CSCI-UA-0002

Intro to Computer Programming (No Prior Experience)

Module 3: Boolean Data, Conditionals, Modules

Professor Emily Zhao

Section 008
T/R 12:30-1:45PM

Section 012
T/R 4:55-6:10PM

Agenda

- Review Ed Questions
- Module 3 Review
- Practice Problems

Module 3

- Boolean Expressions
- Comparison Operators
- Logical Operators
- One-way if statements
- Two-way if statements
- Multi-way if statements *
- Nested if statements
- Basic Python Modules
- Color in Turtle Graphics

Your Questions

How does `elif` work?

- When are `elif` and `else` skipped?
- What happens if the conditions for two `elif` conditions are valid?
- Do I have to use `elif` and `else`?

When do I need to import a module?

- How do I discover other modules?
- What is dot syntax?

Boolean Data

What are the two possible values a Boolean can have?

`True` `False`

What's the difference between `=` and `==`?

`=` → assign values to variables

`==` → test to see if two values are equal

```
1 isSaturday = True # assign variable
2
3 if isSaturday == True: # test equality
4     print("You don't have class!")
```

```
You don't have class!
```

Comparison Operators

```
x == y      # equality
x != y      # inequality
x > y       # greater than
x >= y      # greater than or equal to
x < y       # less than
x <= y      # less than or equal to
```

Boolean Expression

an expression used in programming languages that produces a Boolean value (True or False) when evaluated

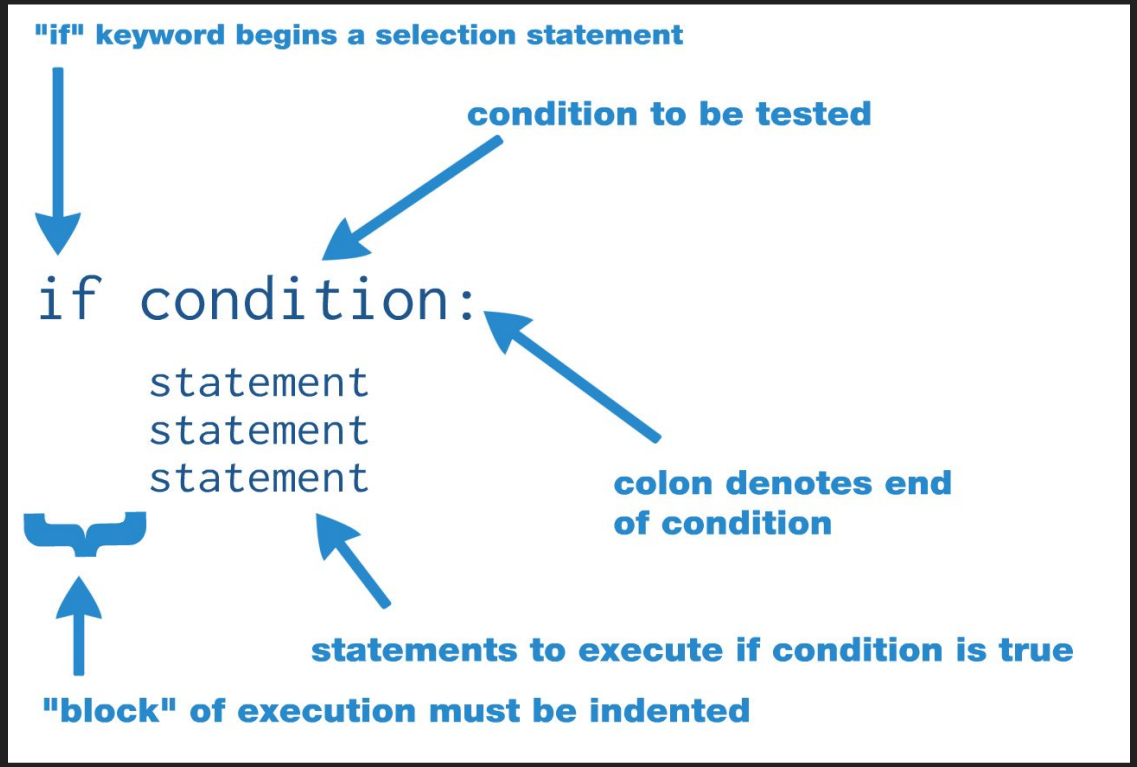
Logical Operators

`and` `or` `not`

What's the output?

```
True and False    → False
True or False     → True
not True          → False
```

Conditional Statements


"if" keyword begins a selection statement
condition to be tested
if condition:
statement
statement
statement
colon denotes end of condition
statements to execute if condition is true
"block" of execution must be indented

Conditionals Practice

pollev.com/emilyzhao

Trace the Output [1]

→ One

→ Three

```
1     a = 5
2     b = 10
3
4     if a < b:
5         print( "one")
6     if a > b:
7         print( "two")
8     if a*2 == b:
9         print ("three")
10    if b < a:
11        print("four")
```

Trace the Output [2]

→ One

→ Three

→ Five

```
1     a = 5
2     b = 10
3
4     if a < b:
5         print("one")
6     if a > b:
7         print ("two")
8     if a*2 == b:
9         print("three")
10    if b < a:
11        print("four")
12    else:
13        print("five")
```

Trace the Output [3]

→ One

```
1     a = 5
2     b = 10
3
4     if a < b:
5         print("one")
6     elif a > b:
7         print ("two")
8     elif a*2 == b:
9         print("three")
10    elif b < a:
11        print("four")
12    else:
13        print("five")
```

Programming Challenge: Grade Determination Program

- Input: ask the user for a numeric grade (i.e. 95)
- Process: convert the grade to its letter format (A through F)
- Output: print the letter grade

1. Try to use only `ifs`
2. Try to use only ONE `if`

A	90 - 100
B	80 - 89
C	70 - 79
D	60 - 69
F	59 and below

Programming Challenge: Grade Determination Program

```
grade = float(input("Enter a grade: "))

if 90 <= grade <= 100:
    print("A")
if 80 <= grade < 90:
    print("B")
if 70 <= grade < 80:
    print("C")
if 60 <= grade < 70:
    print("D")
if 0 <= grade < 60:
    print("F")
```

```
grade = float(input("Enter a grade: "))

if grade >= 90:
    print("A")
elif grade >= 80:
    print("B")
elif grade >= 70:
    print("C")
elif grade >= 60:
    print("D")
else:
    print("F")
```

Help me debug my programs!

Programming Challenge: Guessing Numbers

- Write a program where if a user guesses a number divisible by 7 or the secret number 13, they win!
- Otherwise, any other number they guess results in a loss.

Programming Challenge: Guessing Numbers [Broken]

```
 1 # Guessing Numbers
 2
 3 secret = 13
 4
 5 guess = int(input("Guess a number: "))
 6
 7 # how do I check if a number is divisible by 7? modulo!
 8 if guess % 7 == 0 or secret:
 9     print("You win!")
10 else:
11     print("You lose!")
```

Programming Challenge: Guessing Numbers [Solution]

```
1 # Guessing Numbers
2
3 secret = 13
4
5 guess = int(input("Guess a number: "))
6
7 # how do I check if a number is divisible by 7? modulo!
8 if guess % 7 == 0 or guess == secret:
9     print("You win!")
10 else:
11     print("You lose!")
```

Programming Challenge: Am I Your Man?

- You are Lou Bega, artist behind hit pop song Mambo No 5.
- You only want a little bit of Angela, Pamela, Sandra, Rita, Monica, Erica, Tina, Sandra, Mary, or Jessica. No one else.
- Ask the user for a name and if does not match the name of the above women, print “I am not your man.”
- Otherwise, print “You make me your man.”
- *Feel free to just use a couple of the names*

[Chorus]
A little bit of Monica in my life
A little bit of Erica by my side
A little bit of Rita's all I need
A little bit of Tina's what I see
A little bit of Sandra in the sun
A little bit of Mary all night long
A little bit of Jessica, here I am
A little bit of you makes me your man (Ha!)

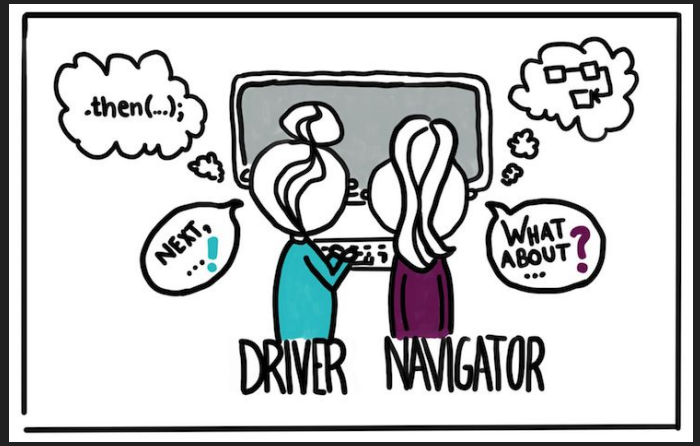
Programming Challenge: Mambo No 5 [Broken]

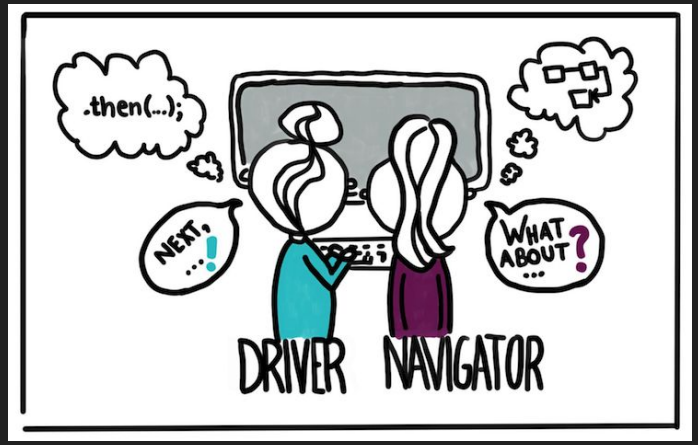
```
1 # Mambo no 5
2
3 name = input("Enter a woman's name: ")
4 if name !="Angela" or name != "Pamela":
5     print("I'm not your man!")
6 else:
7     print("I'm your man!")
```

Programming Challenge: Mambo No 5 [Solution]

```
name = input("Enter a woman's name:")
# user inputs Angela
# != Angela -> False
# != Pamela -> True
if name != "Angela" and name != "Pamela":
    print ("I'm not your man")
else:
    print("You make me your man")
```

Pair Programming





The **Driver** is the person at the wheel, i.e. the keyboard.

- focused on completing the tiny goal at hand, ignoring larger issues for the moment.
- A driver should always talk through what she is doing while doing it.

The **Navigator** is in the observer position, while the driver is typing.

- reviews the code on-the-go, gives directions and shares thoughts.
- The navigator also has an eye on the larger issues, bugs, and makes notes of potential next steps or obstacles.

Pair Programming: Calculating a Bonus

- All sales people should receive 1% commission on their sales
- If a sales person made over 10,000 they should receive a $500 bonus
- If a sales person made over 50,000, they should receive 5% commission on their sales (instead of 1%) – this is in addition to their $500 bonus for making their quota
- Print out their total take-home amount (bonus + commission) at the end of the program

String Comparison

- So far we have been writing Boolean expressions that evaluate based on numeric data
- We can also construct Boolean expressions that can test relationships between strings
- When we compare strings we are essentially reducing them to their zeros and ones and comparing them numerically

Standard ASCII Table

0	NUL	16	DLE	32	SP	48	0	64	@	80	P	96	`	112	p
1	SOH	17	DC1	33	!	49	1	65	A	81	Q	97	a	113	q
2	STX	18	DC2	34	"	50	2	66	B	82	R	98	b	114	r
3	ETX	19	DC3	35	#	51	3	67	C	83	S	99	c	115	s
4	EOT	20	DC4	36	$	52	4	68	D	84	T	100	d	116	t
5	ENQ	21	NAK	37	%	53	5	69	E	85	U	101	e	117	u
6	ACK	22	SYN	38	&	54	6	70	F	86	V	102	f	118	v
7	BEL	23	ETB	39	'	55	7	71	G	87	W	103	g	119	w
8	BS	24	CAN	40	(	56	8	72	H	88	X	104	h	120	x
9	HT	25	EM	41	)	57	9	73	I	89	Y	105	i	121	y
10	LF	26	SUB	42	*	58	:	74	J	90	Z	106	j	122	z
11	VT	27	ESC	43	+	59	;	75	K	91	[	107	k	123	{
12	FF	28	FS	44	,	60	<	76	L	92	\	108	l	124	|
13	CR	29	GS	45	-	61	=	77	M	93	]	109	m	125	}
14	SO	30	RS	46	.	62	>	78	N	94	^	110	n	126	~
15	SI	31	US	47	/	63	?	79	O	95	_	111	o	127	DEL

What's the output?

```
"dog" > "cat"
```
→ True

```
"Camel" < "camel"
```
→ True

```
"dog" < "dogfight"
```
→ True

Programming Challenge: Alphabetization Program

- Take in three names as inputs
- Return the three names in alphabetical order.

Programming Challenge: Alphabetization Program [Solution]

```
name1 = input("Enter a name: ")
name2 = input("Enter a name: ")
name3 = input("Enter a name: ")

# case where name1 is first
if name1 < name2 and name1 < name3:
    if name2 < name3:
        print(name1, name2, name3)
    else:
        print(name1, name3, name2)
#case where name2 is first
elif name2 < name1 and name2 < name3:
    if name1 < name3:
        print(name2, name1, name3)
    else:
        print(name2, name3, name1)
#case where name3 HAS TO BE first
else:
    if name2 < name1:
        print(name3, name2, name1)
    else:
        print(name3, name1, name2)
```

Programming Challenge: Password Protection

- Write a program that asks the user for a password
- Check to see if the password that was submitted is equal to the string "secret"
- If it is, print out a “welcome” message
- Otherwise, tell them to try again

Programming Challenge: Password Protection [Solution]

```
# ask user for password
password = input("Enter a password: ")

# check to see if password matches
if password == "secret":
    print("Welcome!")
else:
    print("Try again.")
```

String Manipulation

```
str.lower()
```

```
str.upper()
```

Dot Syntax

```
moduleName.functionName()
```

Used to access functions, attributes, and methods defined within modules and classes

String Manipulation

```
str.lower("HELLO")
```
→ hello

```
"hello".upper()
```
→ HELLO

Programming Challenge: Password Protection Extension

— Rewrite your password protection program to be case **insensitive** (i.e. the password "Secret" or "sEcReT" would work)

Programming Challenge: Password Protection Extension

```
# ask user for password
password = input("Enter a password: ")

# check to see if password matches, regardless of case
if password.lower() == "secret":
    print("Welcome!")
else:
    print("Try again.")
```

Modules

What are some modules that you know?

What are some modules that you know?

`math` `random` `turtle`

How do I generate a random integer between 1 and 10?

Random integer between 1 and 10

1. Import the module

```
import random
```

2. Call the function using “dot syntax”

```
num = random.randint(1, 10)
```

Homework

- Assignment #2 (due Thurs @ 11:59PM)
- Self-Paced Learning Module #4 (due next Tues)
- Quiz #4 (due next Tues)