



Middlebury

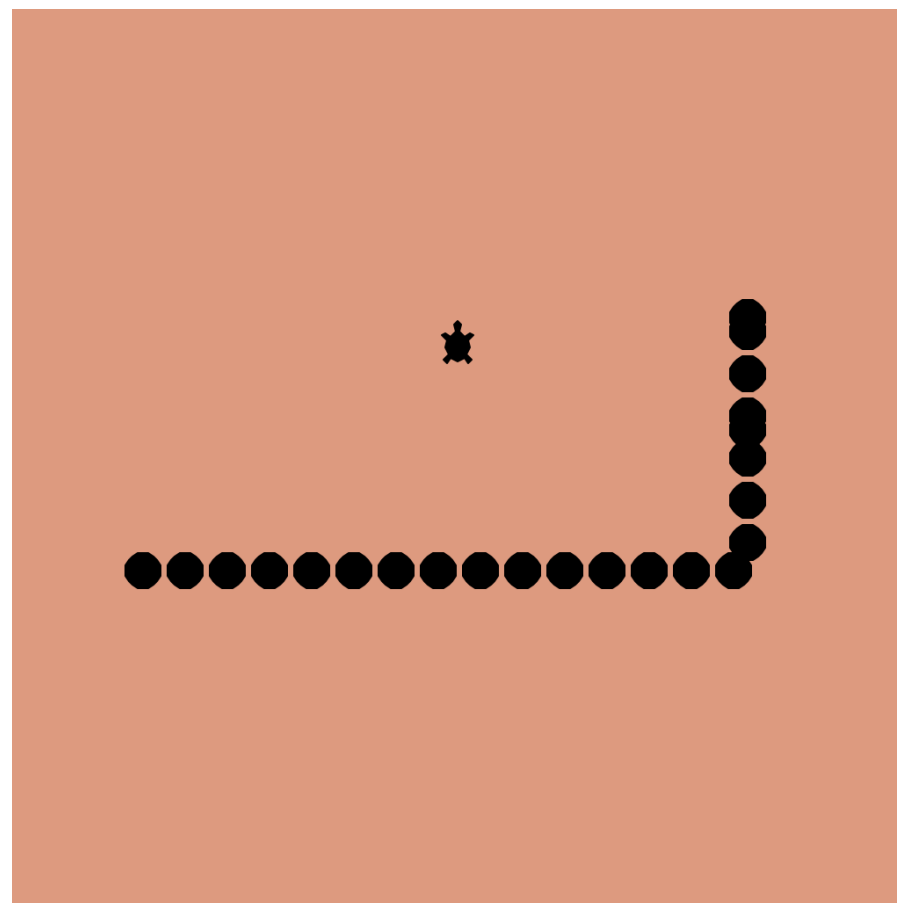
CSCI 146: Intensive Introduction to Computing

Fall 2025

Lecture 7: Conditionals

Goals for today

- Define a `boolean` type and enumerate its possible values.
- Use relational operators to compare values.
- Explain and use AND, OR and NOT operators.
- Generate the truth table from simple boolean expressions and implement a truth table as a boolean expression.
- Describe the evaluation order of `if-elif-else` statements in Python.
- Use conditional statements in a Python program.
- Make a game!



First, let's investigate another **string** function called **startswith**.

What do you expect this function to do?

```
>>> s = "hello"
>>> s.startswith("h")
True
>>> s.startswith("b")
False
```

True and **False** are possible values for a **type** called **bool** (Boolean).

We can also create expressions with **bools** using **not**, **and**, **or** as well as relational operators.

```
>>> not True
False
>>> not False
True
```

a	b	a or b	a and b
T	T	T	T
T	F	T	F
F	T	T	F
F	F	F	F

Relational operators: **<**, **>**, **<=**, **>=**, **==**, **!=**

Question 1: What is the value of the expression at the end of this code? Recall that **not** has the highest precedence, then **and**, then **or**.

```
>>> a = True
>>> b = False
>>> c = True
>>> (not a) and b or c
```

(F and F) or T
T

A. True
B. False

Question 2: What does this code print?

```
1 a = 3      F
2 b = (a != 3)
3 print(b)   f
```

A. True

B. False

C. 3

D. SyntaxError

Question 3: I would like an expression that evaluates to **True** when at least one of the following two conditions is **True**:

1. **a** and **b** are equal.
2. when **a** has the value **5**.

Which of these expressions does that?

- A. **a==b==5**
- B. **(a==b) or (a==5)**
- C. **(a==b) and (a==5)**
- D. **a==(b==5)**

We can use **booleans** to make decisions in our programs with **if** statements.

```
1  if (boolean expression A):  
2      statement1  
3      statement2  
4  elif (boolean expression B):  
5      statement3  
6      statement4  
7  else:  
8      statement5  
9      statement6  
10  
11 statement7  
12 statement8
```

Examples: odd numbers and absolute value.

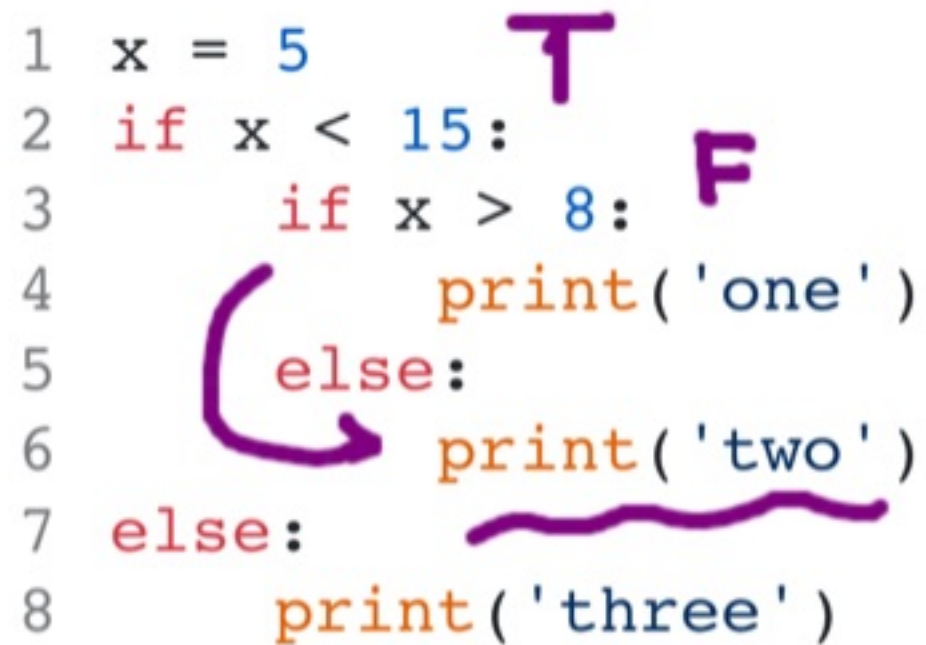
```
1 def is_odd(n):
2     """
3     Determines if some input number is odd.
4
5     Args:
6         n: number to check
7
8     Returns:
9         True if n is odd, False otherwise.
10    """
11    return (n % 2) == 1
```

```
1 def absolute_value(x):
2     """
3     Returns the absolute value of some input number.
4
5     Args:
6         x: number to compute the absolute value of.
7
8     Returns:
9         Absolute value of x, |x|
10    """
11    if x >= 0:
12        return x
13    return -x
```

Note there is also a built-in `abs` function which does this.

Question 4: what does this code print?

```
1 x = 5
2 if x < 15:
3     if x > 8:
4         print('one')
5     else:
6         print('two')
7 else:
8     print('three')
```



- A. one
- B.
- C. three
- D. More than one of one, two or three
- E. Nothing is printed

Question 5: will these codes print the same thing for ALL values of **temperature**?

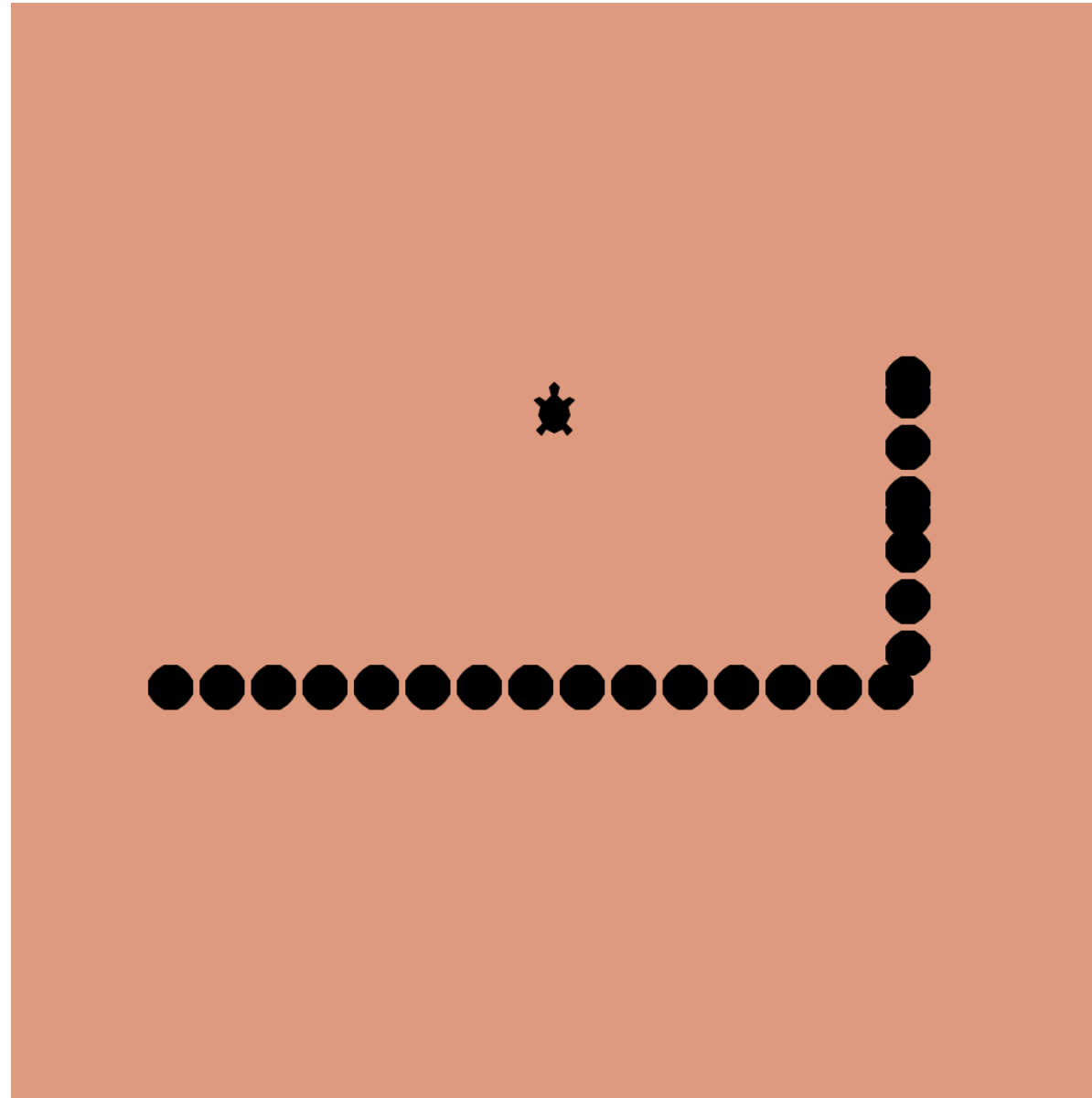
```
1 if temperature > 0:
2     print("above freezing")
3 elif temperature == 0:
4     print("at freezing")
5 else:
6     print("below freezing")
```

```
1 if temperature == 0:
2     print("at freezing")
3 elif temperature <= 0:
4     print("below freezing")
5 else:
6     print("above freezing")
```

doesn't
get here
for
Temp
== 0

- A. True
- B. False

Let's program the game "Snake"!



Things **TODO** (see the labels):

1. Complete the key press callbacks (`key_left`, `key_right`, `key_up`, `key_down`)
2. Complete the `snake_at_food` function.
3. Complete the `inbounds` function (then we'll introduce the `break` keyword).

Summary & Reminders

- There's another example in the reading if you want more practice: estimating π with Monte Carlo sampling.
- **while** loops on Wednesday.
- Midterm 1 on Thursday October 9th at 7:30pm. Please email me if you have a conflict or accommodations. Covers material through this week.
- Programming Assignment 3 due Thursday (initial submission).
- Quiz 4 on Friday with retakes of previous quiz questions.
- Help hours: see go/smith (Smith Gakuya, ASI) and go/cshelp.