Students:
Section A is a part of 2 assignments: CSC108 CH04.1-4 & CH5. ▾
Instructor: Please browse to the assignment through Blackboard's item on zybooks (more answers here: learn.zybooks.com/zbd/help, Learn Mode)
Initiative: CA
Due: 03/11/2025, 11:59 PM EDT

4.2 While loops

While loop: Basics

A **while loop** is a program construct that repeatedly executes a list of sub-statements (known as the **loop body**) while the loop's expression evaluates to true. Each execution of the loop body is called an **iteration**. Once entering the loop body, execution continues to the body's end, even if the expression evaluates false mid-way through.

Construct 4.2.1: While loop.

```
while <expression>:
    # Loop body: Execute if expression evaluates to true
    # Loop body: Execution stops here if the "while" is false
    # Statements that execute after the expression evaluates to false
```

Feedback?

PARTICIPATION ACTIVITY 4.2.1: While loop.

Start

```
num = int(input())
while num > 0:
    print('Hello!')
    num = num - 1
print('Done')
```

Input
1 2 1

Output
Hello!
Hello!
Done

Captions:
1. When encountered, a while loop's expression is evaluated. If true, the loop's body is entered. Here, userOne was initialized with '2', so userOne > 0 is true.
2. Thus, the loop body is executed, which outputs userOne's current value of 2, doubles userOne, and gets the next input. Suppose the input is the other part, userOne > 0 is true that input, so userOne > 0 is true, and the loop body executes again. Suppose instead it
4. userOne > 0 (the second user input), so userOne > 0 is true, and the loop body executes (a third time), outputting 8.
5. userOne > 0 now is 0, so userOne > 0 is false. Thus, execution jumps to after the loop, which outputs 'Done'.

Feedback?

PARTICIPATION ACTIVITY 4.2.2: While loops: Number of iterations.

For the following code, indicate how many times the loop body will execute for the indicated input values.

```
>>> userNum = 5
while (userNum > 0):
    print('Hi')
    userNum = int(input())
```

1) Input 5 - 1

Check Show answer

2) Input 2 - 1 - 0

Check Show answer

3) Input 1 - 3 - 4

Check Show answer

Feedback?

Basic while loop example

The following Celsius to Fahrenheit example shows the common pattern of getting user input at the end of each loop iteration to determine whether to continue looping.

Figure 4.2.1: While loop example: Celsius to Fahrenheit.

```
# While loop example:
# Convert Celsius to Fahrenheit

# Main:
tempCelsiusStr = input('Enter Celsius: ')
tempCelsiusFloat = float(tempCelsiusStr)

while tempCelsiusFloat > 0.0:
    # Convert Celsius to Fahrenheit
    tempFahrenheitFloat = 9.0 / 5.0 * tempCelsiusFloat + 32.0

    print('%.2f degrees C is %.2f degrees F.', %
          % (tempCelsiusFloat, tempFahrenheitFloat))

    tempCelsiusStr = input('Enter Celsius: ')
    tempCelsiusFloat = float(tempCelsiusStr)

print('Thanks.')
```

```
Enter Celsius: 0
0.0 degrees C is 32.0 degrees F.
Enter Celsius: 100
100.0 degrees C is 212.0 degrees F.
Enter Celsius: 37
37.0 degrees C is 98.6 degrees F.
```