

On your way in...(on the side table)

Pick-up:

1. POGIL Activity #5 (and 7, combined)
2. POGIL Activity #6

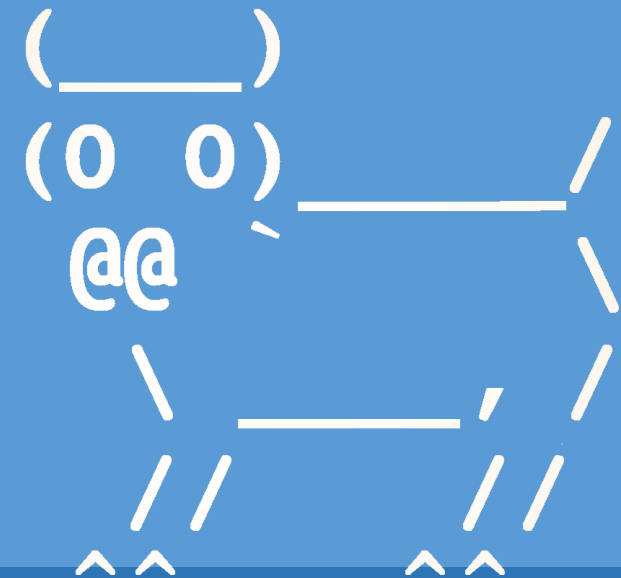


Welcome to CS 134!

Introduction to Computer Science

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-Booleans & Conditionals-



Computer Science Summer Research Applications

- Applications are due February 18, 2019 (1.5 weeks)
- Interested in doing summer research in computer science, download an application and talk to some professors about their research!

<https://csci.williams.edu/files/CS-Summer-Research-Application4-3.pdf>



Computer Science Colloquium Today!

(and pretty much every Friday)

- 2:35pm in this room (Wege Auditorium)

- Phillipa Gill

(Umass-Amherst)



**STAYING ONE STEP AHEAD OF
THE CENSORSHIP ARMS RACE**

NETWORK MEASUREMENT



```
a = float(input('Enter the x**2 coefficient: '))
b = float(input('Enter the x coefficient: '))
c = float(input('Enter the constant coefficient: '))
rootPart = b*b + 4*a*c
rootPart = rootPart ** 0.5
```

Is this a syntax error, or a logic error?

```
root1 = (-b + rootPart)/(2*a)
c = (-b - rootPart)/(2*a)
```

```
print(root1)
print(c)
```

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

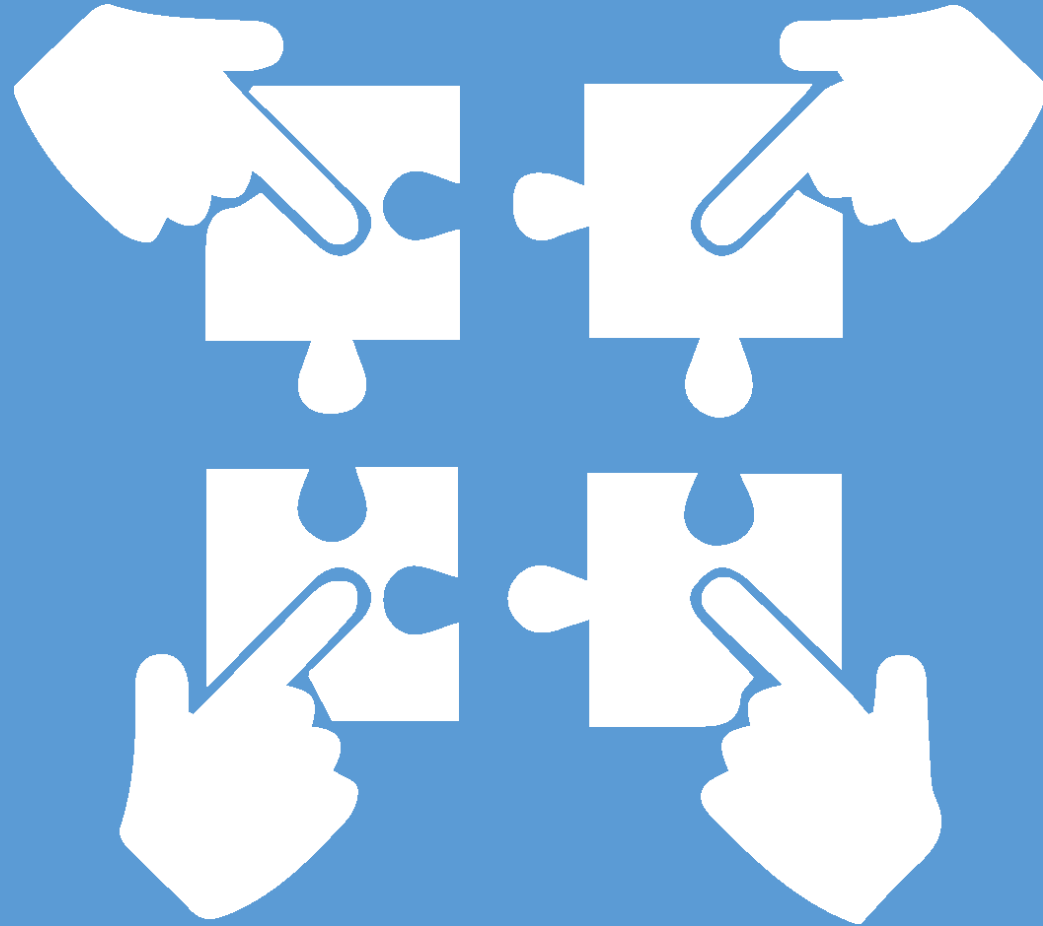
TODAY'S LESSON

`if this, not that`

(booleans+conditionals)

Booleans: True, False, not





Process-Oriented Guided-Inquiry Learning (POGIL)

POGIL

- Look at Python Activity 5, Question 4
- Find a partner and talk through question 4 together

4. What is the result of each of the following expressions?

Assume: $x = 4$, $y = 5$, and $z = 4$

- | | | |
|----|--------------------------------------|-------|
| a. | $x > y$ | _____ |
| b. | $x < y$ | _____ |
| c. | $x == y$ | _____ |
| d. | $x != y$ | _____ |
| e. | $x >= z$ | _____ |
| f. | $x <= z$ | _____ |
| g. | $x + y > 2 * x$ | _____ |
| h. | $y * x - z != 4 \% 4 + 16$ | _____ |
| i. | $\text{pow}(x,2) == \text{abs}(-16)$ | _____ |

Booleans: and, or

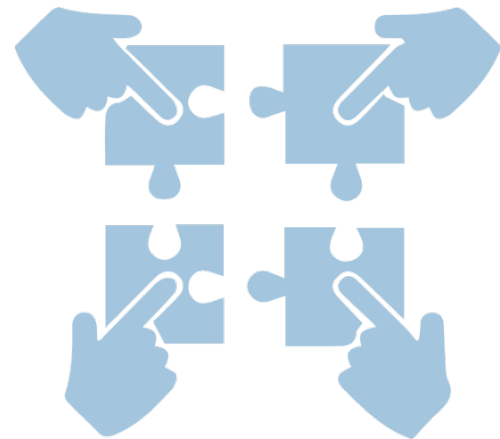


POGIL

- Look at Python Activity 6, Question 2
- Find a partner and talk through question 2 together

Explain what the following lines of code do. Each line appears in the program above.

- a. `originalPrice = input("Enter the original cost of the item: ")`
-
- b. `percentOff = percent_off(float(originalPrice), float (salePrice))`
-
- c. `print("Original price: $" + originalPrice)`
-
- d. `print("Percent Off: " + str(percentOff) + "%")`
-
- e. `if(percentOff >= 50):
 print("You got a great sale!")`
-



POGIL

- Look at Python Activity 6, Question 2
- Find a partner and talk through question 2 together

What does the line: `return int((orig - sa)/orig * 100)` do?

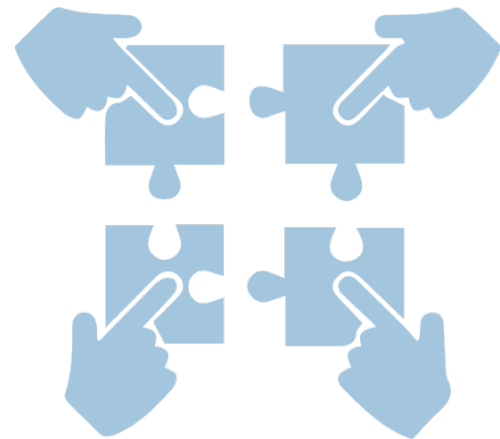
```
def main():
    originalPrice = input("Enter the original cost of the item: ")
    salePrice = input("Enter the sale price: ")

    percentOff = percent_off(float(originalPrice), float(salePrice))

    print("Original price: $" + originalPrice)
    print("Sale price: $" + salePrice)
    print("Percent Off: " + str(percentOff) + "%")

    if(percentOff >= 50):
        print("You got a great sale!")

def percent_off(orig, sa):
    return int((orig - sa)/orig * 100)
```



If, else, elif





The Syracuse Function

Syracuse Function

1. Start with any positive integer n
2. The next term is determined by n :
 - If n is odd, the next term is $3*n + 1$
 - If n is even, the next term is $n/2$

Collatz (1937): “no matter what value of n , the sequence will always reach 1”

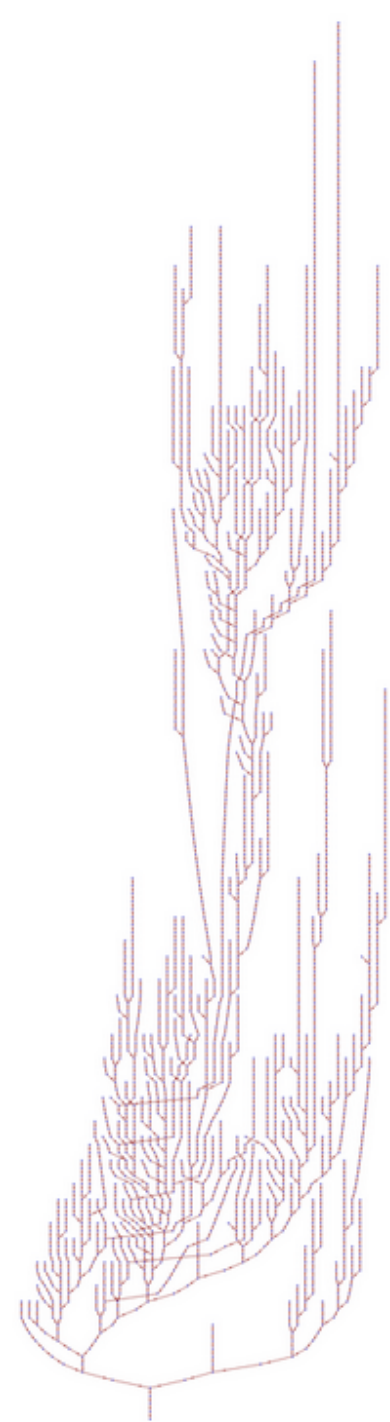
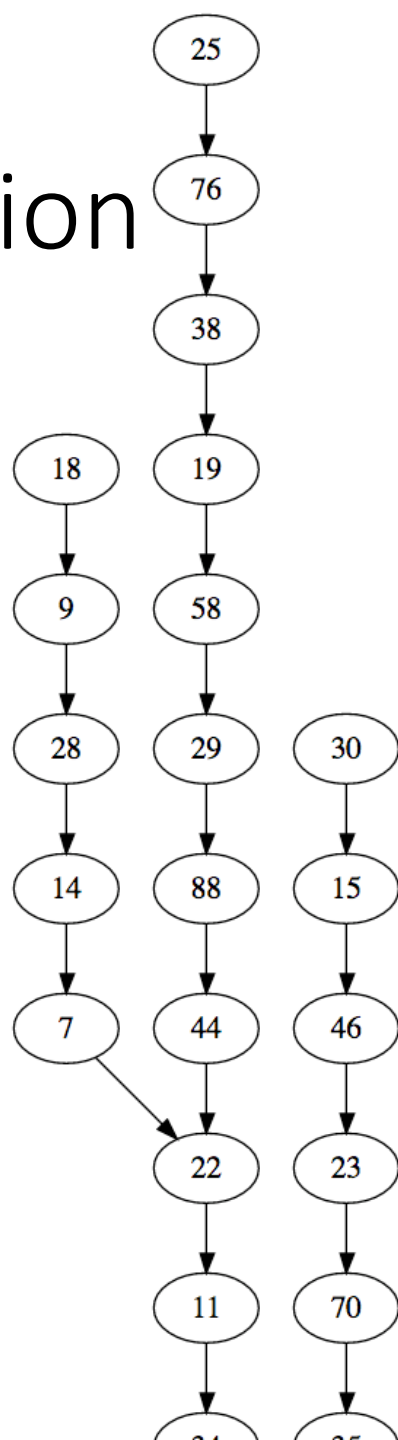
Erdős: "Mathematics may not be ready for such problems."

Lagarias (2010): "this is an extraordinarily difficult problem, completely out of reach of present day mathematics."

Syracuse Function

- The orbit for 4:
 - $4 \rightarrow 2 \rightarrow 1$
- The orbit for 5:
 - $5 \rightarrow 16 \rightarrow 8 \rightarrow 4 \rightarrow \dots$

Syracuse Function



How to program the Syracuse Function?

1. Start with any positive integer n
2. The next term is determined by n :
 - If n is odd, the next term is $3*n + 1$
 - If n is even, the next term is $n/2$

One-line Python Conditionals

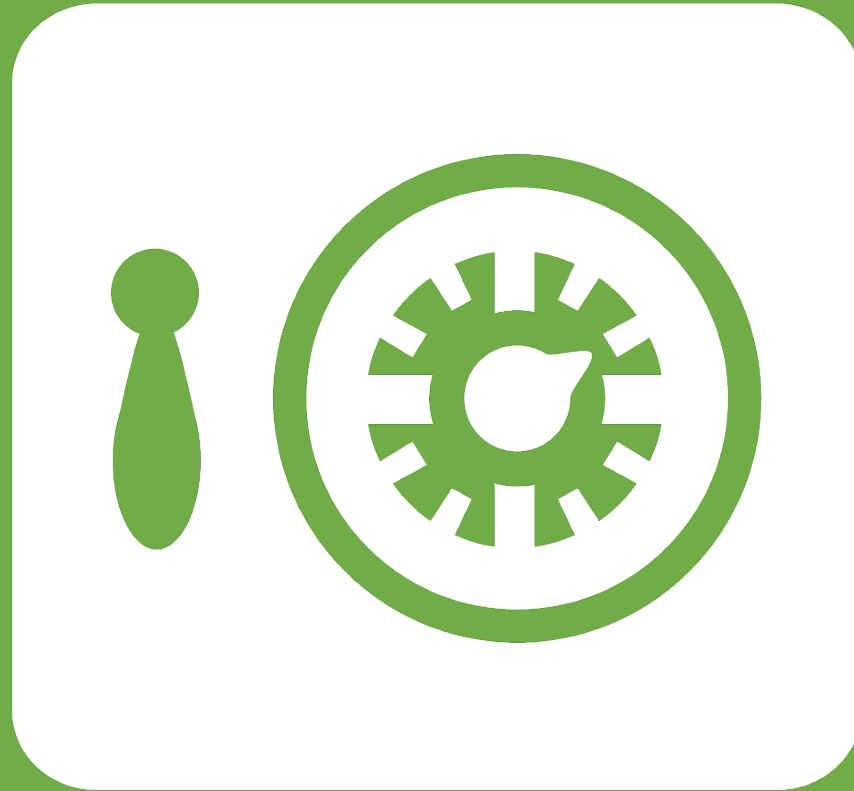
- `x*3+1 if odd(x) else x//2`

Is equivalent to:

- `if odd(x):`
 - `x*3+1`
- `else:`
 - `x//2`

QUESTIONS?





Leftover Slides