UNC TECHNOLOGY, ETHICS & CULTURE IN STOCKHOLM

UNC
COLLEGE OF ARTS AND SCIENCES
Study Abroad

COMP 380
Technology, Ethics, & Culture

May 21 - June 13, 2025

Cece McMahon
mcmahon@cs.unc.edu

More Info & Apply
go.unc.edu/tech-ethics-culture

Info Session at 5pm
on Wednesday, Jan 29
in Fred Brooks (FB) 009

- No prerequisites
- Any major can participate!
- Fulfills the following requirements:
  - Ethical and Civic Values Focus Capacity (FC-Values)
  - High Impact Experience

CL06 - Boolean Operators and Conditional Control Flow

Announcements

Re: Quiz 00

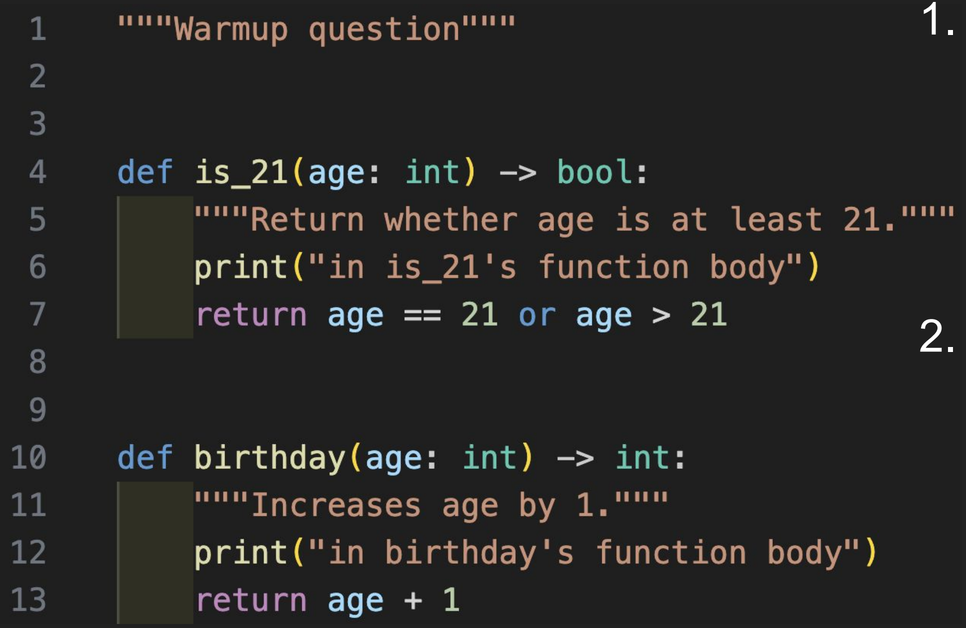
- Median grade was 85% – great job!
- Will publish on Gradescope tomorrow
    - *Please review what you missed ASAP*; we will build on the topics covered in Quiz 00 throughout the course, and these foundational concepts are vital!
    - Don't understand a particular question/part of a memory diagram? Please come see us in Office Hours/Tutoring!
- *Regrade requests will be open for one week*. Please submit a regrade request if you believe your quiz was not graded correctly according to the rubric

LS06 – Boolean Operators (multiple choice questions) – due tonight at 11:59pm

EX01 – Tea Party Planner – due Tuesday, Jan 28!

Warm-up Questions

Given these two function definitions, reason through the questions below with your neighbors!



```python
"""Warmup question"""


def is_21(age: int) -> bool:
    """Return whether age is at least 21."""
    print("in is_21's function body")
    return age == 21 or age > 21


def birthday(age: int) -> int:
    """Increases age by 1."""
    print("in birthday's function body")
    return age + 1
```

1. Which expression is valid, based on parameter and return type declarations?
   a. `is_21(age=birthday(age=21))`
   b. `birthday(age=is_21(age=21))`
2. For the selected expression above, which function call expression evaluates first?
   a. Inner-most function call based on parentheses
   b. Outer-most function call based on parentheses
   c. First function call encountered, reading from left to right, ignoring parentheses

3. What is the *printed output* of evaluating the following? `is_21(age=21)`

4. What is the *returned value* of evaluating the following? `is_21(age=21)`

Relational Operators (Review)

These operators are placed between expressions of the same type* to compare them. Relational operators evaluate to *boolean values*.

Operator Symbol	**Verbalization**	**`True` Ex.**	**`False` Ex.**
`==`	Is equal to?	`1 == 1`	`1 == 2`
`!=`	Is NOT equal to?	`1 != 2`	`1 != 1`
`>`	Is greater than?	`1 > 0`	`0 > 1`
`>=`	Is at least?	`1 >= 0` or `1 >= 1`	`0 >= 1`
`<`	Is less than?	`0 < 1`	`1 < 0`
`<=`	Is at most?	`0 <= 1` or `1 <= 1`	`1 <= 0`

*Comparisons between int and float values will automatically convert (“type coerce”) the ints to floats.

Relational Operator Practice

1. 1 + 2 < 3 + 4

Which operator must have higher precedence? < or +?

2. 110.0 != 110

3. “UNC” == “Unc”

4. “UNC” > “DUKE”

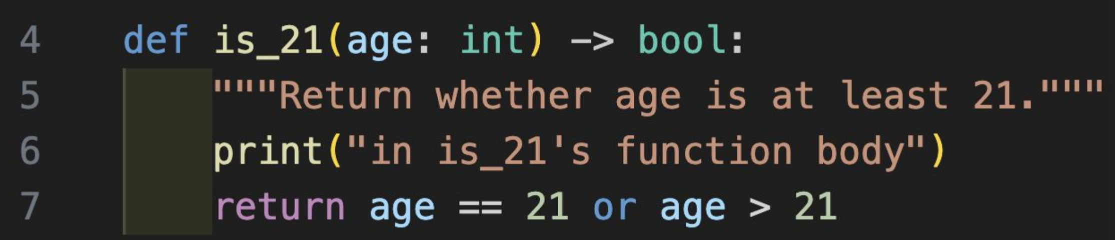
Be careful using relational operators to compare strings!

- Python is a case-sensitive programming language (e.g., “U” != “u”)
- Every character has a numerical (“ASCII”) value associated with it. Strings are compared based on each character of the string’s ASCII values, in order

(Read an explanation here.)

Reasoning through the logical `or` operator

Recall the warm-up question…



```python
4   def is_21(age: int) -> bool:
5       """Return whether age is at least 21."""
6       print("in is_21's function body")
7       return age == 21 or age > 21
```

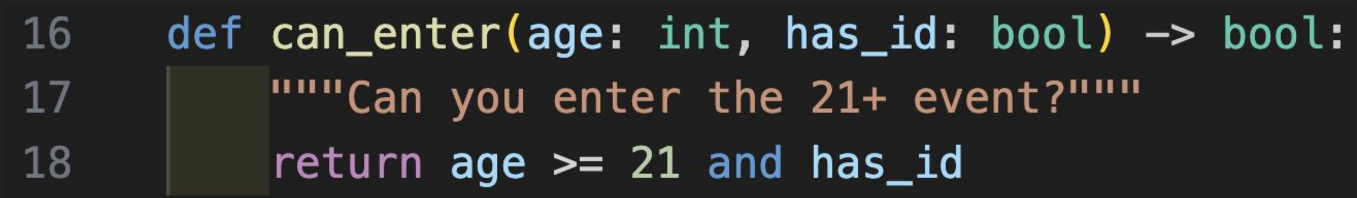
`is_21` returns `True` if age is at least 21, and `False` otherwise. How must the `or` operator work?

Expression	**Evaluated Result**
False **or** False	
True **or** False	
False **or** True	
True **or** True	

How could we rewrite line 7 to simplify it using a different relational operator?

Reasoning through the logical **`and`** operator

Consider the function…



```python
def can_enter(age: int, has_id: bool) -> bool:
    """Can you enter the 21+ event?"""
    return age >= 21 and has_id
```

`can_enter` returns **`True`** if **`age`** is at least 21 and **`has_id`** is **`True`**, and **`False`** otherwise. How does the **`and`** operator work?

Expression	Evaluated Result
False **and** False	
True **and** False	
False **and** True	
True **and** True	

What must have higher precedence:
>= (relational operator), or
and (logical/boolean operator)?

Reasoning through the logical `not` operator

Consider the function…

```python
def can_eat(temp: int, allergic: bool) -> bool:
    """Is it safe to eat this food?"""
    return temp >= 165 and not allergic
```

`can_eat` returns **`True`** if **`temp`** is at least 165 and **`allergic`** is **`False`**, and **`False`** otherwise. How does the **`not`** operator work?

Expression	Evaluated Result
not False	
not True	

For this to be sensible, what must be the precedence of **`not`**, **`and`**, and **`or`**?

Logical / Boolean Operators

Expression	Evaluation
False **or** False	**False**
True **or** False	**True**
False **or** True	**True**
True **or** True	**True**

Expression	Evaluation
False **and** False	**False**
True **and** False	**False**
False **and** True	**False**
True **and** True	**True**

Expression	Evaluation
not False	**True**
not True	**False**

Precedence (highest to lowest):

0. Arithmetic operators (PEMDAS)
1. Relational Operators
2. Not
3. And
4. Or