Module 03

Boolean Data

Emily Zhao
CSCI–UA.0002

Agenda

- Review table formatting / Assignment 1
- Review Module 3 / Go over Quiz 3
- Practice Problems

Module #3

- Boolean Data
- Conditional Statements
- Basic Python Modules
- Color in Turtle Graphics

Table Formatting Review

```
-----------------------------------
            Class Grades
-----------------------------------
Harry Potter          81.5
Hermione Granger      99.9
Ron Weasley           61.9
```

Boolean Data

What are the two possible values a Boolean can have?

What are the two possible values a Boolean can have?

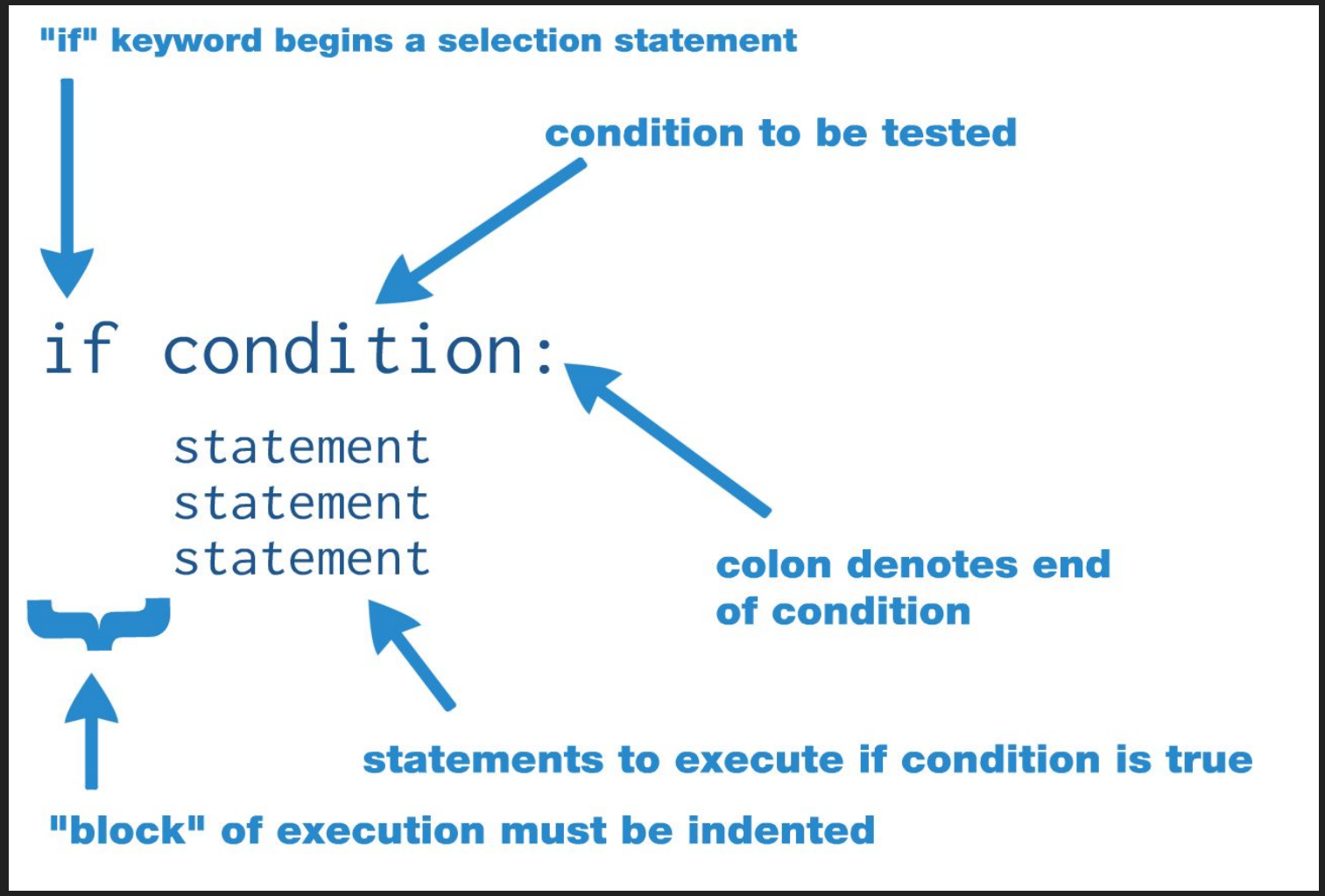
`True` `False`

What’s the difference between = and ==?

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

```
= → assign values to variables

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


"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

```
isSaturday = True

if isSaturday == True:

  print("You don’t have class today!")
```

```
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
```

`and` `or` `not`

What's the output?

```
True and False      → False

True or False       → True

not True            → False
```

Conditional Statements

Programming Challenge: Half Birthday Month

```
1     # Half Birthday Month
2     month = int(input("Enter your birth month (i.e. 10): "))
3
4     if month > 6:
5         print("Your half birthday month is: ", month - 6)
6     else:
7         print("Your half birthday month is: ", month + 6)
8
9
10    # Solution without conditionals:
11    # print("Your half birthday month is: ", (month + 5) % 12 + 1)
```

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

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")
```

Programming Challenge: 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

Programming Challenge: Calculating a Bonus

```
# user input
sales = float(input("Enter monthly sales: "))

# what are the variables?
# initializing my variables / setting "defaults"
percent = 0.01
bonus = 0

# create conditions
if sales >= 10000:
    bonus = 500 # updated the bonus

if sales >= 50000:
    percent = 0.05 # updated the percent

# calculate commission
commission = sales * percent

# output
print("Your take home value: $" + str(sales + commission + bonus))
```

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()
```

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.")
```

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 your criteria, print “I am not your man.”
- Otherwise, print “You make me your man.”
- *Feel free to just use a couple of the names*

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")
```

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)
```

Programming Challenge: Drawing Shapes

- Ask the user how many sides they would like their shape to be (up to 5) or specify random if they don’t care. (Assume they won’t type an integer greater than 5)
- Then ask if they would like it drawn or named
  - If they want it drawn, draw it using turtle
  - If they want it named, tell them what it is (triangle, square, pentagon, etc...)

Homework

- Assignment #2 (due Tues)
- Self-Paced Learning Module #4 (due Thurs)
- Quiz #4 (due Thurs)