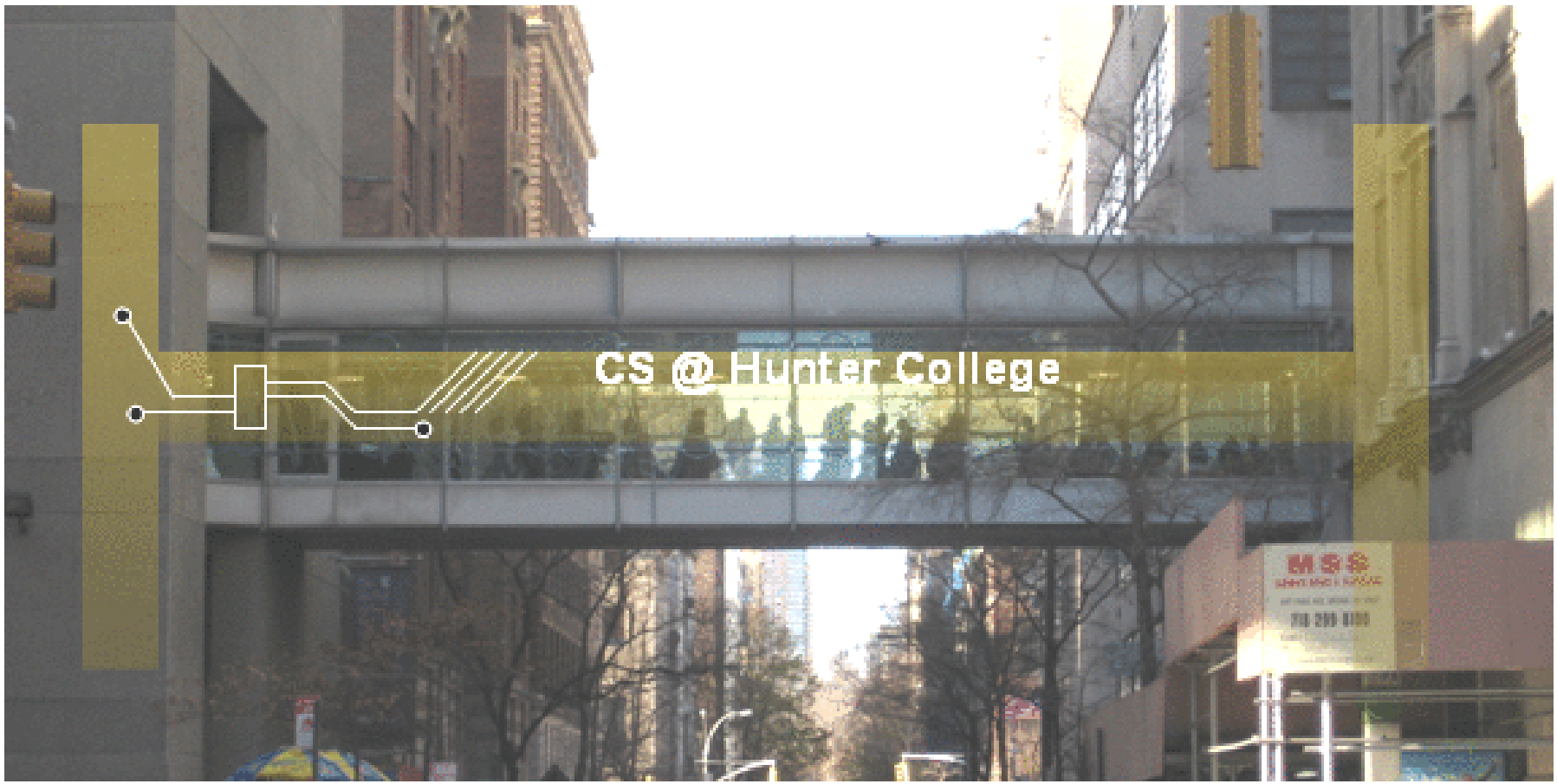
CSci 127: Introduction to Computer Science



Finished the lecture preview?

hunter.cuny.edu/csci

Guest Speakers

- Today we will start with guest speakers from computer science clubs at Hunter
- Instead of the usual lecture slip, you will fill out a survey to get credit for today's lecture (link on Blackboard under Course Materials)

Challenge (Group Work):

- Basic pattern: *img[rows, columns, channels]* with: *start:stop:step*.
- Assuming the libraries are imported, what do the following code fragments produce:

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    img = np.ones( (10,10,3) )
    img[0:10,0:5,0:2] = 0
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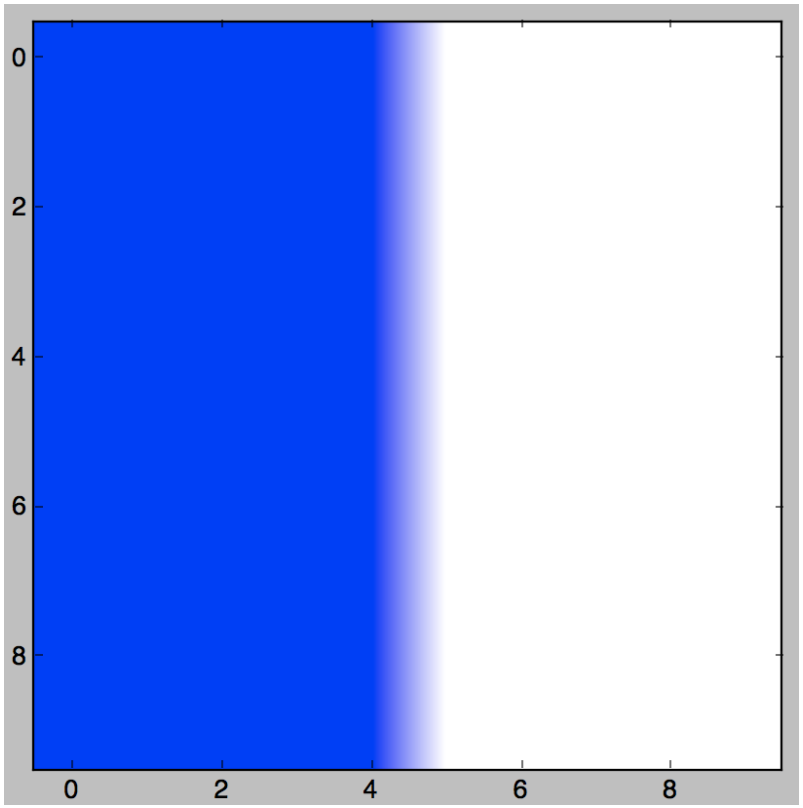
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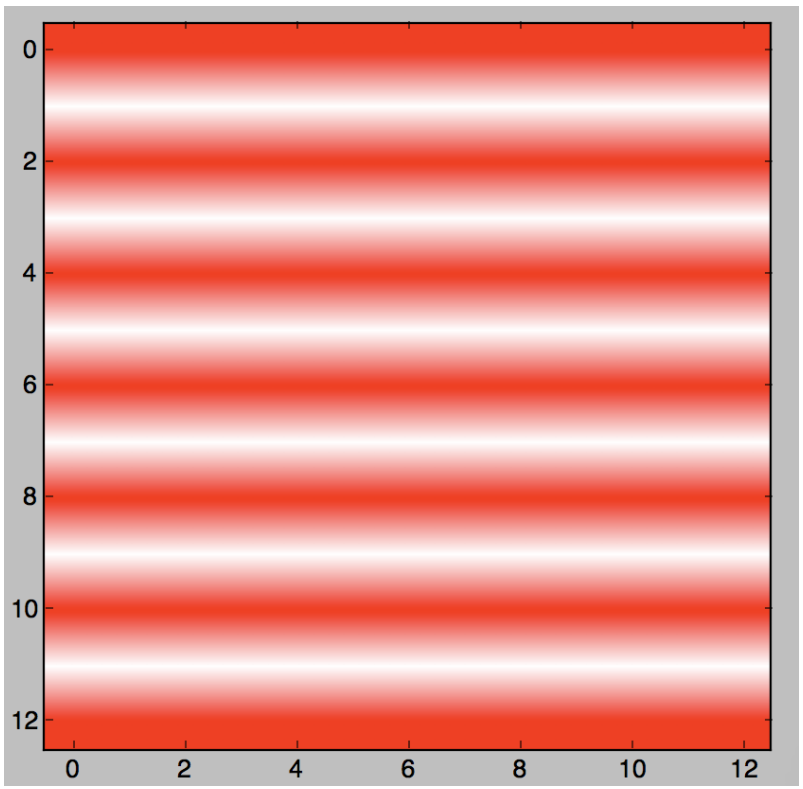
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- Basic pattern: *img[rows, columns, channels]* with: *start:stop:step*.
- Assuming the libraries are imported, what do the following code fragments produce:

  - ```
    img = np.zeros( (8,8,3) )
    img[::2,1::2,0] = 1
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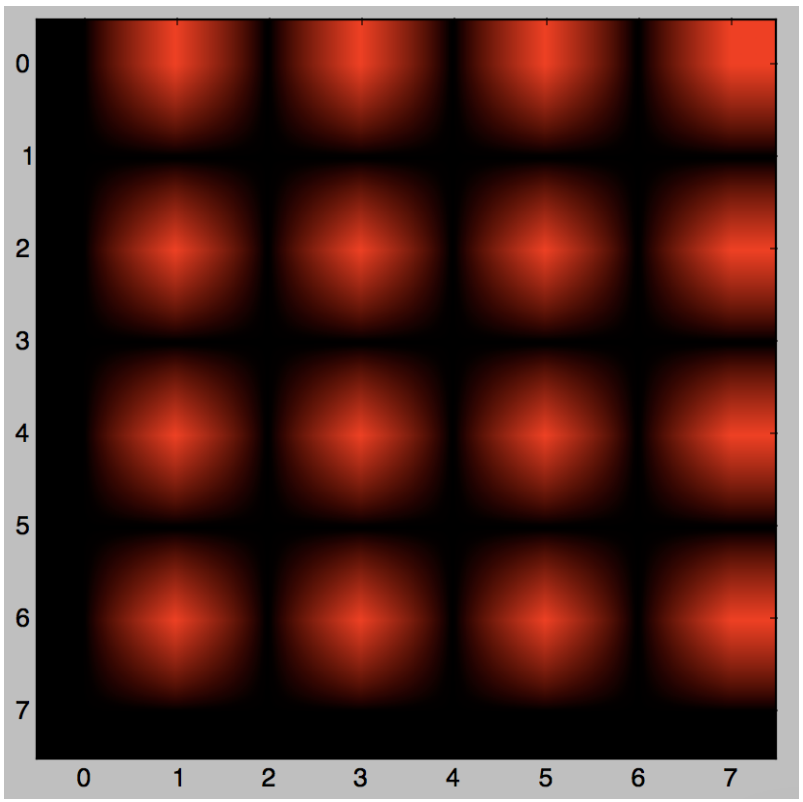
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Today's Topics

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

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Decisions

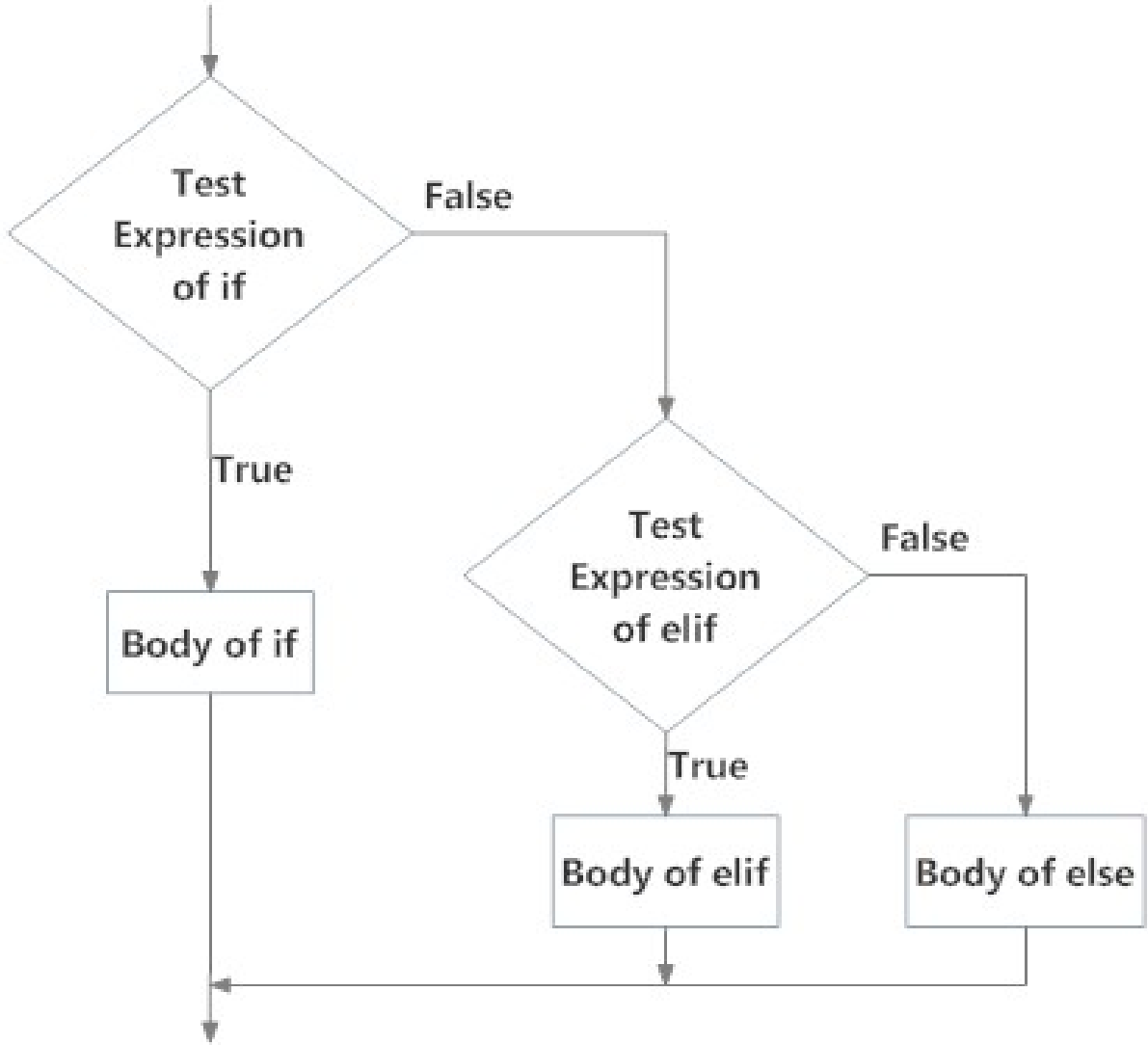
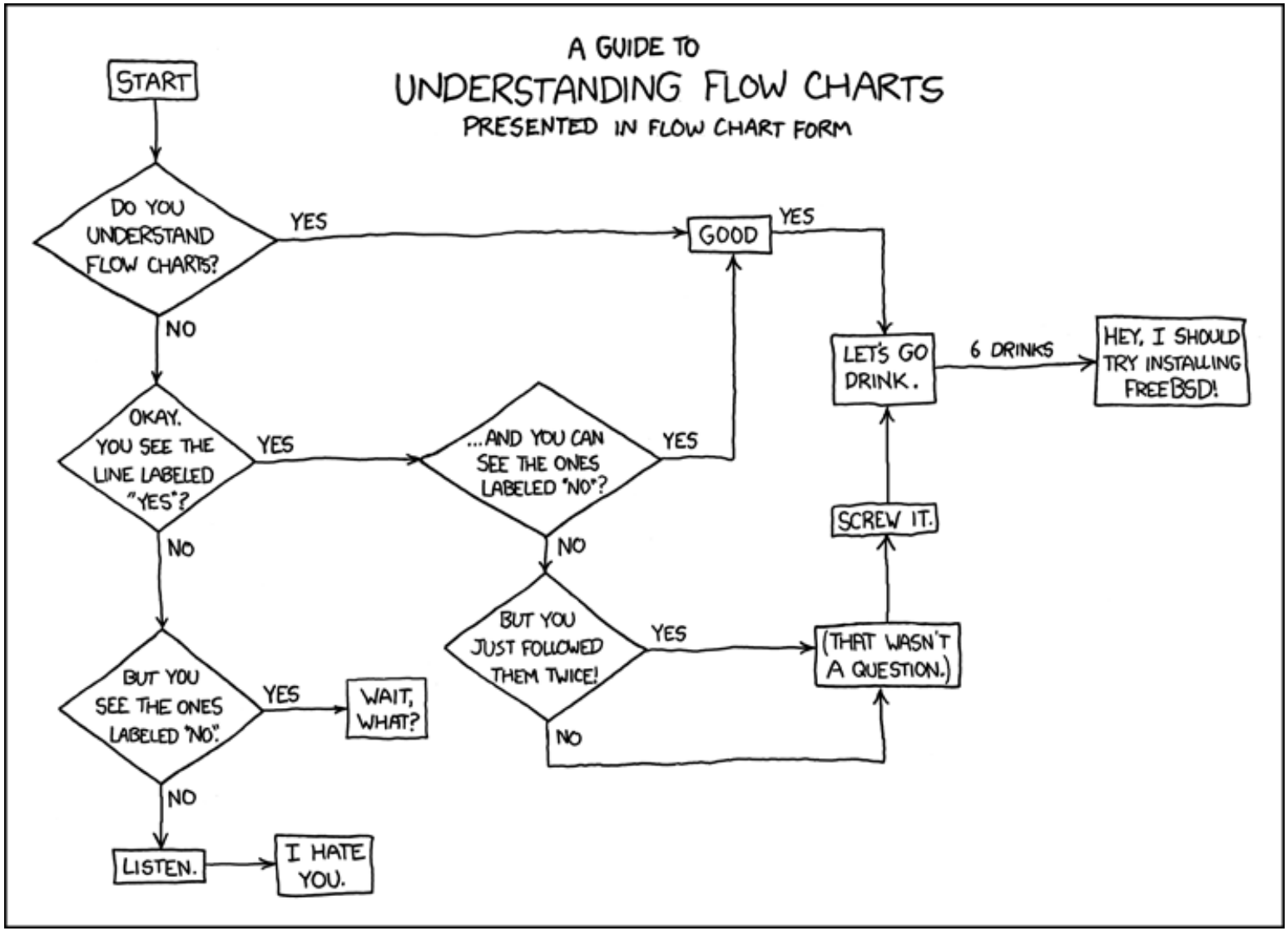


Fig: Operation of if...elif...else statement

(programiz)

Side Note: Reading Flow Charts



(xkcd/518)

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Logical Operators

and

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

in1		in2	*returns:*
`False`	`or`	`False`	`False`
`False`	`or`	`True`	`True`
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not

	in1	*returns:*
`not`	`False`	`True`
`not`	`True`	`False`

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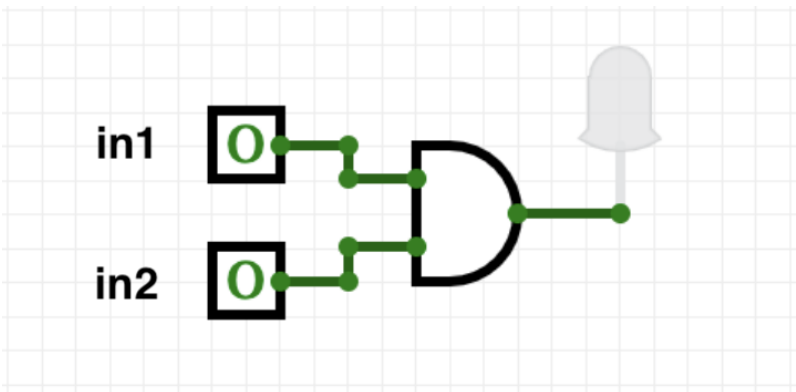
Circuit Demo

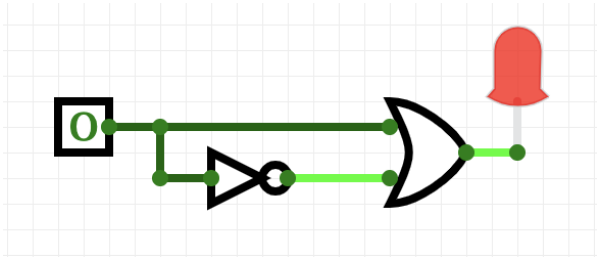


(Demo with `circuitverse`)

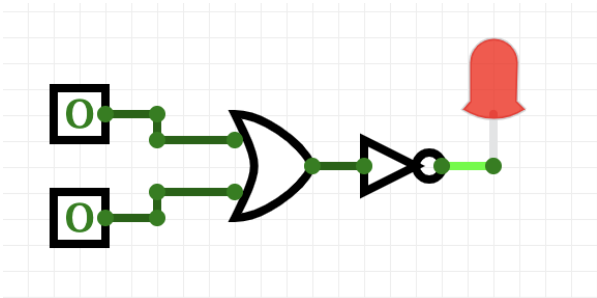
Challenge

Predict when these expressions are true:

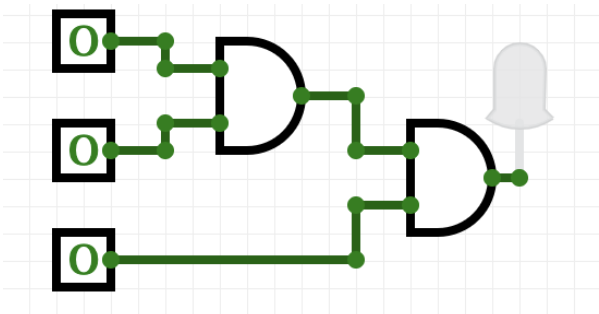
- `in1 or not in1`:



- `not(in1 or in2)`:



- `(in1 and in2) and in3`:



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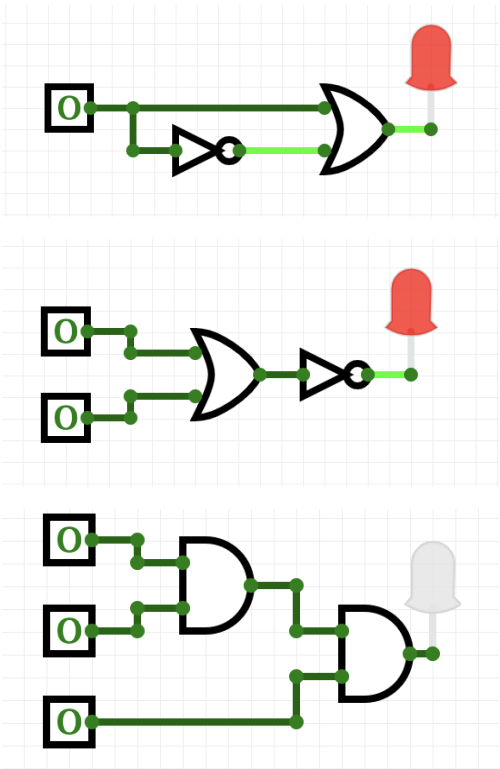

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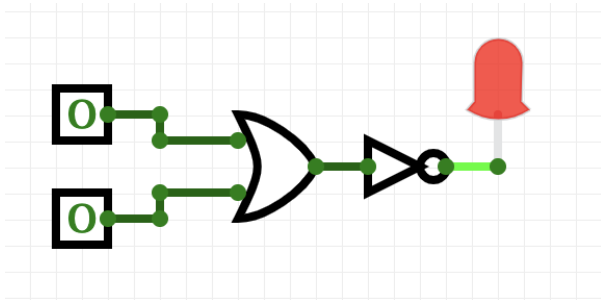
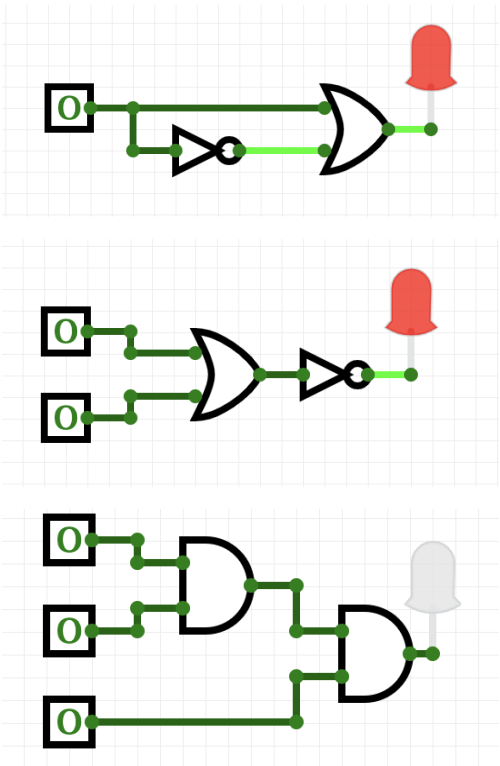
Challenge



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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- **Binary Numbers**

Binary Numbers

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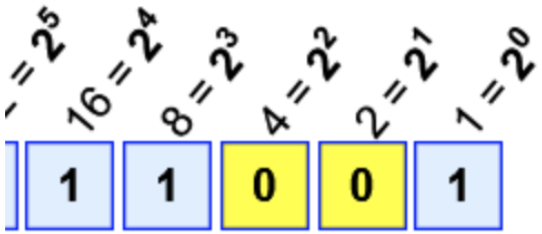
- Computers store numbers using the Binary system (base 2)
- A **bit** (binary digit) being 1 (on) or 0 (off)

Binary Numbers



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

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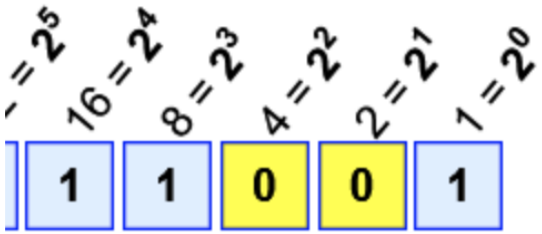
Binary Numbers



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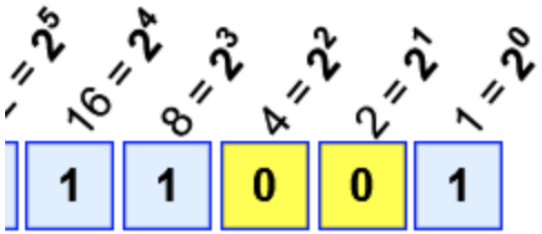

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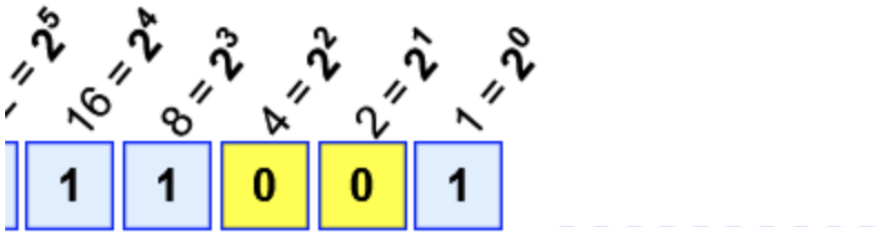

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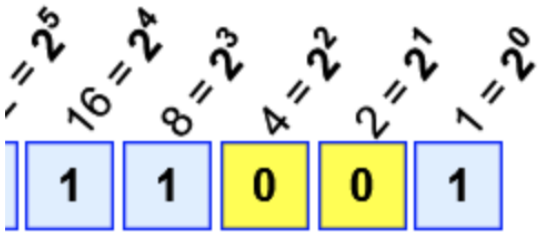

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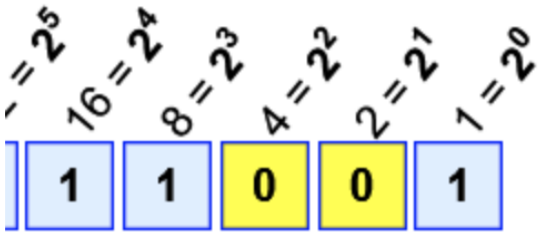

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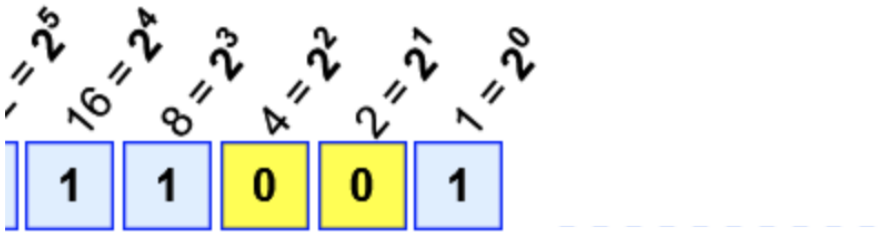

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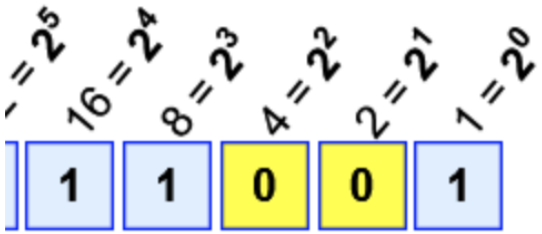

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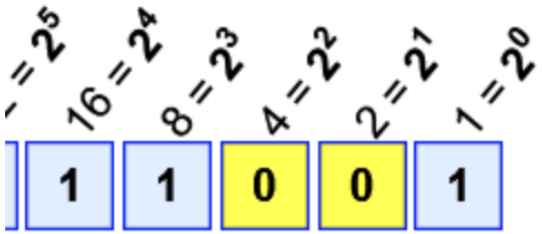

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- **Example:**

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

Recap

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Recap

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  - Decisions
  - Logical Expressions
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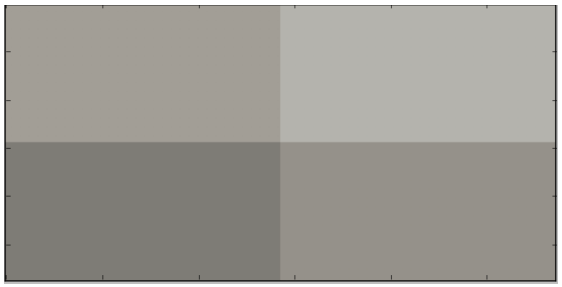
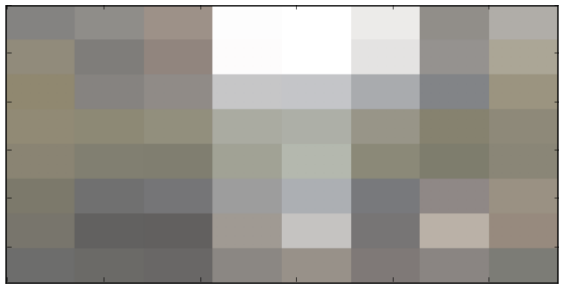
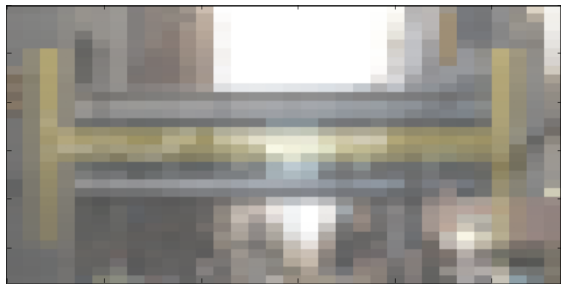
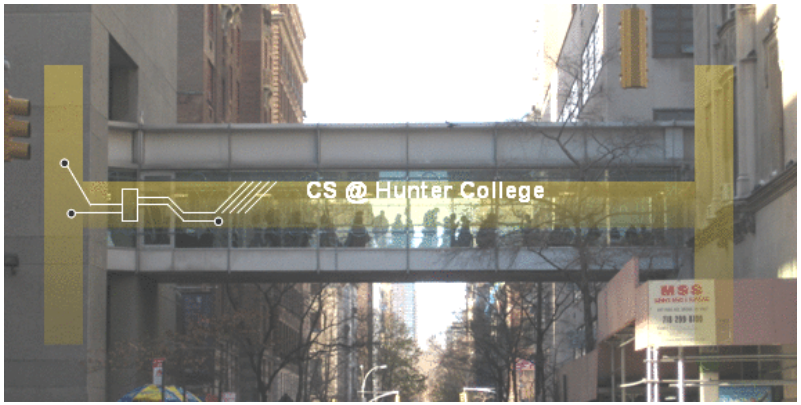
Final Exam

- 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;
  - followed by answer; and
  - repeat.
- Past exams are on the webpage (under Final Exam Information).

Weekly Reminders!



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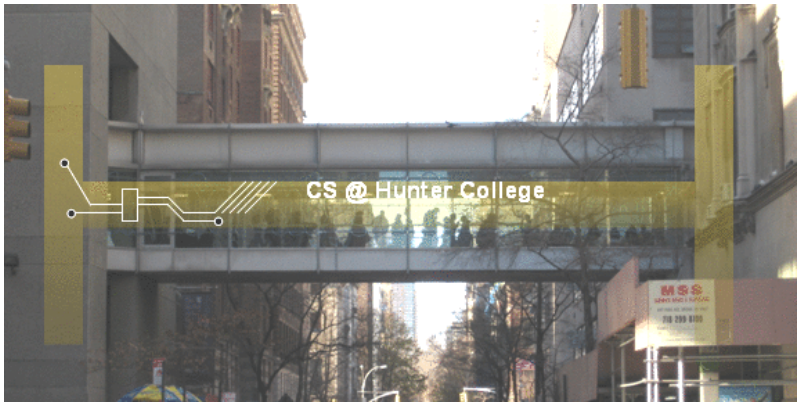

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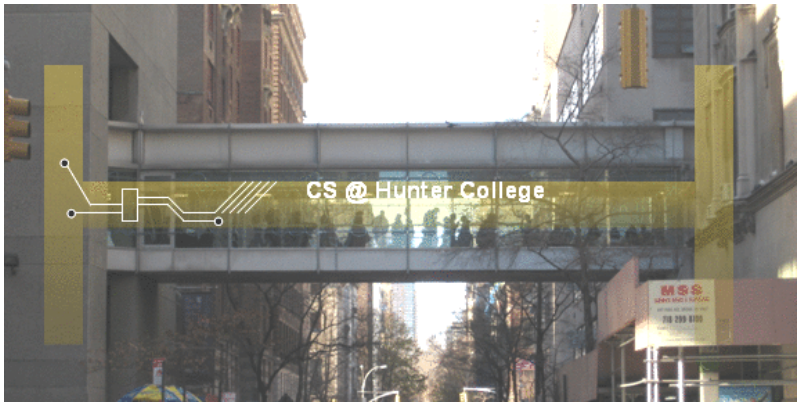

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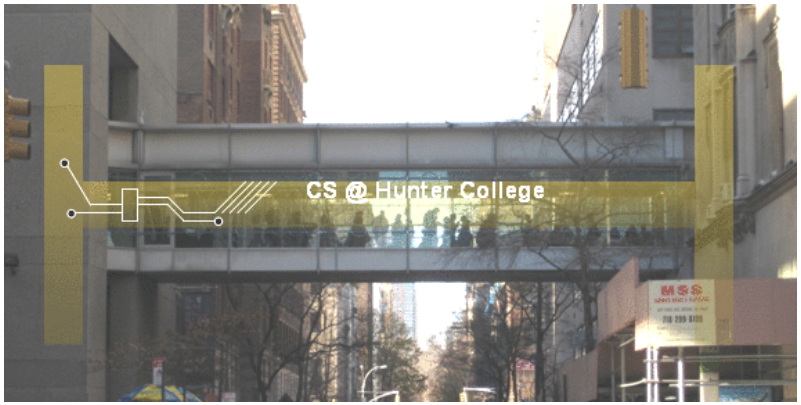

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- Take the Lecture Preview on Blackboard on Monday (or no later than 10am on Tuesday)

Lecture Slips & Writing Boards

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