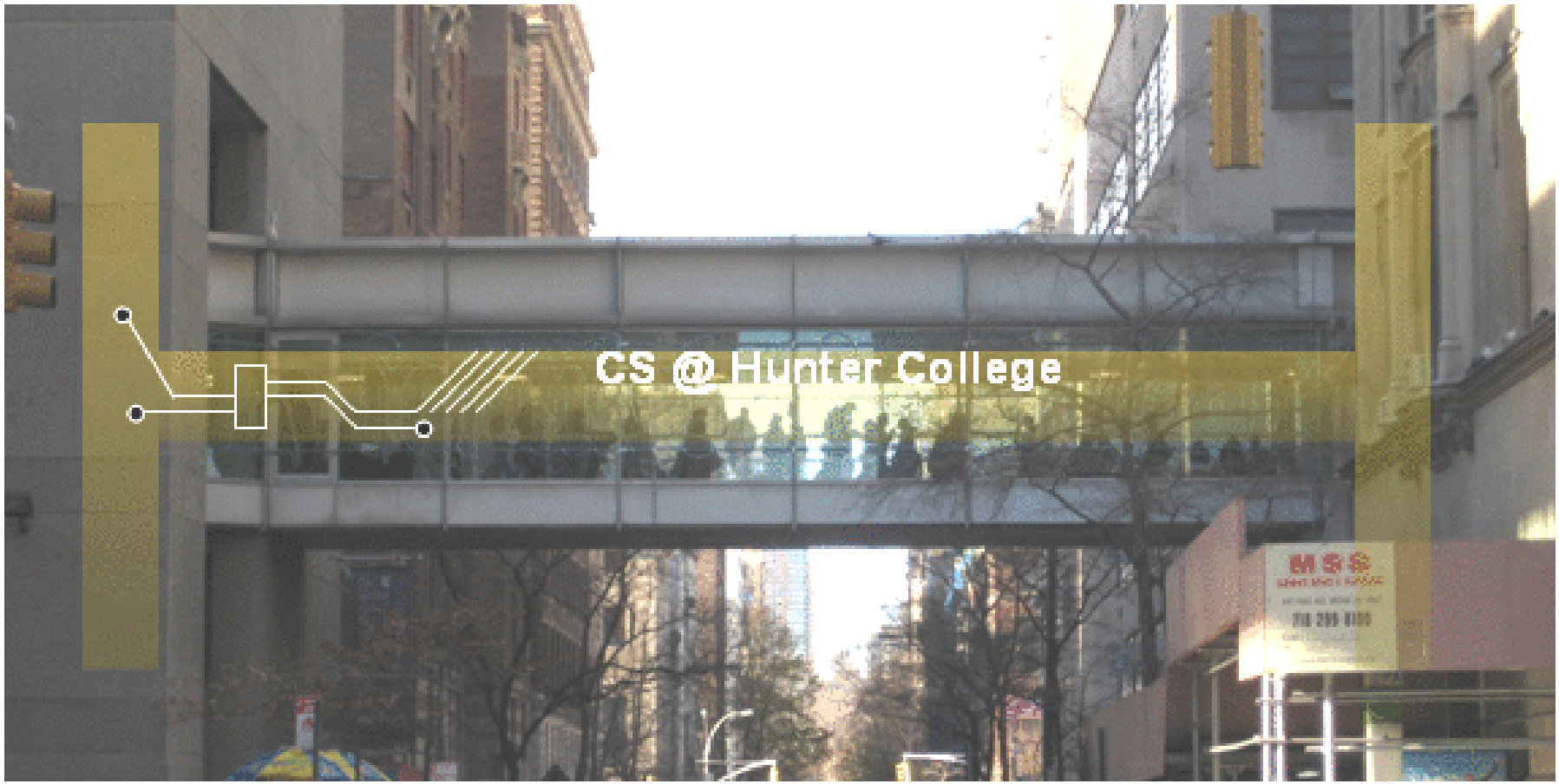
CSci 127: Introduction to Computer Science



hunter.cuny.edu/csci

- This lecture will be recorded

Frequently Asked Questions

From email

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  Types we have seen so far: `int`, `float`, `str` *and objects (e.g. turtles).*

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- **How can I tell if I am on track?**
  You should have submitted programs 1-20. This week we will work on programs 21-25.If you are not working on programs the week of the related lab you will likely fall behind. Submitting at the due date should be for emergency only!!!

Today's Topics

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

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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

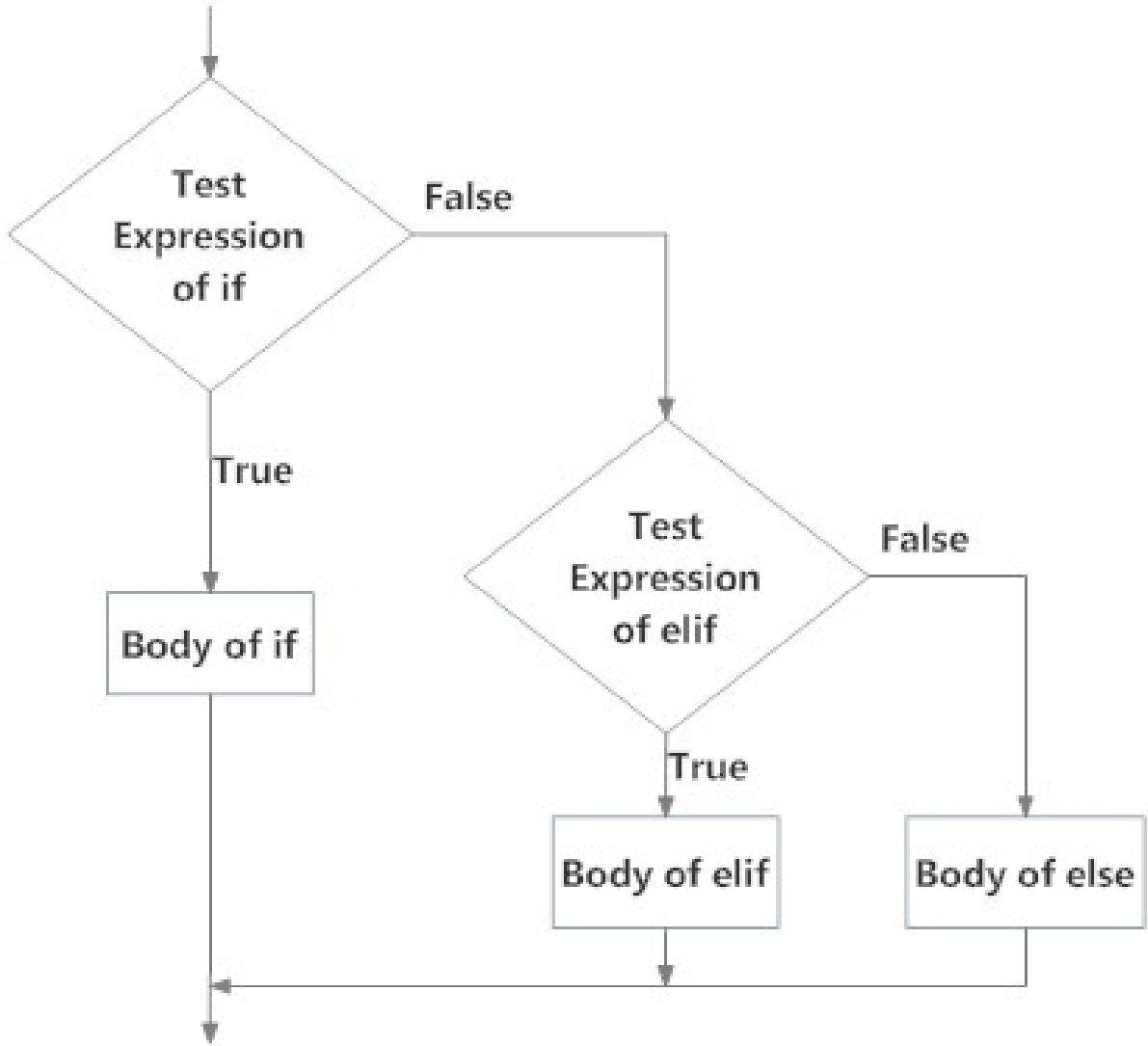
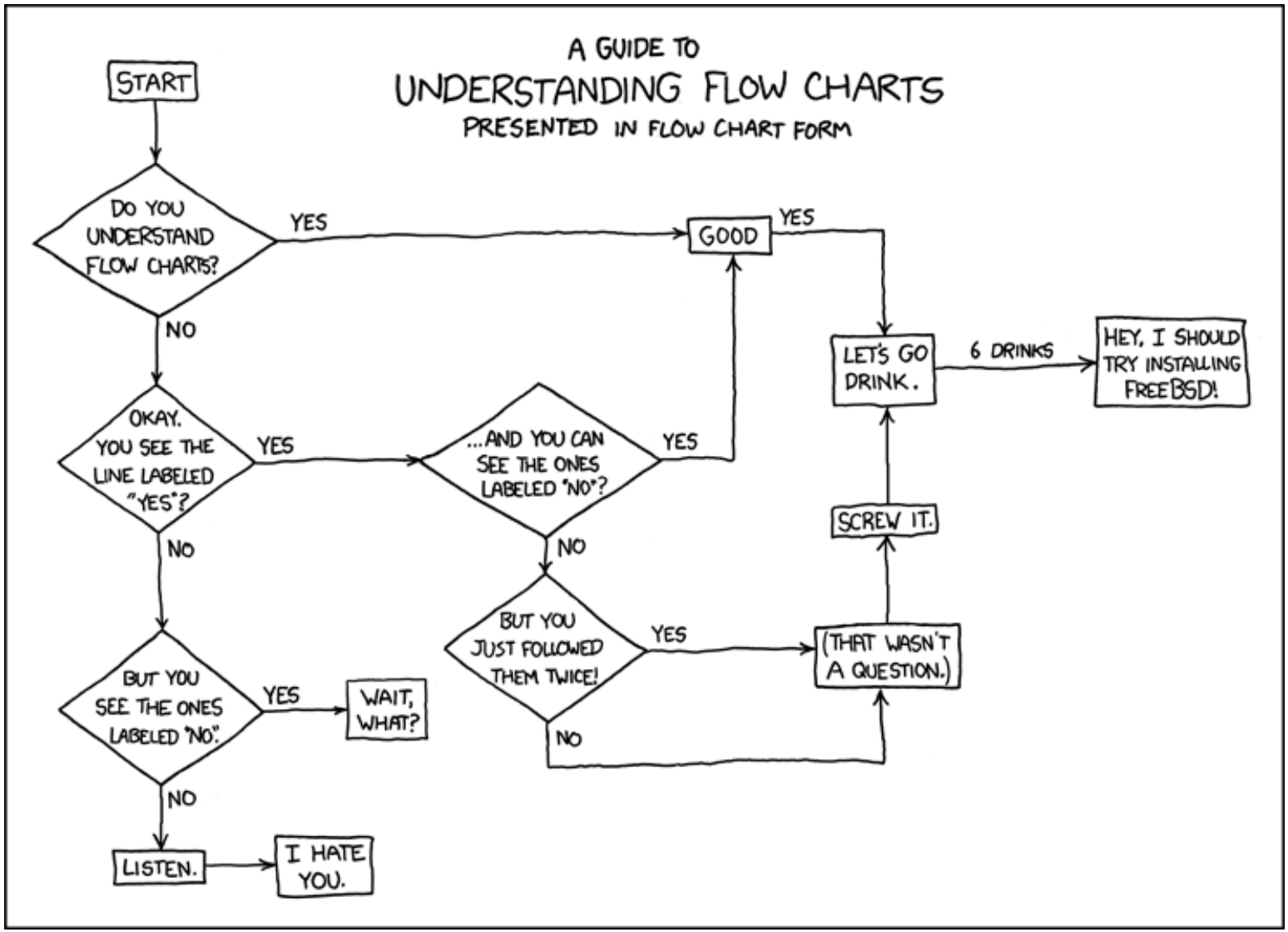


Fig: Operation of if...elif...else statement

(programiz)

Side Note: Reading Flow Charts



(xkcd/518)

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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!")
```

Python Tutor

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(Demo with `pythonTutor`)

Logical Operators

and

in1		in2	*returns:*
`False`	`and`	`False`	`False`
`False`	`and`	`True`	`False`
`True`	`and`	`False`	`False`
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in1		in2	*returns:*
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`False`	`or`	`True`	`True`
`True`	`or`	`False`	`True`
`True`	`or`	`True`	`True`

not

	in1	*returns:*
`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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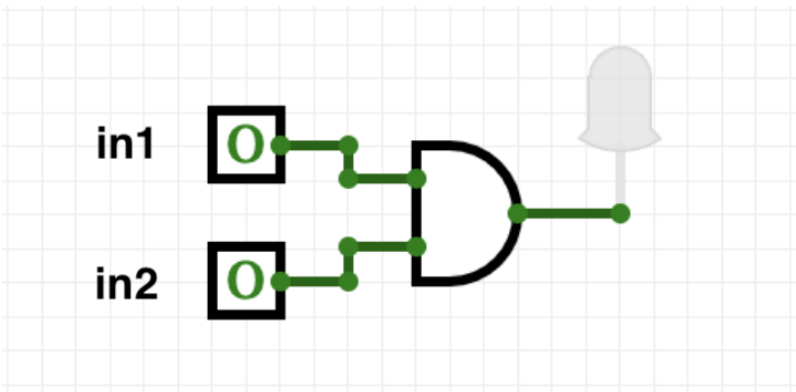
Circuit Demo

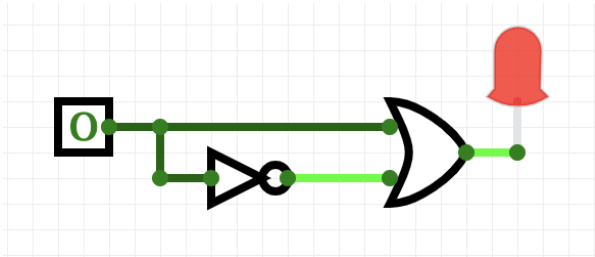


(Demo with `circuitverse`)

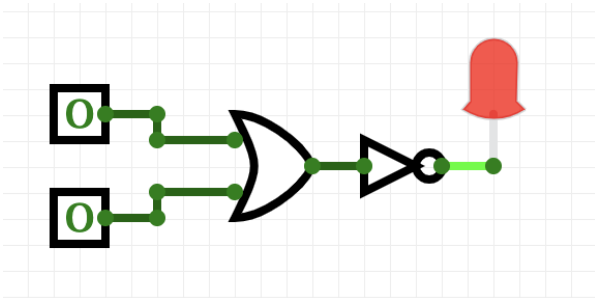
Challenge

Predict when these expressions are true:

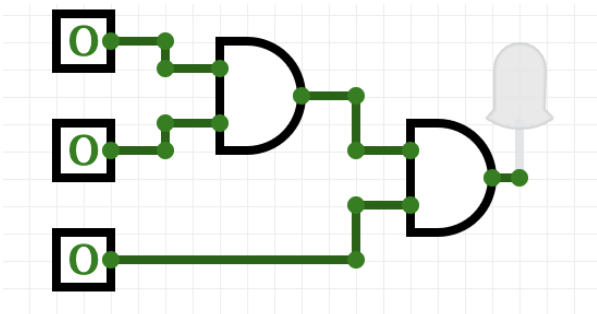
- `in1 or not in1`:



- `not(in1 or in2)`:



- `(in1 and in2) and in3`:



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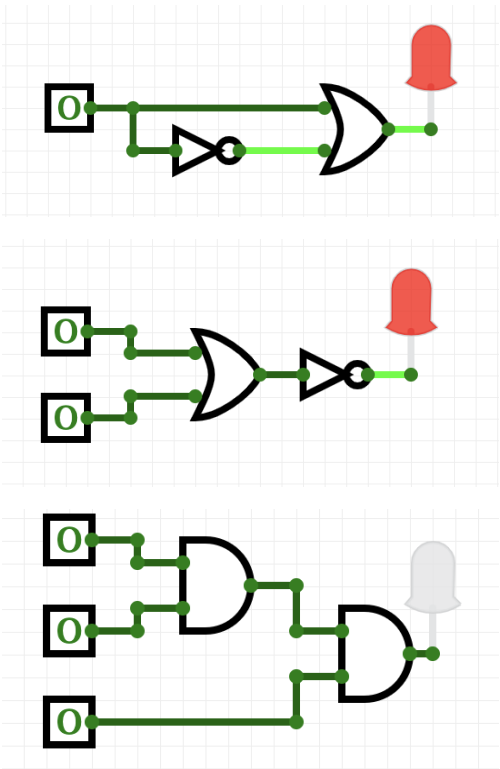

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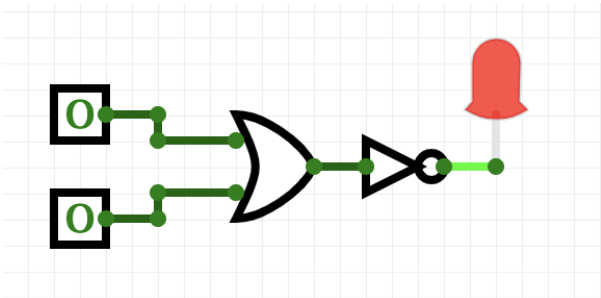
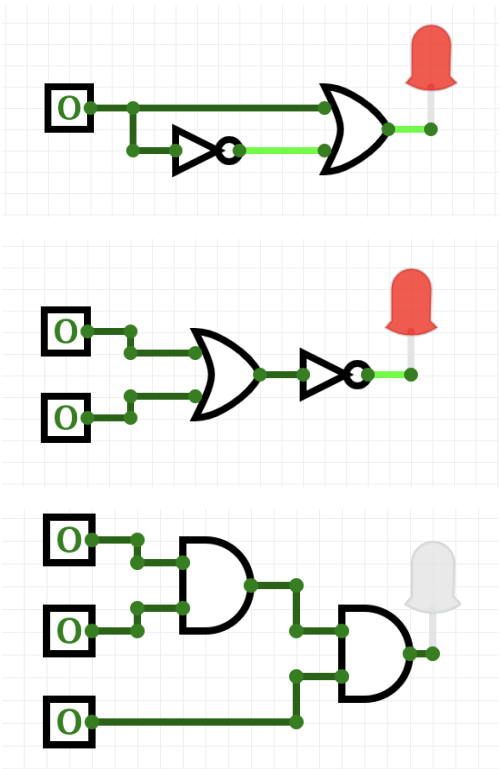


Draw a circuit that corresponds to each logical expression:

- `in1 or in2`
- `(in1 or in2) and (in1 or in3)`
- `(not(in1 and not in2)) or (in1 and (in2 and in3))`

Circuit Demo



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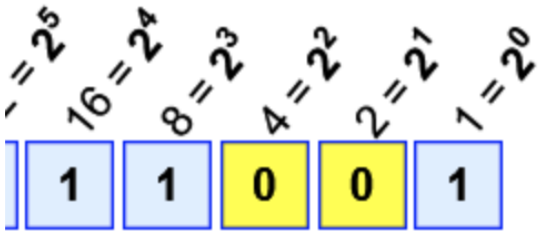
- Digital logic design allows for two states:
  - True / False
  - On / Off (two voltage levels)
  - 1 / 0
- Computers store numbers using the Binary system (base 2)
- A **bit** (binary digit) being 1 (on) or 0 (off)

Binary Numbers



Example: 1×16 + 1×8 + 1×1 = 16+8+1 = 25

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

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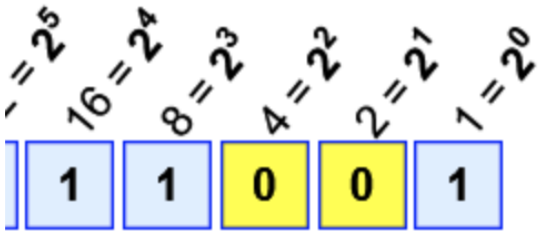

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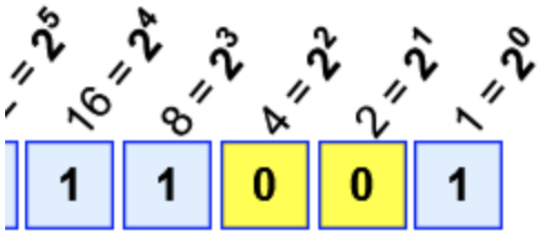

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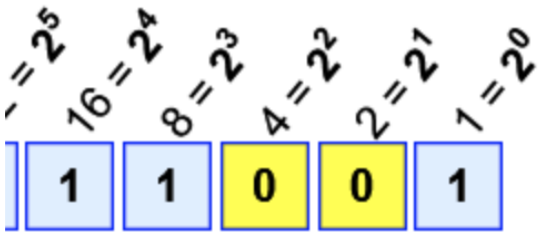

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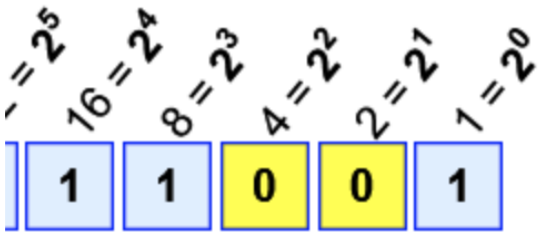

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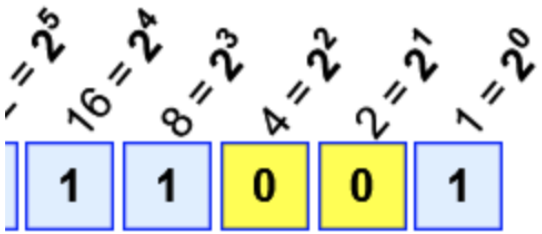

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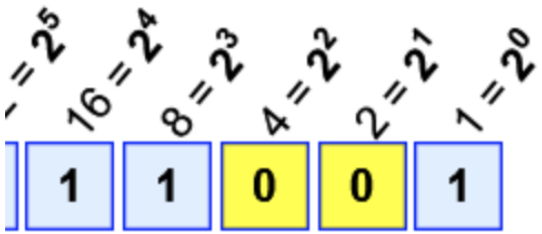

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  - In the "twos" position we either have a 2 or not

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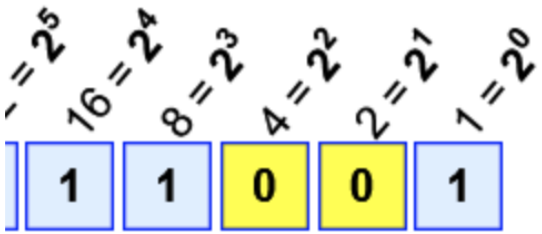

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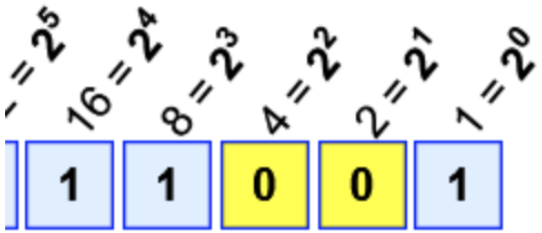

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- **Example:**

$$11001_{base2} = 16 + 8 + 1 = 25_{base10}$$

Lecture Quiz

- Log-in to Gradescope
- Find LECTURE 5 Quiz
- Take the quiz
- **You have 3 minutes**

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".

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".
- Write down the output to see the pattern:

Challenge: Tech Interview Classic

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- Write down the output to see the pattern:
  1

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".
- Write down the output to see the pattern:
  1
  2

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".
- Write down the output to see the pattern:
  1
  2
  Fizz

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".
- Write down the output to see the pattern:
  1
  2
  Fizz
  4

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".
- Write down the output to see the pattern:
  1
  2
  Fizz
  4
  Buzz

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".
- Write down the output to see the pattern:
  1
  2
  Fizz
  4
  Buzz
  Fizz

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".
- Write down the output to see the pattern:
  1
  2
  Fizz
  4
  Buzz
  Fizz
  7

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".
- Write down the output to see the pattern:
  1
  2
  Fizz
  4
  Buzz
  Fizz
  7
  ...
  14

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".
- Write down the output to see the pattern:
  1
  2
  Fizz
  4
  Buzz
  Fizz
  7
  ...
  14
  FizzBuzz

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".
- Write down the output to see the pattern:
  1
  2
  Fizz
  4
  Buzz
  Fizz
  7
  ...
  14
  FizzBuzz
- Write the **algorithm** then, if time, write the code.

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”.

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”.
- To Do List:

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

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

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”.
- To Do List:
  - Create a loop that goes from 1 to 100.
  - If the number is divisible by 3, print “Fizz”.
  - If the number is divisible by 5, print “Buzz”.

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”.
- To Do List:
  - Create a loop that goes from 1 to 100.
  - If the number is divisible by 3, print “Fizz”.
  - If the number is divisible by 5, print “Buzz”.
  - **If divisible by both, 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”.
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  - 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.

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".
- To Do List:
  - Create a loop that goes from 1 to 100.
  - If the number is divisible by 3, print "Fizz".
  - If the number is divisible by 5, print "Buzz".
  - **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!

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".
- To Do List (**Reordered**):

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".
- To Do List (**Reordered**):
  - Create a loop that goes from 1 to 100.
  - **If divisible by both 3 and 5, print "FizzBuzz".**

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".
- 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".
  - If the number is divisible by 5, print "Buzz".
  - Otherwise print the number.
  - Also should print a new line (so each entry is on its own line).

Tech Interview Classic

- To Do List:
  - 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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  - Otherwise print the number.
  - Also should print a new line (so each entry is on its own line).

```
for i in range(1,101):
```

Tech Interview Classic

- To Do List:
  - 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".
  - If the number is divisible by 5, print "Buzz".
  - Otherwise print the number.
  - Also should print a new line (so each entry is on its own line).

```
for i in range(1,101):
    if i%3 == 0 and i%5 == 0:
        print("FizzBuzz")
```

Tech Interview Classic

- To Do List:
  - 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".
  - If the number is divisible by 5, print "Buzz".
  - Otherwise print the number.
  - Also should print a new line (so each entry is on its own line).

```
for i in range(1,101):
    if i%3 == 0 and i%5 == 0:
        print("FizzBuzz")
    elif i%3 == 0:
        print("Fizz")
```

Tech Interview Classic

- To Do List:
  - 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".
  - If the number is divisible by 5, print "Buzz".
  - Otherwise print the number.
  - Also should print a new line (so each entry is on its own line).

```
for i in range(1,101):
    if i%3 == 0 and i%5 == 0:
        print("FizzBuzz")
    elif i%3 == 0:
        print("Fizz")
    elif i%5 == 0:
        print("Buzz")
```

Tech Interview Classic

- To Do List:
  - 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".
  - If the number is divisible by 5, print "Buzz".
  - Otherwise print the number.
  - Also should print a new line (so each entry is on its own line).

```
for i in range(1,101):
    if i%3 == 0 and i%5 == 0:
        print("FizzBuzz")
    elif i%3 == 0:
        print("Fizz")
    elif i%5 == 0:
        print("Buzz")
    else:
        print(i)
```

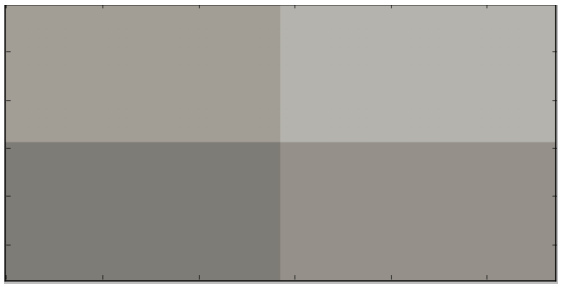
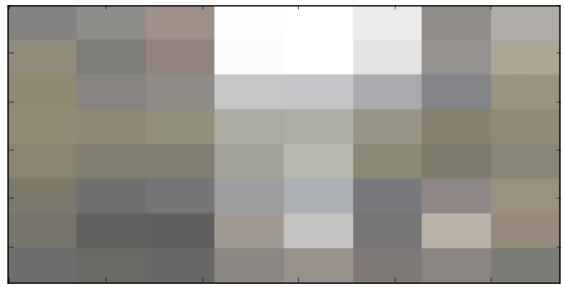
Recap

- In Python, we introduced:

Recap

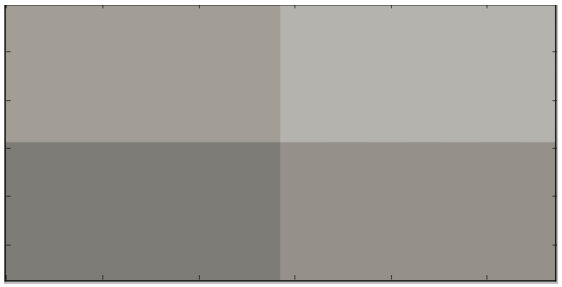
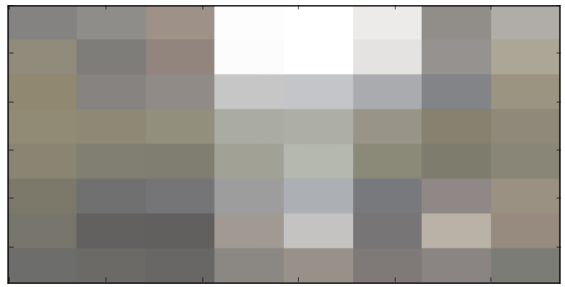
- In Python, we introduced:
  - Decisions
  - Logical Expressions
  - Circuits
  - Binary Numbers

Practice Quiz & Final Questions

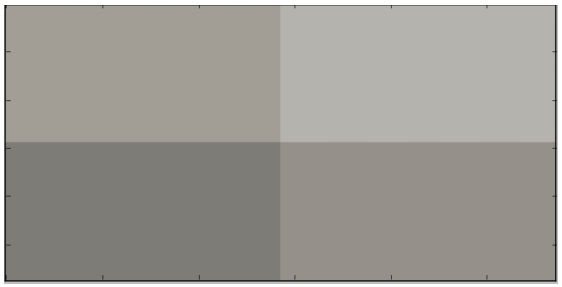
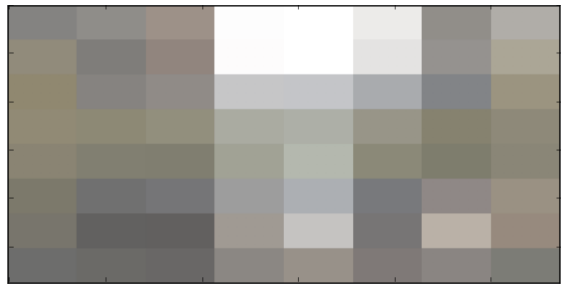

- Since you must pass the final exam to pass the course, we end every lecture with final exam review.

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).

Practice Quiz & Final Questions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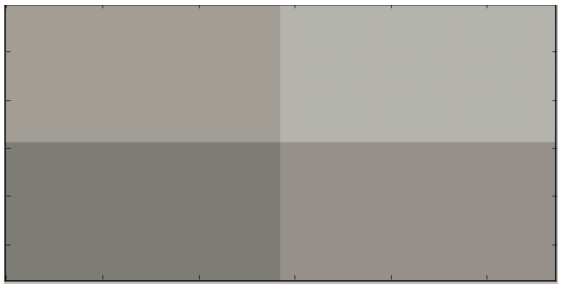
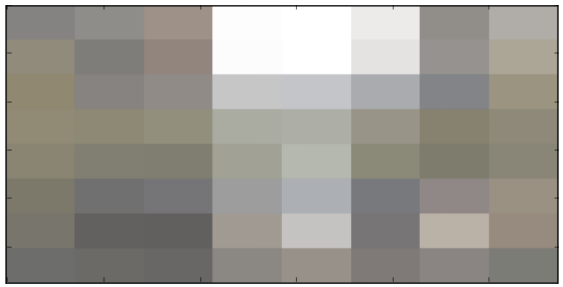
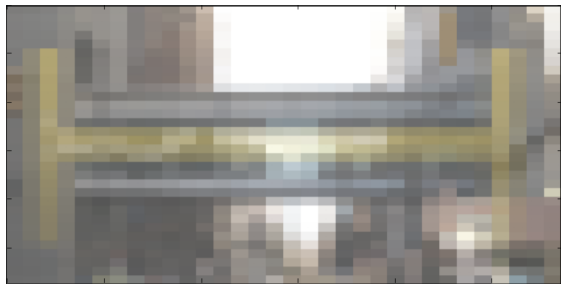
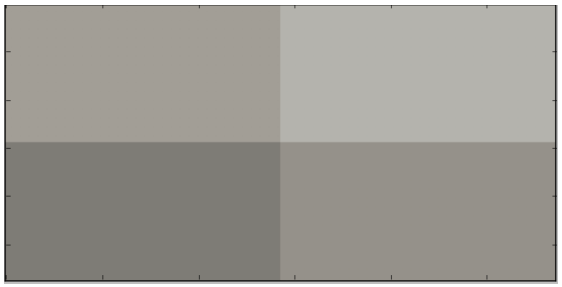
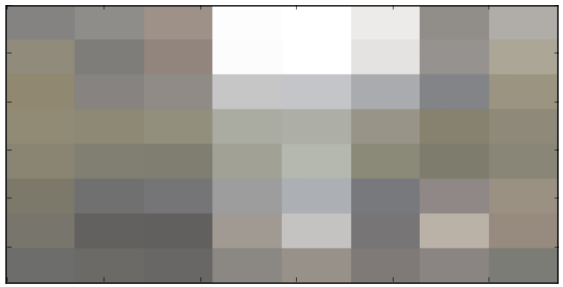
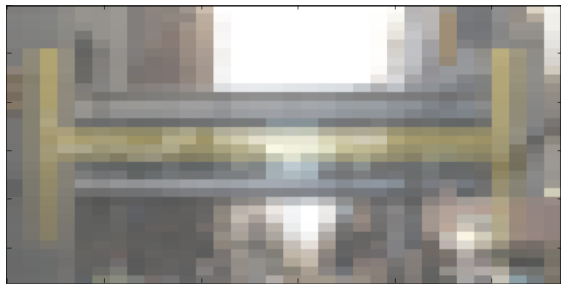
- Pull out something to write on (not to be turned in).
- Lightning rounds:

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).
- Lightning rounds:
  - write as much you can for 60 seconds;

Practice Quiz & Final Questions

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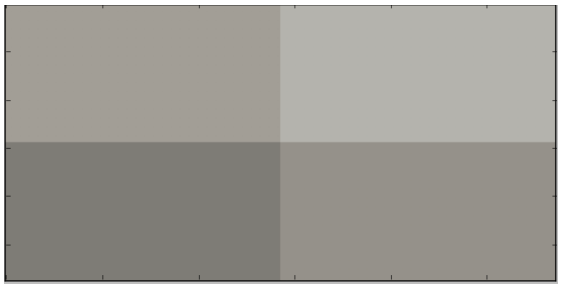
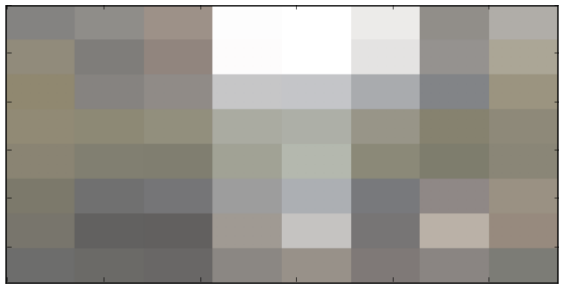
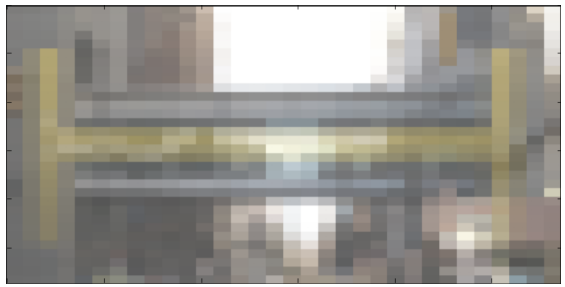
  - followed by answer; and

Practice Quiz & Final Questions

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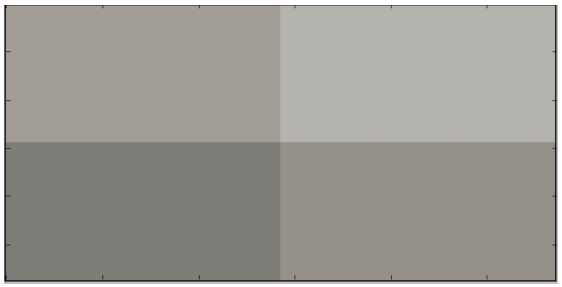
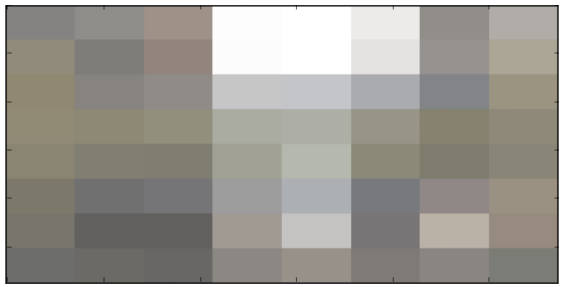
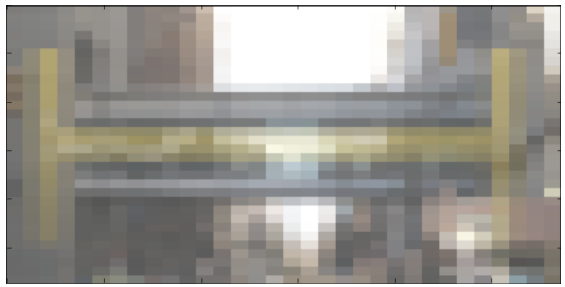
  - repeat.

Practice Quiz & Final Questions

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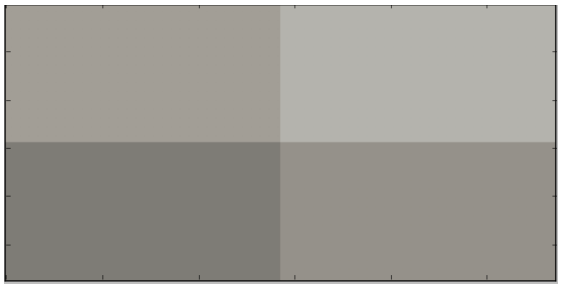
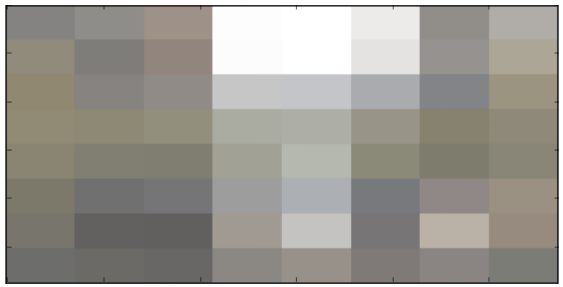
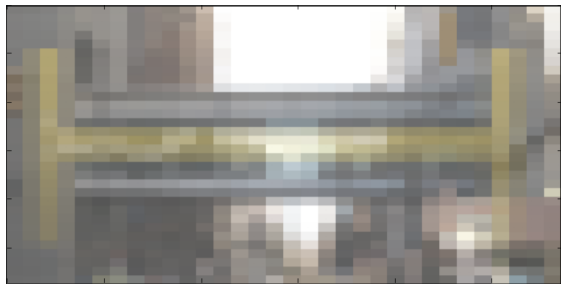
  - repeat.
- Past exams are on the webpage (under Final Exam Information).

Practice Quiz & Final Questions

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  - repeat.
- Past exams are on the webpage (under Final Exam Information).
- We're starting with Spring 2018, Version 1.

See you next week!

Before next lecture, don't forget to:

- Work on this week's Online Lab
- Optional - attend live Lab Review on Wednesday 1-2:30pm
- Take the Lab Quiz on Gradescope by 6pm on Wednesday
- Submit this week's 5 programming assignments (programs 21-25)
- At any point, visit our Drop-In Tutoring if you need help!!!