Chapter: Lists

What You Will Learn

- Lists
- Searching in Lists
- Exception Handling
- Slices
- Ranges
- For Loop
- While Loop

Lists

Lists

- A list is a data type that holds an ordered collection of items.
- The items can be of various data types.
- You can even have lists of lists!

Creating Lists

```
list_name = [item_1, item_2, item_N]
list_name = []


list_name[index]
```

```
animals= ['man', 'bear', 'pig']
print(animals[0])
print(animals[1])
print(animals[2])
```

```
man
bear
pig
```

```
animals= ['man', 'bear', 'pig']
print(animals[0])
animals[0] = 'cat'
print(animals[0])
```

```
man
cat
```

```
animals= ['man', 'bear', 'pig']
print(animals[-1])
print(animals[-2])
print(animals[-3])
```

```
pig
bear
man
```

```
animals= ['man', 'bear', 'pig']
animals.append('cow')
print(animals[-1])
```

cow

```
animals = ['man', 'bear', 'pig']
animals.extend(['cow', 'duck'])
print(animals)

more animals = ['horse', 'dog']
animals.extend(more animals)
print(animals)
```

```
['man', 'bear', 'pig', 'cow', 'duck']
['man', 'bear', 'pig', 'cow', 'duck', 'horse', 'dog']
```

```
animals = ['man', 'bear ', 'pig']
animals.insert(0, 'horse')
print(animals)

animals.insert(2, 'duck')
print(animals)
```

```
['horse', 'man', 'bear ', 'pig']
['horse', 'man', 'duck', 'bear ', 'pig']
```

Slices

```
list[index1:index2]
list [:index2]

list [index1:]
```

```
animals    ['man', 'bear', 'pig', 'cow', 'duck', 'horse']

some animals = animals[1:4]
print('Some animals:    {}'.format(some animals))

first two = animals[0:2]
print('First two animals: {}'.format(first two))

first two again = animals[:2]
print('First two animals: {}'.format(first two again))
```

```
Some animals:  ['bear', 'pig', 'cow']
First two animals: ['man', 'bear']

First two animals: ['man', 'bear']
```

```
animals = ['man', 'bear', 'pig', 'cow', 'duck','horse']

last two = animals[4:6]
print('Last two animals:
{}'.format(last two))

last two again = animals[-2:]
print('Last two animals:
{}'.format(last two again))
```

```
Last two animals:  ['duck', 'horse']
Last two animals:  ['duck', 'horse']
```

String Slices

```
part_of_a_horse = 'horse'[1:3]
print(part_of_a_horse)
```

or

Finding an item in a list.

```
animals= ['man', 'bear', 'pig']
bear_index = animals.index('bear')
print(bear_index)
```

1

Exceptions

```
animals = ['man', 'bear', 'pig']
cat index = animals.index('cat')
print(cat index)
```

```
Traceback (most recent call last):
  File ''exception example.py'',line 2, in <module>
    cat index = animals.index('cat')
ValueError: 'cat' is not in list
```

Exception Handling

Exception Handling

```
animals= ['man', 'bear', 'pig']
try:
    cat index= animals.index('cat')
except:
    cat index   'No cats found.'
print(cat index)
```

```
No cats found.
```

Loops

Looping through a list

```
for item_variable in list_name:
    # Code block
```

```
item_variable = list[O]
item_variable = list[l]
item_variable= list[N]
```

```
animals= ['man', 'bear', 'pig']
for animal in animals:
    print(animal.upper())
```

```
MAN
BEAR
PIG
```

While Loop

```
while condition:
        # Code block
```

```
animals   ['man', 'bear', 'pig', 'cow', 'duck', 'horse']


index   0

while index < len(animals):
    print(animals[index])
    index += 1
```

```
man
bear
pig
cow
duck
horse
```

Sorting and Ranges

```
animals = ['man', 'bear', 'pig']
sorted animals = sorted(animals)
print('Animals list:                {}'.format(animals))
print('Sorted animals list:         {}'.format(sorted animals))
animals.sort()
print('Animals after sort method: {}'.format(animals))
```

```
Animals list:                ['man', 'bear', 'pig']
Sorted animals list:         ['bear', 'man', 'pig']
Animals after sort method: ['bear', 'man', 'pig']
```

```
animals= ['man', 'bear', 'pig']
more animals= ['cow', 'duck', 'horse']
all animals= animals+ more animals
print(all animals)
```

```
['man', 'bear', 'pig', 'cow', 'duck', 'horse']
```

```
animals= ['man', 'bear', 'pig']
print(len(animals))
animals.append('cow')
print(len(animals))
```

```
3
4
```

Ranges

```
for number in range(3):
    print(number)
```

0

1

2

```
for number in range(1, 3):
    print(number)
```

1

2

```
for number in range(1, 10, 2):
    print(number)
```

1

3

5

7

9

```
animals =['man',  'bear', 'pig', 'cow',
'duck', 'horse', 'dog']

for number in range(0, len(animals), 2):
    print(animals[number])
```

```
man
pig
duck
dog
```

Section Summary

Summary

- **Lists are created using comma separated values between square brackets. The format is:**

```
list name = [item 1, item 2, item N]
```

Summary

- Items in a list can be accessed by index. List indices are zero based. The format is:
  `list_name[index]`
- Access items from the end of the list by using negative indices. The last item in a list is:
  `list_name[-1]`

Summary

- **Add items to a list by using the** `append()` **or** `extend()` **list methods.**
- **Access a portion of a list using a slice. The format is:** `list_name(start, stop)`
- **The list** `index()` **method accepts a value as a parameter and returns the index of the first value in the list or an exception if the**

Summary

- Loop through a list using a for loop. The format is `for item_variable in list_name:` followed by a code block.
- The code block in a while loop executes as long as the condition evaluates to true. The format is `while condition:` followed by

Summary

- **To sort a list, use the** `sort()` **list method or the built-in** `sorted()` **function.**
- **The built-in** `range()` **function generates a list of numbers. The format is:** `range(start, stop, step)`
- **Unhandled exceptions cause Python programs to terminate. Handle exceptions using** `try/except` **blocks.**