Lecture 2: Conditionals

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Review: Useful (simple) Functions

- Example Functions
  - print( )
  - type( )
  - str( ), int( ), float( )
  - input( )

```
print(1+2.001)
print(1*3)
print("1.0"+"2.0")
print("Happy"*2 + "?!"*3)
print(1*2 + "2"*2)
```

```
print(type("2"))
```

```
print(1*2 + int("2")*2)
print(str(1)*2 + "2"*2)
```

Review: Input and Output

Write a program that asks the user for word and a number, then prints the word followed by an exclamation point and a space that many times. For example:

```
Enter a word:
    happy
Enter a positive integer:
    3

happy! happy! happy!
```

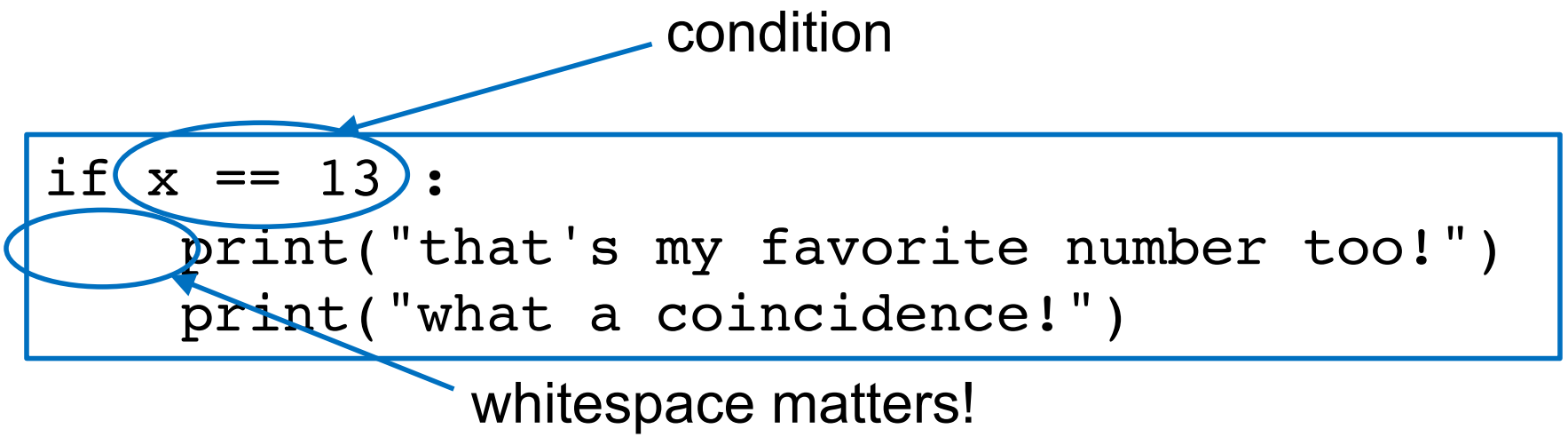
What about?

```
what's your favorite positive integer?
      20
mine is 13.
```

```
what's your favorite positive integer?
      13
that's my favorite number too!
what a coincidence!
```

if-statements

- syntax



- condition must be an expression that evaluates to True or False (type bool)

bool datatype - values

- Values: True and False

Boolean Expressions

- Examples of operations that return a bool:
  - relational operators: ==, !=, >, <, >=, <=

```
10 < 0

11 >= 11

11 > 11.0

10 == 10.1
```

```
x != 3

y <= x

x = 5
```

bool datatype - operators

- Values: True and False

- Operators: and, or, not

- <bool expression> **and** <bool expression>
  - True if both expressions True, False otherwise
- <bool expression> **or** <bool expression>
  - True if at least one expression True, False otherwise
- **not** <bool expression>
  - returns True if expression is False, False otherwise

Example

Assume the variable n currently stores the value 25.

What will the following expressions evaluate to?

```
2 < n and n < 30

n > 2 and < 20

(2 > n) or (n == 25)

not (n == n)

not (n != 3)
```

Exercise 1: Boolean Expressions

After executing each snippet of code, the variable `val` stores a value of type `bool`. What value does it store?

A)
```
val = (5 > 0 and 5 < 10)
```

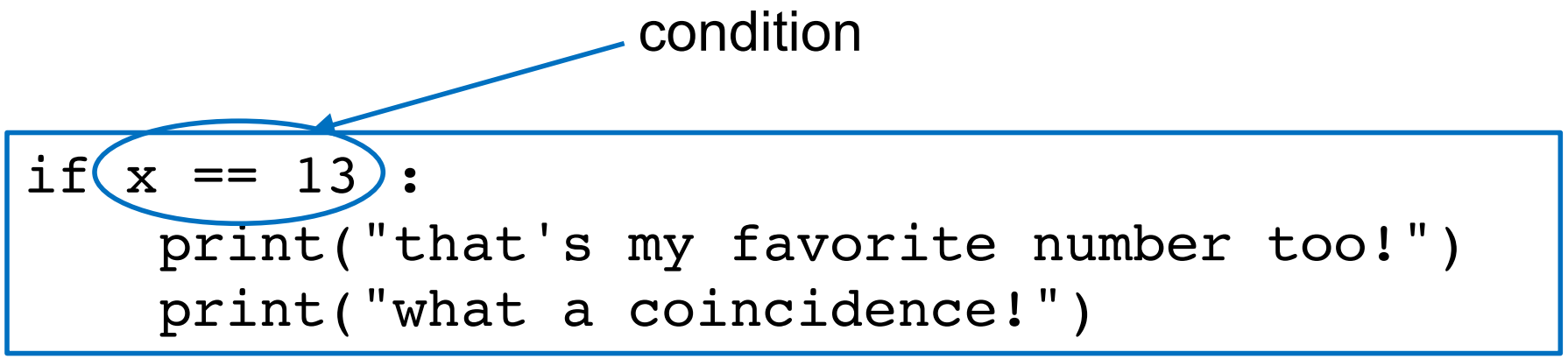
B)
```
n = 25
val = (n % 2 == 0 or n % 3 == 0)
```

C)
```
s = "string"
val = ("String" != s)
```

D)
```
val = not True and False
```

if-statements

- syntax



- condition must be an expression that evaluates to True or False (type bool)
  - Booleans: True, False
  - relational operators: ==, !=, >, <, >=, <=
  - logical operators: and, or, not
  - functions that evaluate to type bool

Exercise 2: If statements

Use input, print, and if statements to write a program with the following behavior:

```
Which room in Edmunds is CS51 in?
      114
Thanks!
```

```
Which room in Edmunds is CS51 in?
      13
I thought it was Edmunds 114.
```

if-else statements

- syntax

```
if x == 13:
    print("that's my favorite number too!")
    print("what a coincidence!")
else:
    print("mine is 13")
```

Exercise 3: if-else statements

```
s1 = int(input())
if s1 % 4 == 0:
     print(4*s1)
if s1 % 2 == 0:
     print(2*s1)
else:
     print(s1)
```

What gets printed if the user inputs 2?
If they input 3?
If they input 4?
If they input 5.0?

What about?

```
what's your favorite positive integer?
      13
that's my favorite number too!
what a coincidence!
```

```
what's your favorite positive integer?
      20
my favorite number is less than that.
```

```
what's your favorite positive integer?
      10
my favorite number is more than that.
```

Attempt #1: If statements

```
if x == 13:
    print("that's my favorite number too!")
if x > 13:
    print("my favorite number is less than that.")
if x < 13:
    print("my favorite number is more than that.")
```

Attempt #2: nested if-statements

```
if x == 13:
    print("that's my favorite number too!")
else:
    if x > 13:
         print("my favorite number is less than that.")
    else:
        print("my favorite number is more than that.")
```

Attempt #3: using elif

```
if x == 13:
    print("that's my favorite number too!")
elif x > 13:
    print("my favorite number is less than that.")
else:
    print("my favorite number is more than that.")
```

Exercise 4: elif statements

Convert the following program to a program with the same behavior that doesn't use nested if-statements

```
x = int(input("pos int?\n\t"))
if x == 13:
    print("mine too!")
else:
    if x > 30 or x < 10:
        print("mine is 13")
    else:
        if x == 19:
            print("19!")
        else:
            print("?")
print("!")
```