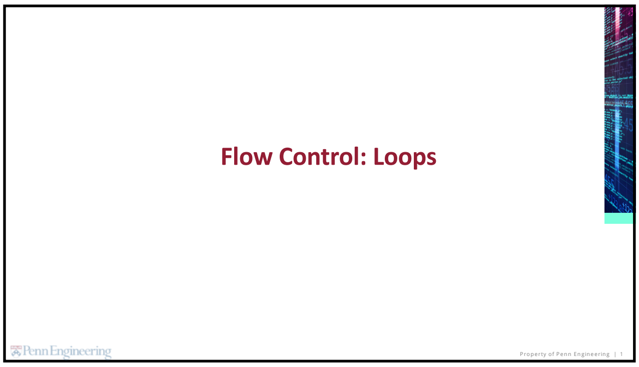
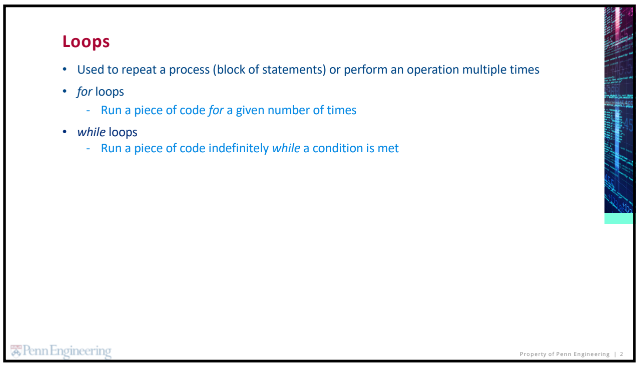


Flow Control: Loops

Property of Penn Engineering | 1

1

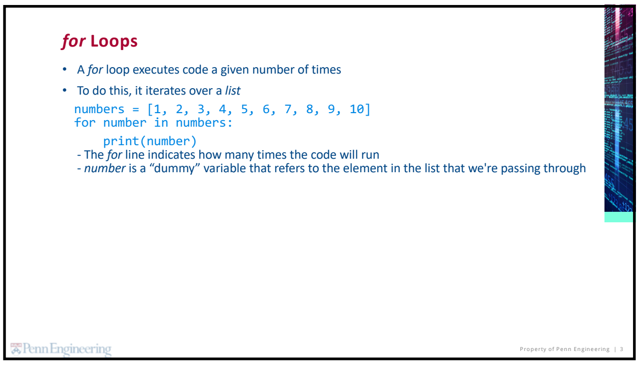


Loops

- Used to repeat a process (block of statements) or perform an operation multiple times
- *for* loops
  - Run a piece of code *for* a given number of times
- *while* loops
  - Run a piece of code indefinitely *while* a condition is met

Property of Penn Engineering | 2

2



for Loops

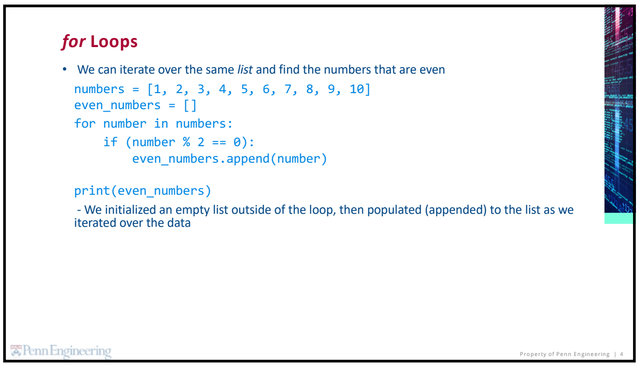
- A *for* loop executes code a given number of times
- To do this, it iterates over a *list*

```
numbers = [1, 2, 3, 4, 5, 6, 7, 8, 9, 10]
for number in numbers:
    print(number)
```

- The *for* line indicates how many times the code will run
- *number* is a "dummy" variable that refers to the element in the list that we're passing through

Property of Penn Engineering | 3

3



for Loops

- We can iterate over the same *list* and find the numbers that are even

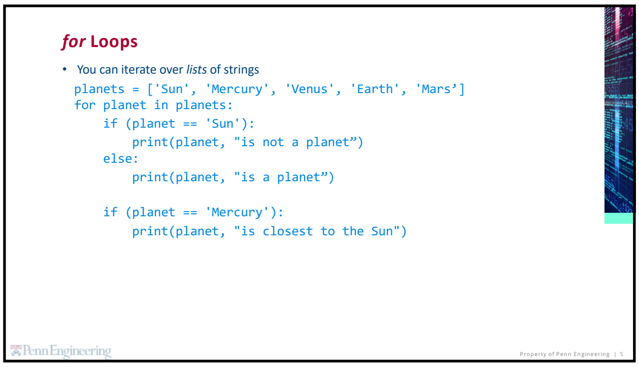
```
numbers = [1, 2, 3, 4, 5, 6, 7, 8, 9, 10]
even_numbers = []
for number in numbers:
    if (number % 2 == 0):
        even_numbers.append(number)

print(even_numbers)
```

- We initialized an empty list outside of the loop, then populated (appended) to the list as we iterated over the data

Penn Engineering

Property of Penn Engineering | 4

4



for Loops

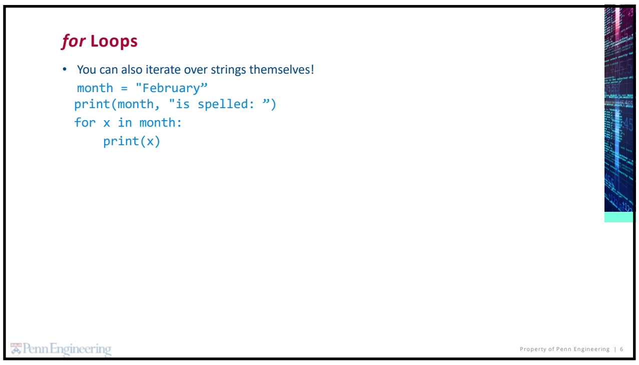
- You can iterate over *lists* of strings

```
planets = ['Sun', 'Mercury', 'Venus', 'Earth', 'Mars’]
for planet in planets:
    if (planet == 'Sun'):
        print(planet, "is not a planet”)
    else:
        print(planet, "is a planet”)

    if (planet == 'Mercury'):
        print(planet, "is closest to the Sun")
```

Penn Engineering

Property of Penn Engineering | 5

5



for Loops

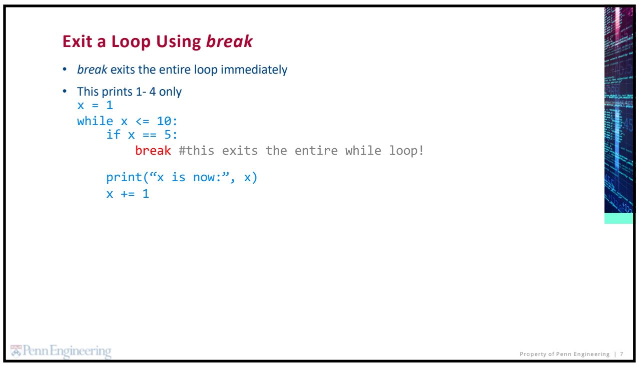
- You can also iterate over strings themselves!

```
 month = "February”
print(month, "is spelled: ”)
for x in month:
    print(x)
```

Penn Engineering

Property of Penn Engineering | 6

6



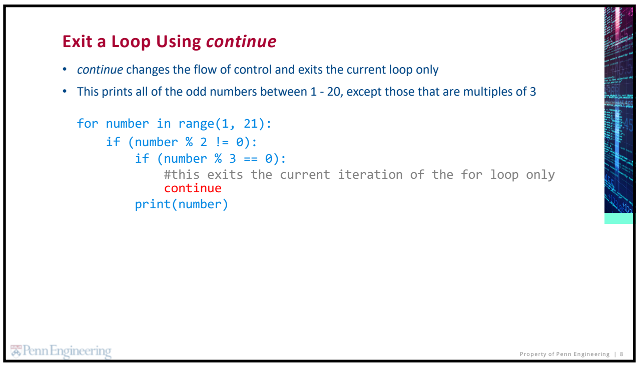
Exit a Loop Using *break*

- *break* exits the entire loop immediately
- This prints 1- 4 only

```
x = 1
while x <= 10:
    if x == 5:
        break #this exits the entire while loop!

    print(“x is now:”, x)
    x += 1
```

Property of Penn Engineering | 7

7



Exit a Loop Using *continue*

- *continue* changes the flow of control and exits the current loop only
- This prints all of the odd numbers between 1 - 20, except those that are multiples of 3

```
for number in range(1, 21):
    if (number % 2 != 0):
        if (number % 3 == 0):
            #this exits the current iteration of the for loop only
            continue
        print(number)
```

Property of Penn Engineering | 8

8