PIC 10B Discussion
Week 7
Professor: Michael Lindstrom
TA: Thomas Tu
Costing Algorithms

• Towers of Hanoi

```cpp
void hanoi(int n, int pole1, int pole3) {
    if(n==0) { return; }
    pole2=6-pole1-pole2;
    hanoi(n-1, pole1, pole2);
    cout << "disk" << n << " pole" << pole1 << "->pole" << pole3 << endl;
    hanoi(n-1, pole2, pole3);
}
```

How long does this take?
Costing Algorithms

Hanoi(n):

    // constant time operations
    Hanoi(n-1)
    Hanoi(n-1)

• \( f(n) = 2 \times f(n-1) = 2 \times 2 \times f(n-2) = \ldots = 2^n \times f(0) = 2^n \)

• So it takes \( O(2^n) \) time
Data Structures: Linked Lists

• Exercise: search a linked list
• Linked list code: from website (subset of code from professor’s slides)
• Return true if the value was found, false if not in list
• Sequential search: go element by element until you find it or hit end
• Remember edge cases:
  • What if something is null?
Data Structures: Linked Lists

• Exercise: reverse a linked list
  • 1,2,3,4,5 -> 5,4,3,2,1

• Remember to set first and last

• Also handle edge cases
  • What if the list is empty? What if there’s only one element?

• std::swap may come in handy