CMPUT 174

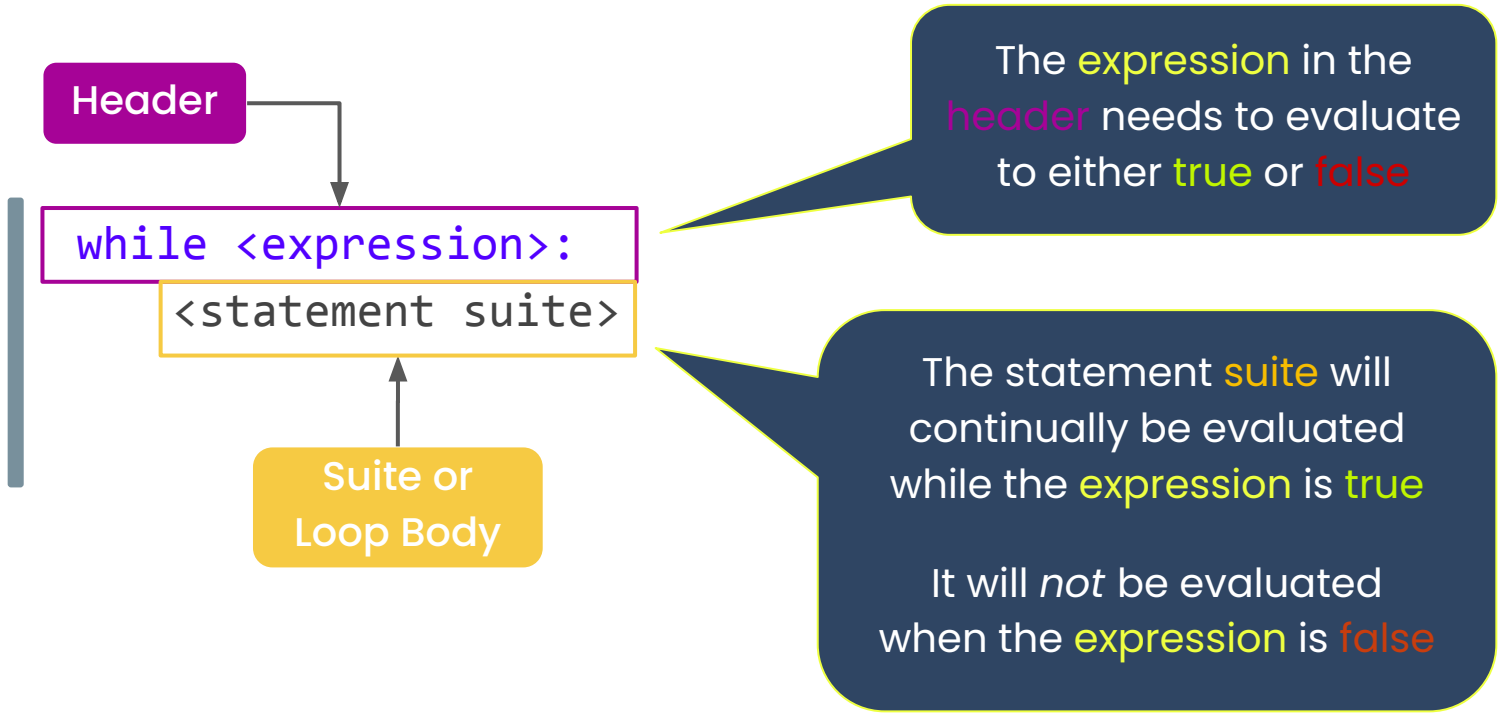
While Loops

Lecture Outline

- ❏ *while* Statements
- ❏ *for* Loops vs. *while* Loops
- ❏ Infinite Loops

What is a *while* Statement?

- `while` **statements** are another type of compound repetition statement that can be used to evaluate code repeatedly



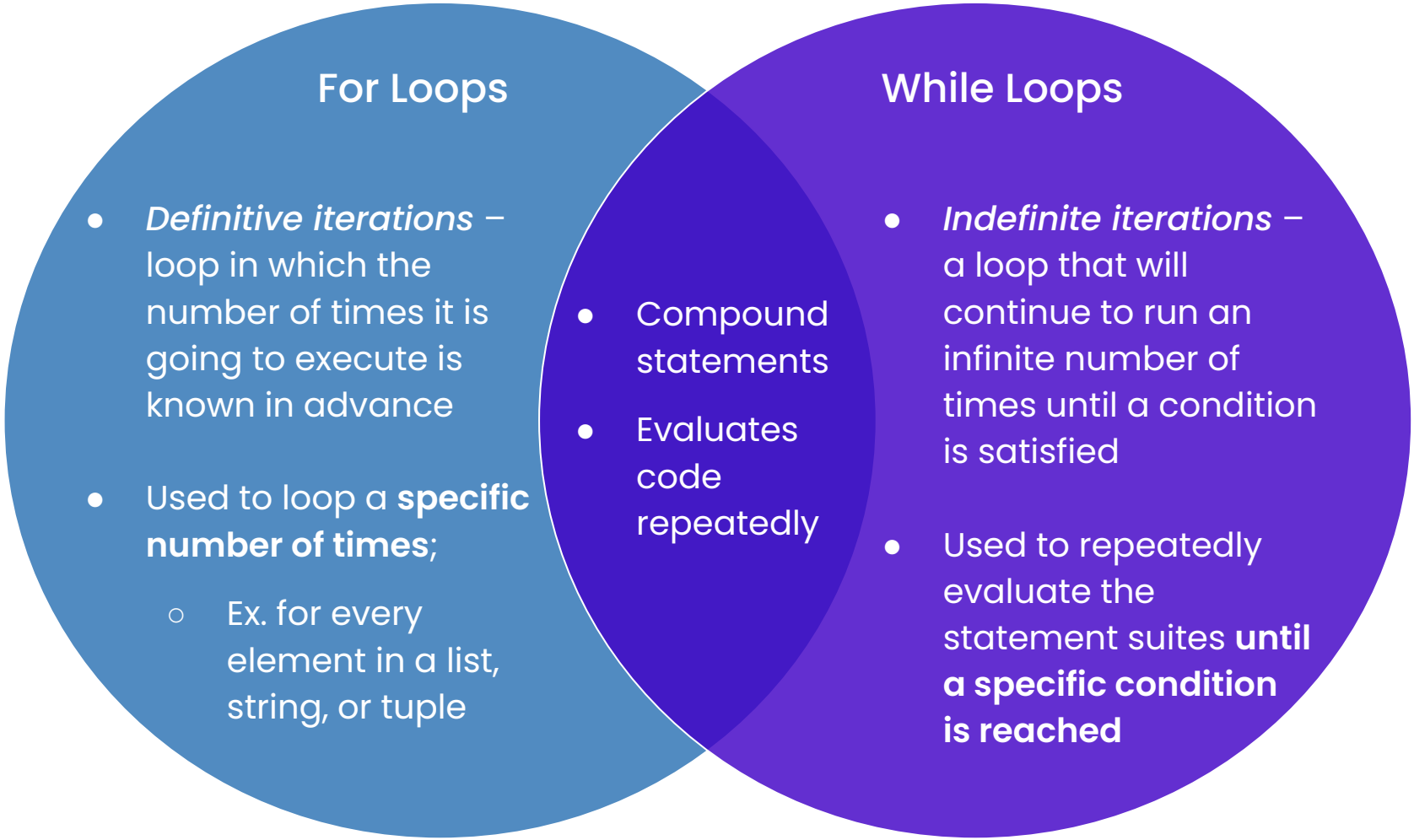
while Statements

- A code example of a `while` statement using the user's input

```
>>> word = ''
>>> while len(word) < 8:
...     word = input("Enter word: ")
...
    Enter word: hello
    Enter word: candy
    Enter word: pen
    Enter word: textbook
```

The entered word `textbook` is 8 characters – when the program loops back, the header will evaluate to `False`; terminating the `while` loop

for Statements vs. *while* Statements



for Statements vs. *while* Statements

- In some cases, we know *exactly* how many times a suite will be repeated. In such cases we use a `for` loop
- For example, if want to make a `3x3 Tic Tac Toe board` then we know that we have to make exactly `9 squares`
- We'll look at some examples of using a `for` loop

for Statements vs. *while* Statements

- In some situations we do not know exactly *how many times* a suite should be repeated
- For example, while playing a game of checkers, each player makes a move. The moves are made until one player wins. We don't know how many moves each player will make.
- We'll look at some examples of indefinite repetition

Infinite Loops

- When using `while` statements, be careful of *infinite loops*
- Infinite loops happen when the expression in the header of the `while` statement never evaluates to False

★ Consequently the suite of the `while` statement will continuously be evaluated without any way to stop!

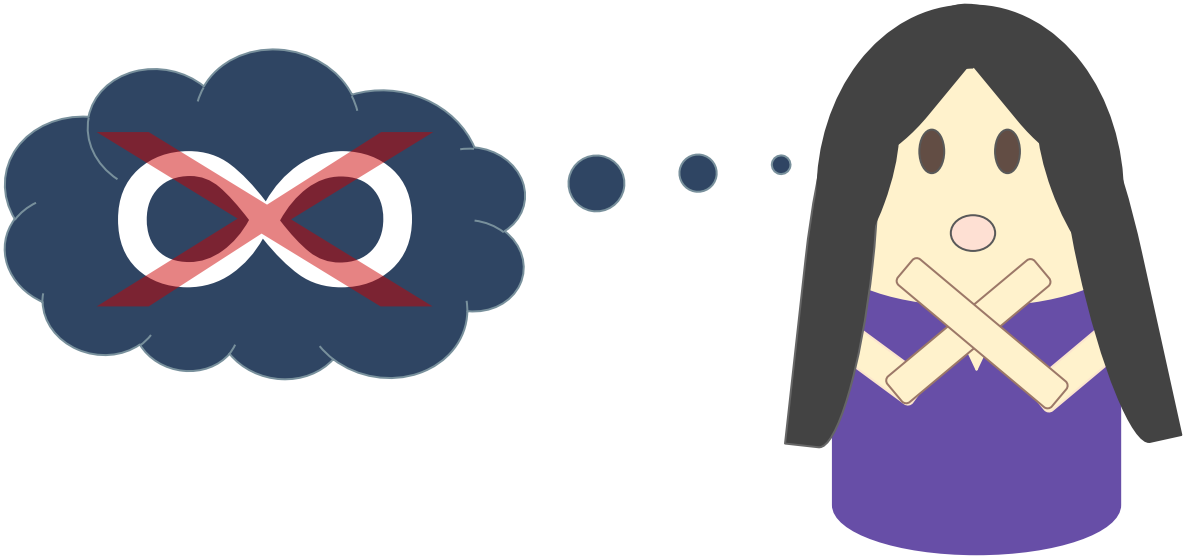
Infinite Loops

- Example of an **infinite loop**!

```
>>> clone = True
>>> while clone == True:
...     print("Make it double!")
...
    Make it double!
    Make it double!
    Make it double!
    Make it double!
        etc...
```

Infinite Loops

- The main idea to prevent an infinite loop is to ensure there is some way to make a change within the suite of the `while` statement
- The expression in the header of the `while` statement must evaluate to False at some point in time



Infinite Loops

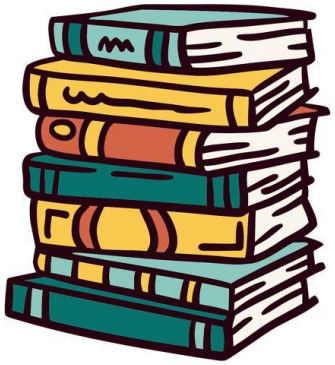
- Changing the code so that it's no longer an infinite loop!

```
>>> clone = True
>>> while clone == True:
...     print("Make it double!")
...

    Make it double!
    Make it double!
    Make it double!
    Make it double!
         etc...
```

```
>>> clone = True
>>> times = 5
>>> while clone == True:
...     print("Make it double!")
...     times = times - 1
...     if times <= 0:
...         clone = False
...

    Make it double!
    Make it double!
    Make it double!
    Make it double!
    Make it double!
```

Reminder

- *Online Activities*:
  - Assigned Readings:
    - While Statements



  - Week 4 Videos (2):
    - While loop
    - Definite and indefinite repetition

  - Complete Quiz 1

Sookie's Bistro

Image Source: https://giphy.com/gifs/gilmore-girls-melissa-mccarthy-sookie-st-james-l1J9zTcxkTOpjlwgU

Practice Problem 1!

Trout Cakes or Seafood Medley-while loop

'''Sookie wants to make trout cakes for her Bistro.

The recipe calls for **5 trouts**. In order to catch fresh trout, she goes fishing in a nearby lake.

Sookie wants to keep the trouts that she catches and release any other fish back into the lake. However, she must abide by the local fishery regulations.

Practice Problem 1!

The fishery regulation in her town has set a daily catch **limit of 7** which means that Sookie **cannot** have in her possession **more than 7 fish in one day**.

Since mortality rate of fish that are caught and released is high, there is also a daily **catch and release limit of 3** which means that Sookie can catch and immediately release **not more than 3 fish in one day**.

Practice Problem 1!

The catch and release limit prevents Sookie from **releasing all fish that are not trouts**.

Sookie wants to stop fishing once she has **enough fish for the trout cakes**.

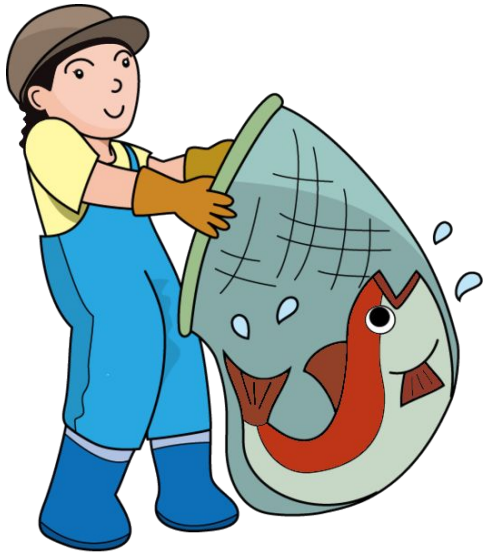
If she is unable to get the required number of trouts and has reached the daily catch limit, she will make a seafood medley from her catch instead.

Practice Problem 1!

Create a program that helps Sookie keep track of how many trouts she has caught *without* exceeding any limits.

The program prints *'Trout cakes'* if she has enough trouts otherwise prints *'Seafood medley'*.

```
...
```



Practice Problem 2!

while loop

```
'''In order to promote her bistro, Sookie would like
to run a Jelly Bean Guessing Game for her customers.

She informs the customer that the number of jelly
beans could be anywhere in the range of 2000 to 5000.
```

Practice Problem 2!

Each customer gets ***3 attempts*** to guess the number of jelly beans in the jar.

If the customer gets it right in their ***first attempt***,they receive a **50% off coupon** that they can redeem at their next order.

If the ***first attempt*** fails, the customer is given the **sum of all digits of the number of jelly beans** as a hint.

Practice Problem 2!

If the customer is able to guess correctly in the ***second attempt*** they get a **25% off coupon** that they can redeem at their next order.

If the ***second attempt*** fails, the customer is given the **first and last digit of the number of jelly beans** as a second and final hint.

Practice Problem 2!

If the customer is able to guess correctly in the ***third attempt*** they get a **10% off coupon** that they can redeem at their next order.

Create a program that asks for the number of jelly beans and displays how much discount the customer can get in their next order.

'''

Image Source: http://clipart-library.com/