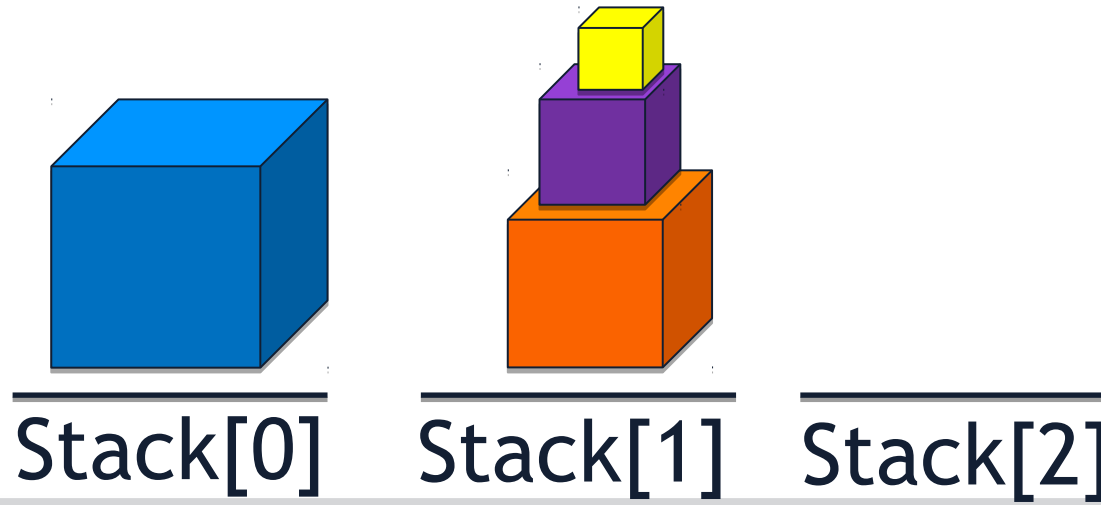
1  2

0  1

0  2

1  2

0  1



Moves Made:

0  1

0  2

1  2

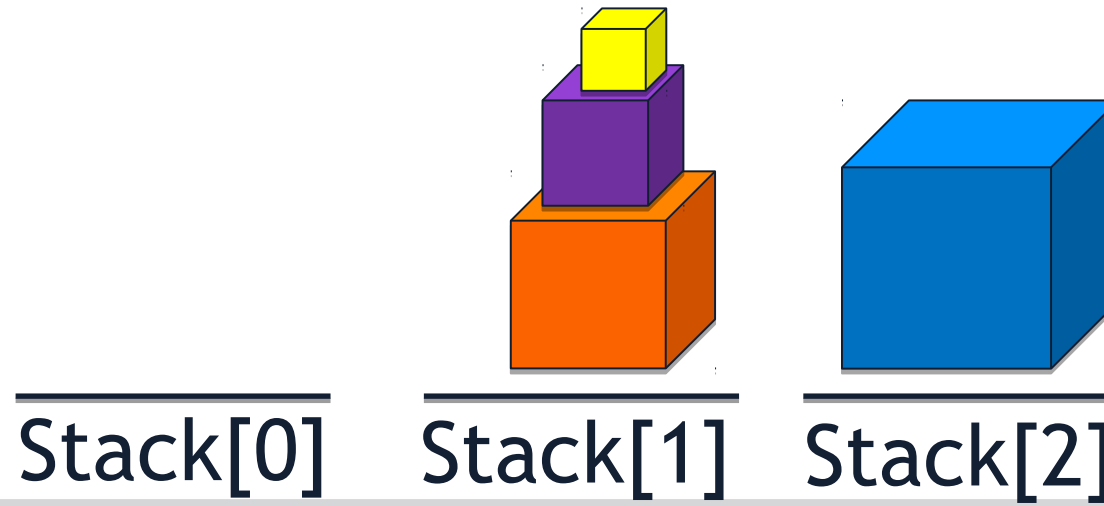
0  1

0  2

1  2

0  1

0  2



Moves Made:

0  1

0  2

1  2

0  1

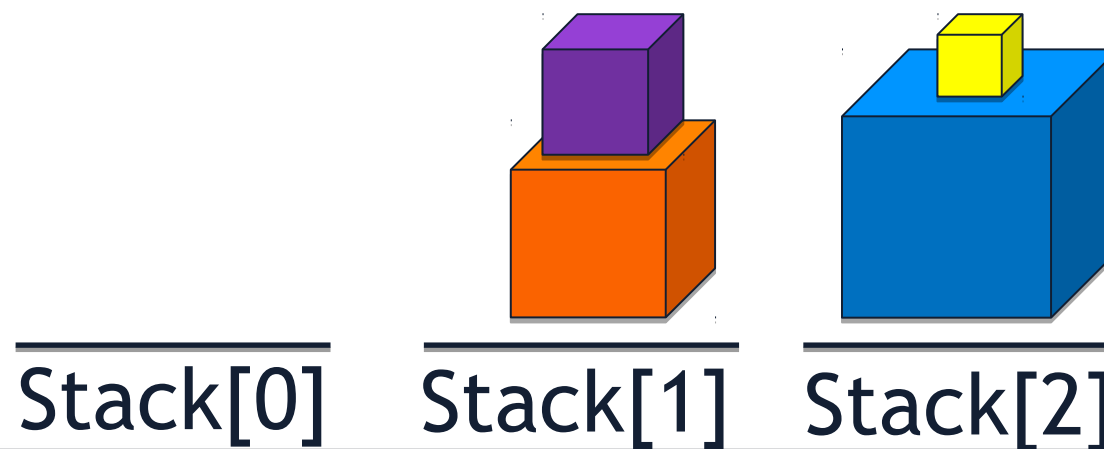
0  2

1  2




0  1




0  2




1  2

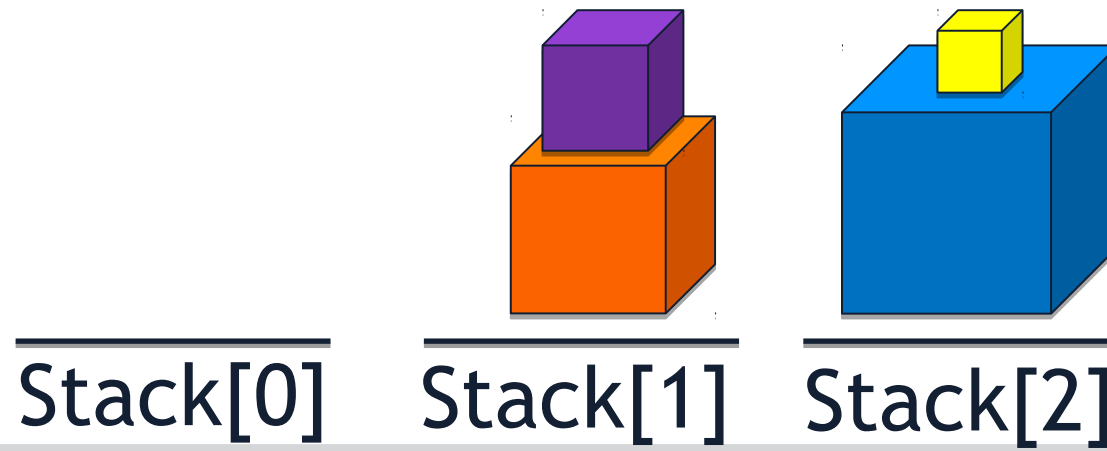


Moves Made:

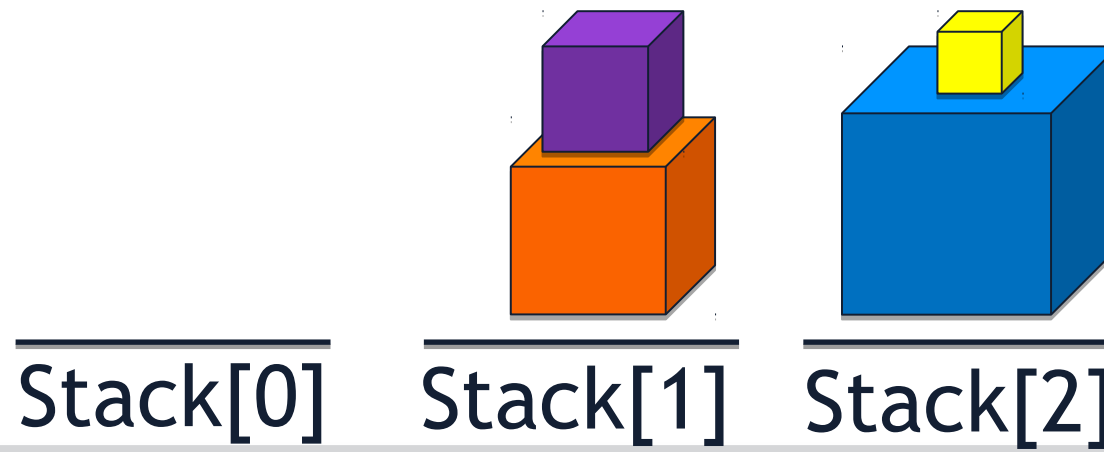
0  1
0  2
1  2




0  1
0  2
1  2




0  1
0  2
1  2






Moves Made:



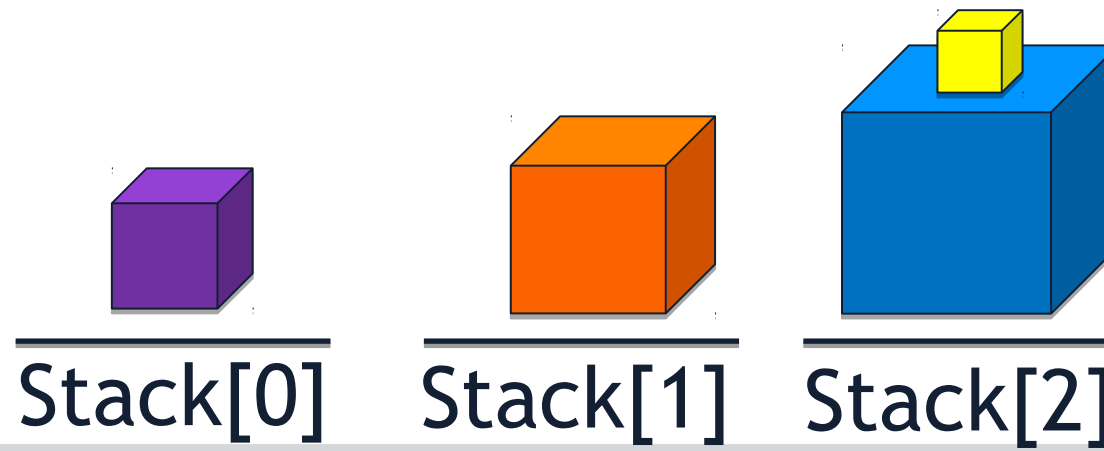
0  1
0  2
1  2




0  1
0  2
1  2




0  1
0  2
1  2




0 ? 1
0 ? 2
1 ? 2


Moves Made:



0  1
0  2
1  2




0  1
0  2
1  2




0  1
0  2
1  2




0  1
0 ? 2
1 ? 2



Moves Made:



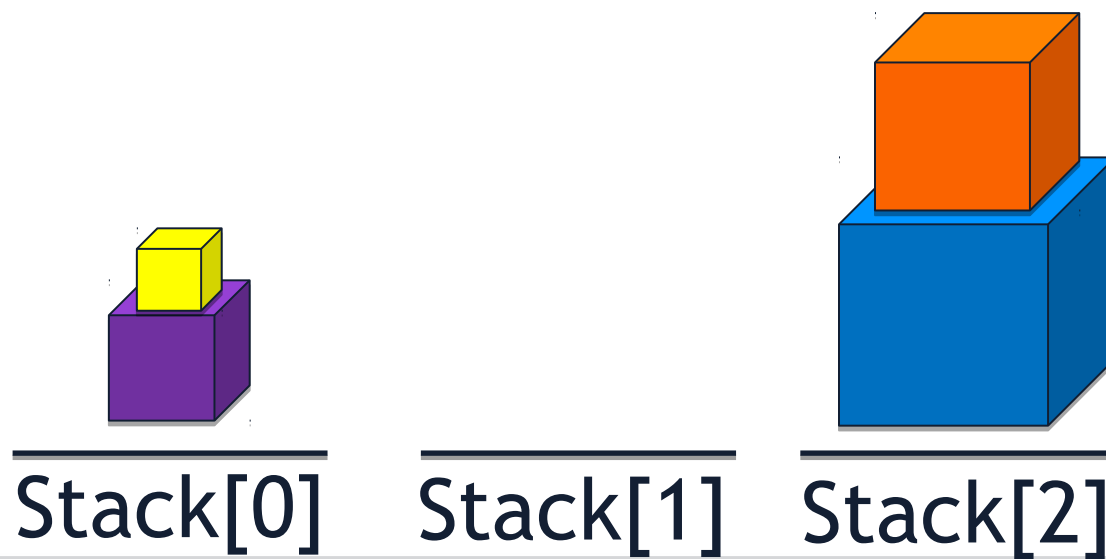
0  1
0  2
1  2

0  1
0  2
1  2

0  1
0  2
1  2

0  1
0  2
1 ? 2

Moves Made:



0 1
0 2
1 2

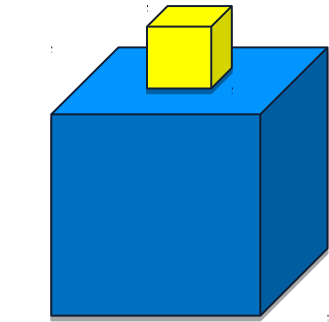
0 1
0 2
1 2

0 1
0 2
1 2

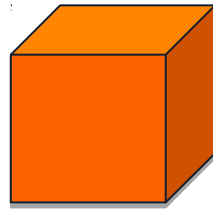
0 1
0 2
1 2

cpp-tower-solution/Game.cpp

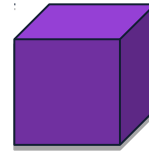
```
59 void Game::solve() {  
60     while (stacks_[2].size() != 4) {  
61         _legalMove(0, 1);  
62         _legalMove(0, 2);  
63         _legalMove(1, 2);  
64     }  
65 }
```



Stack[0]



Stack[1]



Stack[2]

cpp-tower-solution/Game.cpp

```
43 void Game::_legalMove(unsigned index1, unsigned index2) {  
...  
49     if ( stacks_[index1].peekTop().getLength() <  
50         stacks_[index2].peekTop().getLength() ) {  
51         _move(index1, index2);  
52     } else {  
53         _move(index2, index1);  
54     }  
55  
56     cout << *this << endl;  
57 }
```

cpp-tower-solution/Game.cpp

```
43 void Game::_legalMove(unsigned index1, unsigned index2) {  
44     if ( stacks_[index1].size() == 0 &&  
45         stacks_[index2].size() > 0 ) {  
46         _move(index2, index1);  
47     } else if (stacks_[index1].size() > 0 &&  
48         stacks_[index2].size() == 0) {  
49         _move(index1, index2);  
50     } else if (stacks_[index1].size() > 0 &&  
51         stacks_[index2].size() > 0) {  
52         _move(index1, index2);  
53     }  
54 }
```

...

cpp-tower-solution/Game.cpp

```
38 void Game::_move(unsigned index1, unsigned index2) {  
39     Cube    cube = stacks_[index1].removeTop();  
40     stacks_[index2].push_back(cube);  
41 }
```