

# CS 150: Conditionals

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# Recall: Booleans

- Another type, just like int, float, etc
- True or False

# If Statements

## Syntax

$x < 3$

if (<boolean>):

<body>

if (x < 3):  
 print("hi")

## Semantics

1. Evaluate Boolean
2. If true, execute body

if false,  
skip body  
x = 1    "hi"  
x = 8    nothing

## Code

```
x = 1
if (x < 3):
    print(x)
    x = x + 4
    print(x)
```

At the end of this code,  
what will appear on the  
terminal?

A. Nothing

B 

1
---

C 

5
---

D 

1
5

E. I don't know

# If-Else Statements

$(x > 0) \text{ and } (x < 3)$

## Syntax

```
if (<boolean>):  
    <body1>  
else:  
    <body2>
```

$\text{if } (x < 3):$   
     $\text{print("yay")}$   
else:  
     $\text{print("boo")}$

## Semantics

1. Evaluate Boolean
2. If true, execute body1, skip body2
3. If false, skip body1, execute body2

$x = 1$     yay

$x = 8$     boo

## Code

```
x = 1
if (x < 3):
    print(x)
else:
    print(x+7)
```

*Handwritten red annotations: "true" with an arrow pointing to the condition, and a large red 'X' over the entire code block.*

At the end of this code,  
what will appear on the  
terminal?

A. Nothing

B

1

C

8

D

1

8

E. I don't know

else-if

# If-Elif Statements

( $x \leq 3$ )

## Syntax

```
if (<boolean1>) :  
    <body1>  
elif (<boolean2>) :  
    <body2>  
elif . . .  
else:  
    <body n>
```

## Semantics

1. Evaluate boolean1
2. If true, execute body1, skip rest
3. If false, check boolean2. If it is true, execute body2, and skip rest. Otherwise, check next boolean
4. If none of the booleans evaluate to true, execute body n

~~if (x < 7)~~

## If-elif example

```
if (x < 3):  
    print("a")  
elif (x < 5):  
    print("b")  
elif (x < 7):  
    print("c")  
else:  
    print(":(")
```

x = 1    a

x = 4    b

x = 8    :(

x = 6    c

# Booleans

> greater than

>= greater than or equal to

< less than

<= less than or equal to

== equals

!= not equals

*x = 7 ← assignment*

## Code

```
grade = 98
if (grade >= 90):
    print("You got an A!")
if (grade >= 80):
    print("You got a B!")
else:
    print("You got
something else")
```

At the end of this code,  
what will appear on the  
terminal?

A You got an A!

B You got a B!

C You got something  
else!

D. More than one of the above

E. I don't know

## Code

```
grade = 98
if (grade >= 90):
    print("You got an A!")
if (grade >= 80 and grade < 90):
    print("You got a B!")
else:
    print("You got something else")
```

At the end of this code, what will appear on the terminal?

A You got an A!

B You got a B!

C You got something else!

D. More than one of the above

E. I don't know

if (a < b) false  
print("A")

else print("B")  
→ print("B")

if (x < 5) true  
print("Z")

K=4  
5  
Z

# Which code prints the correct output?

```
grade = 98
if (grade >= 90):
    print("You got an A!")
if (grade >= 80 and grade < 90):
    print("You got a B!")
if (grade < 80):
    print("You got something else")
```

*Handwritten annotations: "true" next to the first if, "false" next to the second if, and "false" next to the third if. A large red checkmark is next to the first if.*

```
grade = 98
if (grade >= 90):
    print("You got an A!")
elif (grade >= 80):
    print("You got a B!")
else:
    print("You got something else")
```

*Handwritten annotations: "B" circled in red above the first if, "true" written in red next to the first if. The entire code block is crossed out with a large red X.*

```
grade = 98
if (grade >= 90):
    print("You got an A!")
elif (grade >= 80):
    print("You got a B!")
elif (grade < 80):
    print("You got something else")
```

*Handwritten annotations: "> 80" written in red next to the third elif.*

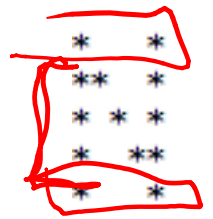
A

D. More than one of the above

E. I don't know

C

# How do we print this pattern?



n=3

`print(*, some spaces, *)`

for # of rows

frontspaces =

backspaces =

`print(*, frontspaces, *`  
`backspaces, *)`

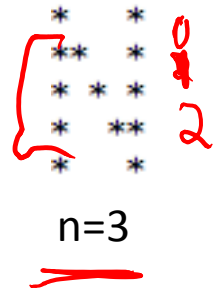
`print(*, some spaces, *)`

0		*
*	*	*
*		*
*	*	*
*		*

*		*
*		*

n=4

How do we print row  $r$  of this pattern? Skip rows with 2 stars.



	before	after
0	0	2
1	1	1
2	2	0

Clicker	Spaces before *	Spaces after *
A	$r$	$r$
B	$r$	$n-r$
C	$n-r$	$r$
D	$r$	$n-r-1$

$r-1$  3  $n-r$

# Write Code

# Will this print the right thing?

```
for row in range(n+2):  
    for col in range(n+2):  
        if (row == col or col == 0 or col == n+1):  
            print("*", end='')  
        else:  
            print(" ", end='')  
    print()
```

A hand-drawn diagram of a 5x5 grid. The first and last columns are filled with stars. The main diagonal is also filled with stars. The rest of the grid is empty. This represents the output of the code for n=3.

A. Yes

B. No

C. Sometimes

D. I don't know

A hand-drawn diagram of a 5x5 grid. The first and last columns are filled with stars. The main diagonal is also filled with stars. The rest of the grid is empty. This represents the output of the code for n=3.

# Next Class

- Conditionals and While Loops
- Reading
  - 6.1-6.3
- CLICKERS ARE MANDATORY
- Lab 2 – Due Tuesday at 10pm
- Prelab for Lab 3 – Due Wednesday in class