Announcements

- APT-2 due tonight!
  - Remember you get 24-hour grace period, can’t turn in after that!
- APT-3 out today – due 3/2
- Assignment 2 Turtles out – due 3/4
- Lab 4 Friday – No Prelab

APT Quiz 1 coming…

- APT Quiz 1 is 3/5-3/8
- Open around 8am 3/5
- There are two parts
- Pick a start time for each part,
  - Once you start a part, You have 1.5 hours
  - If you get accommodations, you get those
- 4 APTs to solve (2 in each part)
- Will put up problems from an old APT Quiz so you can practice

I believe that every engineer has a responsibility to make the world a better place. We are gifted with an amazing power to take people’s wishes and make them a reality.
WOTO-2: Let’s draw a triangle!

• Equilateral triangle
  • Corner degrees: 60
  • Side length: 100

WOTO-2: Let’s draw it 3 times!

• TPS: What will the turtle draw?
  • Note: Think about where the turtle is and facing after each iteration

Option 1
(Draw 3 triangles on top of each other)

Option 2

Option 3

Option 4

Orientation and location matters!
APT Bagels

• How figure out how many bagels needed?
  • 7-steps!

Examples

1. orders = [1,3,5,7]
   
   Returns: 16

   No order is for more than a dozen, return the total of all orders.

2. orders = [11,22,33,44,55]
   
   Returns: 175 since 11 + (22+1) + (33+2) + (44+3) + (55+4) = 175
Step 1 and 2

• Step 1: Solve an instance (think)
  • orders = [11, 3, 24, 17]

2/23/21 Compsci 101, Spring 2021 13

Step 1 and 2

• Step 1: Solve an instance (think)
  • orders = [11, 3, 24, 17]
  • $11 + 3 + (24+2) + (17+1) = 58$
  • Total: 58

• Step 2: What did we do?
  • Write down in words

2/23/21 Compsci 101, Spring 2021 14

WOTO-3   Step 3: Generalize

2/23/21 Compsci 101, Spring 2021 15

WOTO-3   Step 3: Generalize

• Go through list
  • If less than 12
    • Do nothing
  • If greater than or equal to 12
    • Add however many times 12 goes into the order

• Sum everything

2/23/21 Compsci 101, Spring 2021 16
Step 4: Test steps

- Go through list
  - If less than 12
    - Do nothing
  - If greater than or equal to 12
    - Add however many times 12 goes into the order
- Sum everything

- [11, 22, 33, 44, 55]
  - 11
    - Nothing (less than 12)
  - 22
    - +1
  - 33
    - +2
  - 44
    - +3
  - 55
    - +4
- Sum: 175

Step 5: Code

- for loop!
- if statement
- Think: if’s or if…else statement?
  - floor div: //

Could we use the accumulator pattern?
Yes!

Code-Tracing a Loop

1. Find the changing variables/expressions
2. Create table, columns are variables/expressions
   1. First column is loop variable
   2. Add columns to help track everything else
3. Each row is an iteration of the loop
   1. Before execute code block, copy down each variable’s value
   2. Execute code block, update a value in the row as it changes

```python
def bagelCount(orders):
    total = 0
    for order in orders:
        if order < 12:
            total += order
        else:
            extra = order // 12
            total += order + extra
    return total
```
• Remember the steps
• (1) Find the changing variable/expressions,
• (2) Create the table with these as the column
• (3) Each row is an iteration of the loop