

# CSci 127: Introduction to Computer Science



Finished the lecture preview?

[hunter.cuny.edu/csci](http://hunter.cuny.edu/csci)

# Announcement: Academic Dishonesty

Hunter College regards acts of academic dishonesty (e.g., plagiarism, cheating on examinations, obtaining unfair advantage, and falsification of records and official documents) as serious offenses against the values of intellectual honesty. The College is committed to enforcing the CUNY Policy on Academic Integrity and will pursue cases of academic dishonesty according to the Hunter College Academic Integrity Procedures.

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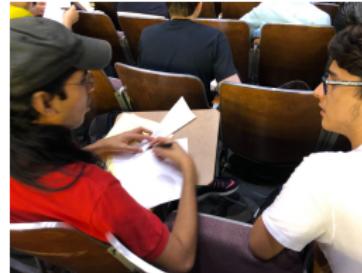
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*Strings are surrounded by quotes (either single or double).*

*Variables names (identifiers) for memory locations are not. Ex: 'num' vs. num.*

# One More FAQ: Why Paper Planes?



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Why paper planes?

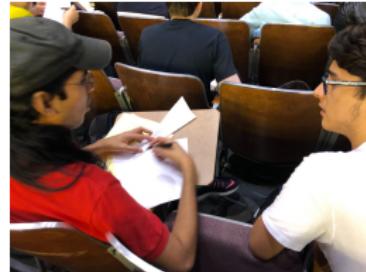
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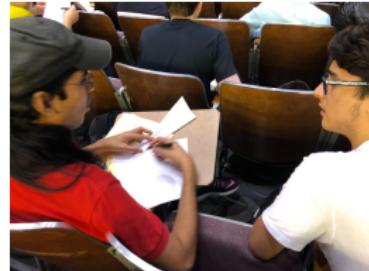
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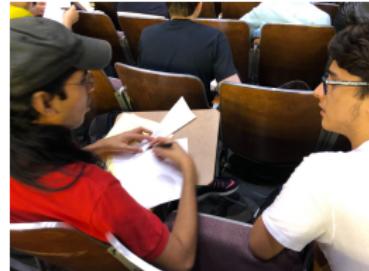
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    - ★ communicating technical ideas precisely, and
    - ★ communicating and working in teams.

# Today's Topics



- Recap: Decisions
- Logical Expressions
- Circuits
- Binary Numbers

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- **Recap: Decisions**
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# Challenge

Some challenges with types & decisions:

#What are the types:

```
y1 = 2017
y2 = "2018"
print(type(y1))
print(type("y1"))
print(type(2017))
print(type("2017"))
print(type(y2))
print(type(y1/4.0))

x = int(y2) - y1
if x < 0:
    print(y2)
else:
    print(y1)
```

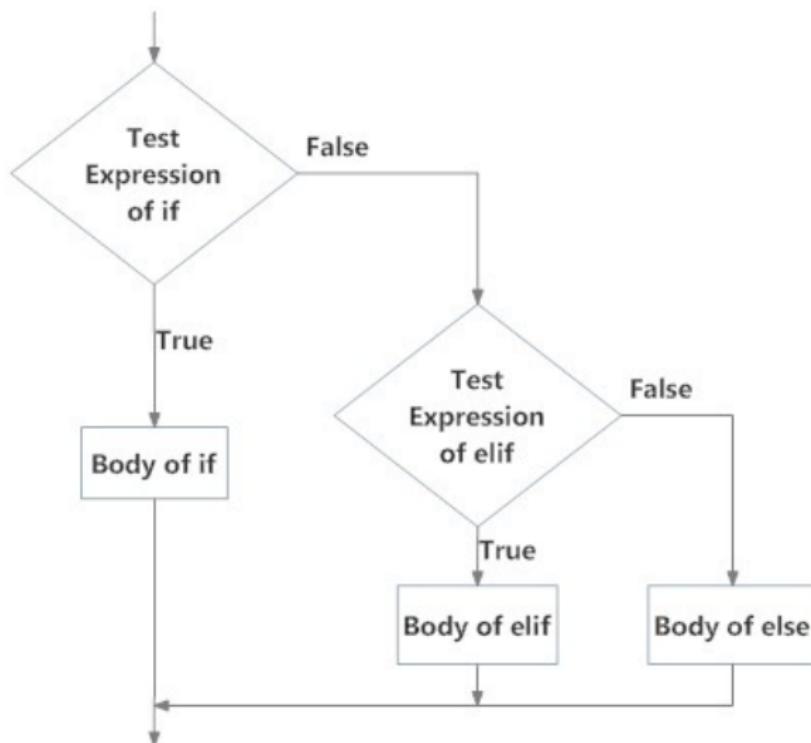
```
cents = 432
dollars = cents // 100
change = cents % 100
if dollars > 0:
    print('$'+str(dollars))
if change > 0:
    quarters = change // 25
    pennies = change % 25
    print(quarters, "quarters")
    print("and", pennies, "pennies")
```

# Python Tutor

```
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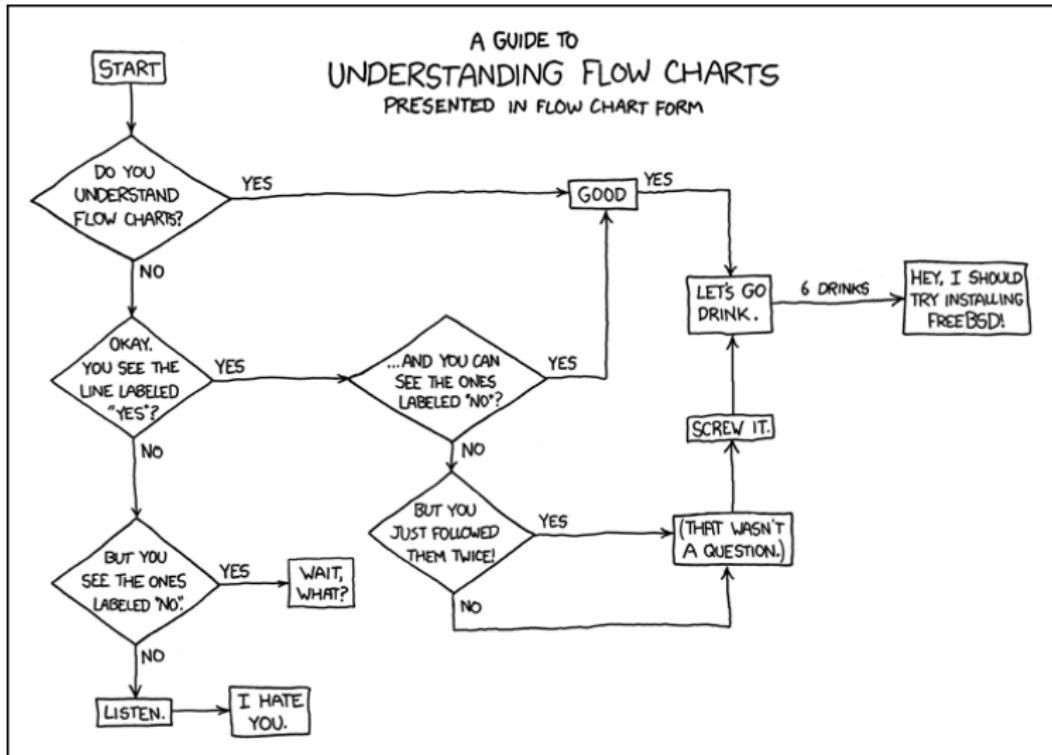
(Demo with pythonTutor)

## Decisions



#### **Fig: Operation of if...elif...else statement**

# Side Note: Reading Flow Charts



(xkcd/518)

# Today's Topics



- Recap: Decisions
- **Logical Expressions**
- Circuits
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# Challenge

Predict what the code will do:

```
origin = "Indian Ocean"
winds = 100
if (winds > 74):
    print("Major storm, called a ", end="")
    if origin == "Indian Ocean" or origin == "South Pacific":
        print("cyclone.")
    elif origin == "North Pacific":
        print("typhoon.")
    else:
        print("hurricane.")

visibility = 0.2
winds = 40
conditions = "blowing snow"
if (winds > 35) and (visibility < 0.25) and \
    (conditions == "blowing snow" or conditions == "heavy snow"):
    print("Blizzard!")
```

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# Logical Operators

## and

in1	and	in2	<i>returns:</i>
False	and	False	False
False	and	True	False
True	and	False	False
True	and	True	True

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**or**

in1		in2	<i>returns:</i>
False	or	False	False
False	or	True	True
True	or	False	True
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False	and	True	False
True	and	False	False
True	and	True	True

**or**

in1		in2	<i>returns:</i>
False	or	False	False
False	or	True	True
True	or	False	True
True	or	True	True

**not**

	in1	<i>returns:</i>
not	False	True
not	True	False

# Challenge

Predict what the code will do:

```
semHours = 18
reqHours = 120
if semHours >= 12:
    print('Full Time')
else:
    print('Part Time')

pace = reqHours // semHours
if reqHours % semHours != 0:
    pace = pace + 1
print('At this pace, you will graduate in', pace, 'semesters,')
yrs = pace / 2
print('(or', yrs, 'years).')

for i in range(1,20):
    if (i > 10) and (i % 2 == 1):
        print('oddly large')
    else:
        print(i)
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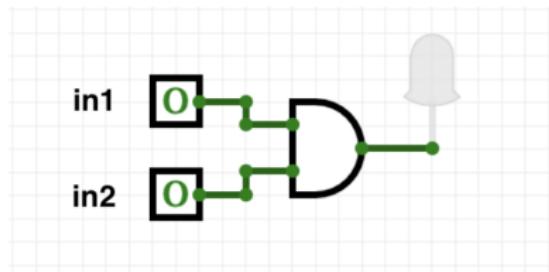
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# Circuit Demo

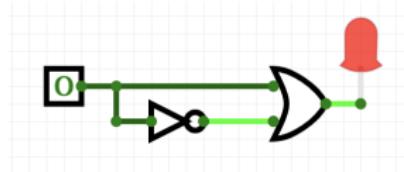


(Demo with [circuitverse](#))

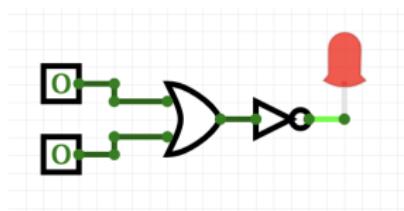
# Challenge

*Predict when these expressions are true:*

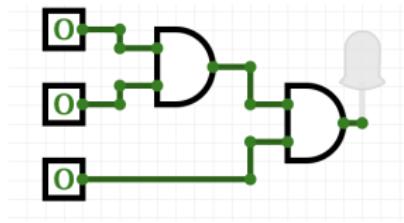
- $\text{in1 or not in1:}$



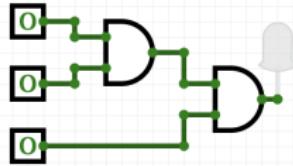
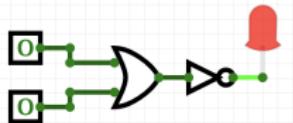
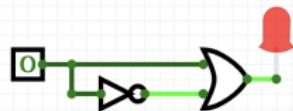
- $\text{not(in1 or in2):}$



- $\text{(in1 and in2) and in3:}$

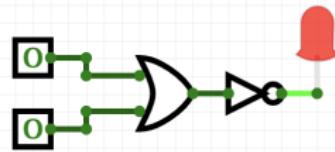


# Circuit Demo



(Demo with `circuitverse`)

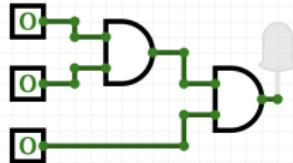
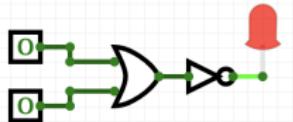
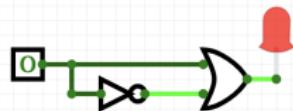
# Challenge



Draw a circuit that corresponds to each logical expression:

- $\text{in1 or in2}$
- $(\text{in1 or in2}) \text{ and } (\text{in1 or in3})$
- $(\text{not(in1 and not in2)}) \text{ or } (\text{in1 and (in2 and in3)})$

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(Demo with `circuitverse`)

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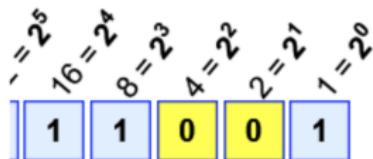
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- Computers store numbers using the Binary system (base 2)
- A **bit** (binary digit) being 1 (on) or 0 (off)

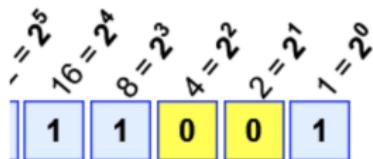
# Binary Numbers



Example:  $1 \times 16 + 1 \times 8 + 1 \times 1 = 16 + 8 + 1 = 25$

- Two digits: **0** and **1**

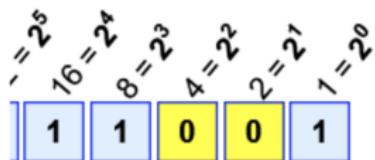
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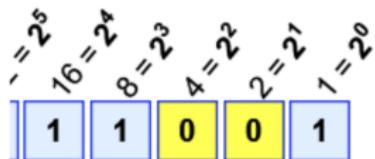
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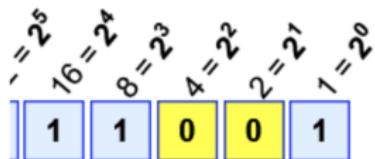
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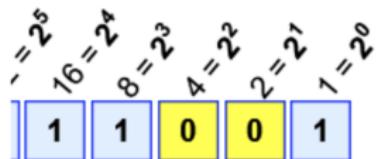
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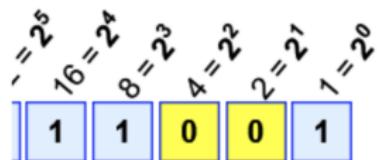
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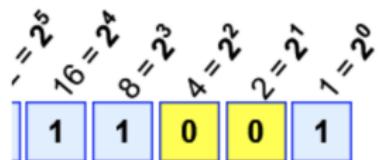
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  - ▶ In the "twos" position we either have a 2 or not

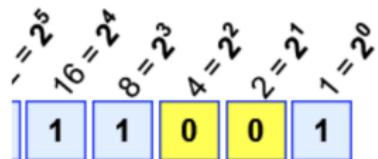
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- **Example:**

$$11001_{\text{base}2} = 16 + 8 + 1 = 25_{\text{base}10}$$

# Lecture Slip Challenge: Tech Interview Classic

- Write a program that prints the numbers from 1 to 100. But for multiples of three print “Fizz” instead of the number and for the multiples of five print “Buzz”. For numbers which are multiples of both three and five print “FizzBuzz”.

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- Write a program that prints the numbers from 1 to 100. But for multiples of three print “Fizz” instead of the number and for the multiples of five print “Buzz”. For numbers which are multiples of both three and five print “FizzBuzz”.
- Write down the output to see the pattern:

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FizzBuzz

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FizzBuzz

- Write the **algorithm** then, if time, write the code.

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- To Do List:
  - ▶ Create a loop that goes from 1 to 100.

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- To Do List:
  - ▶ Create a loop that goes from 1 to 100.
  - ▶ If the number is divisible by 3, print “Fizz”.

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  - ▶ **If divisible by both, print “FizzBuzz”.**
  - ▶ Otherwise print the number.

*Order matters!!! To print FizzBuzz when i is divisible by both it should be checked first, otherwise it will never get to this case!*

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- To Do List (**Reordered**):
  - ▶ Create a loop that goes from 1 to 100.
  - ▶ **If divisible by both 3 and 5, print “FizzBuzz”.**
  - ▶ If the number is divisible by 3, print “Fizz”.
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  - ▶ Also should print a new line (so each entry is on its own line).

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- To Do List:

- ▶ Create a loop that goes from 1 to 100.
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for i in range(1,101):
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- ▶ Create a loop that goes from 1 to 100.
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```
for i in range(1,101):
    if i%3 == 0 and i%5 == 0:
        print("FizzBuzz")
```

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- To Do List:

- ▶ Create a loop that goes from 1 to 100.
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```
for i in range(1,101):
    if i%3 == 0 and i%5 == 0:
        print("FizzBuzz")
    elif i%3 == 0:
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    elif i%3 == 0:
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    elif i%5 == 0:
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    else:
        print(i)
```

# Recap



- In Python, we introduced:

# Recap



- In Python, we introduced:
  - ▶ Decisions
  - ▶ Logical Expressions
  - ▶ Circuits
  - ▶ Binary Numbers

# Practice Quiz & Final Questions



- Since you must pass the final exam to pass the course, we end every lecture with final exam review.
- Pull out something to write on (not to be turned in).

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- Pull out something to write on (not to be turned in).
- Lightning rounds:
  - ▶ write as much you can for 60 seconds;
  - ▶ followed by answer; and
  - ▶ repeat.
- Past exams are on the webpage ([under Final Exam Information](#)).
- We're starting with Spring 2018, Version 1.

# Weekly Reminders!



Before next lecture, don't forget to:

- Work on this week's Online Lab

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- Take the Lecture Preview on Blackboard on Monday (or no later than 10am on Tuesday)

# Lecture Slips & Writing Boards



- Hand your lecture slip to a UTA.
- Return writing boards as you leave.