COMP 141

Lists II

Rhodes College

Announcements

Program 7 has been assigned - due Sunday, April 15th

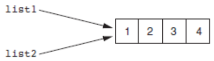
Copying Lists

- **To make a copy of a list you must copy each element of the list**
  - Two methods to do this:
    - Creating a new empty list and using a `for` loop to add a copy of each element from the original list to the new list
    - Creating a new empty list and concatenating the old list to the new empty list

Copying Lists (cont'd.)

```
list1 = [1,2,3,4]
list2 = list1
```

Figure 8-4 `list1` and `list2` reference the same list



```
list1 = [1,2,3,4]
list2 = list1
print("List 1:", list1)
print("List 2:", list2)
list1[0] = 99
print("List 1:", list1)
print("List 2:", list2)
```

Output

```
List 1: [1, 2, 3, 4]
List 2: [1, 2, 3, 4]
List 1: [99, 2, 3, 4]
List 2: [99, 2, 3, 4]
```

Code to Copy List

```
list1 = [1,2,3,4]
list2 = []
for item in list1:
    list2.append(item)
print("List 1:", list1)
print("List 2:", list2)
list1[0] = 99
print("List 1:", list1)
print("List 2:", list2)
```

Output

```
List 1: [1, 2, 3, 4]
List 2: [1, 2, 3, 4]
List 1: [99, 2, 3, 4]
List 2: [1, 2, 3, 4]
```

Saving Lists to a File

- **To save the contents of a list to a file:**
  - Use a `for` loop to write each element and ‘`\n`‘
  - DON’T just typecast list to a string and write the string.

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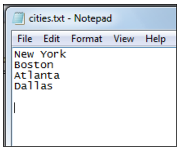
Writing a List to a File

```
# This program saves a list of strings to a file.

def main():
    # Create a list of strings.
    cities = ['New York', 'Boston', 'Atlanta', 'Dallas']

    # Open a file for writing.
    outfile = open('cities.txt', 'w')

    # Write the list to the file.
    for item in cities:
        outfile.write(item + '\n')

    # Close the file.
    outfile.close()

# Call the main function.
main()
```



```
New York
Boston
Atlanta
Dallas
```

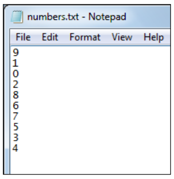
Comparing Lists

```
>>> list1 = ['green', 'red', 'blue']
>>> list2 = ['red', 'blue', 'green']
>>> list1 == list2
False
>>> list1 != list2
True
>>> list1 < list2
True
>>> list1 <= list2
True
>>> list1 > list2
False
>>> list1 >= list2
False
```

- To compare two lists, they must contain the same type of elements.
- The comparison uses alphabetical ordering.
  - Compares first element of each list and if they differ, this determines the outcome of the comparison.

Comparing Consecutive Items in File

```
def main():
    infile = open("numbers.txt", 'r')
    prev = -1
    deltas = []
    for line in infile:
        current = int(line)
        if(prev != -1):
            diff = current - prev
            deltas.append(diff)
        prev = current
    print(deltas)
```



```
9
1
0
2
8
6
7
5
3
4
```

Output

```
[-8, -1, 2, 6, -2, 1, -2, -2, 1]
```

Comparing Consecutive Items in List

```
def main2():
    numbers = [9, 1, 0, 2, 8, 6, 7, 5, 3, 4]
    deltas = []

    for i in range(1, len(numbers)):
        diff = numbers[i] - numbers[i-1]
        deltas.append(diff)

    print(deltas)
```

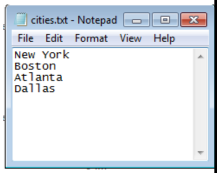
Output

```
[-8, -1, 2, 6, -2, 1, -2, -2, 1]
```

Reading Files into Lists

- Don’t read a file into a list more than once per program.
  - This is the true power of lists – you only need to create them once and then you can use them over and over.

```
# This program reads a file's contents into a list.

def main():
    # Open a file for reading.
    infile = open('cities.txt', 'r')

    cities = []

    # Read the contents of the file into a list.
    for line in infile:
        line = line.rstrip()
        cities.append(line)

    # Close the file.
    infile.close()

    # Print the contents of the list.
    print(cities)

# Call the main function.
main()
```



```
New York
Boston
Atlanta
Dallas
```

Output

```
['New York', 'Boston', 'Atlanta', 'Dallas']
```

Parallel Lists

Parallel lists are two or more lists of the same length, where there is a relationship between list1[p] and list2[p] (for any index/position p.)

	0	1	2
list1 =	“hello”	“my”	“friend”
list2 =	“ahoy”	“me”	“matey”

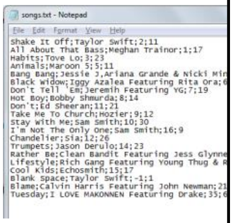
Using Parallel Lists

```
students = []
grades = []
keep_going = 'Y'

while(keep_going == 'Y'):
     student = input("Enter student's name: ")
     grade = input("Enter the student's grade: ")
     students.append(student)
     grades.append(grade)
     keep_going = input("Would you like to enter another student/grade? (Y or N) "

print(students)
print(grades)
```

```
Enter student's name: Mary
Enter the student's grade: 99
Would you like to enter another student/grade? (Y or N)Y
Enter student's name: Dave
Enter the student's grade: 78
Would you like to enter another student/grade? (Y or N)Y
Enter student's name: Kate
Enter the student's grade: 86
Would you like to enter another student/grade? (Y or N)Y
Enter student's name: Todd
Enter the student's grade: 92
Would you like to enter another student/grade? (Y or N)N
['Mary', 'Dave', 'Kate', 'Todd']
['99', '78', '86', '92']
```

Using Parallel Lists with Files

```
def main():
      infile = open("songs.txt", 'r')

      titles = []
      artists = []
      prev = []
      num_weeks = []

      for line in infile:
            line = line.rstrip()
            title, artist, prev_pos, weeks = line.split(';')
            titles.append(title)
            artists.append(artist)
            prev.append(int(prev_pos))
            num_weeks.append(int(weeks))


      longest = max(num_weeks)
      indLongest = num_weeks.index(longest)

      print("Artist: ", artists[indLongest], "\nTitle: ", titles[indLongest])

      print(artists)
      prev = artists[0]
      for i in range(1, len(artists)):
            current = artists[i]
            if prev == current:
                  print(current)
            prev = current
main()
```



```
Shake It Off;Taylor Swift;2;11
All About That Bass;Meghan Trainor;1;17
Habits;Tove Lo;3;23
Animals;Maroon 5;5;11
Bang Bang;Jessie J,Ariana Grande & Nicki Min
Black Widow;Iggy Azalea Featuring Rita Ora;6
Don't Tell 'Em;Jeremih Featuring YG;7;19
Hot Boy;Bobby Shmurda;8;14
Don't;Ed Sheeran;11;21
Take Me To Church;Hozier;9;12
Stay With Me;Sam Smith;10;30
I'm Not The Only One;Sam Smith;16;9
Chandelier;Sia;12;26
Trumpets;Jason Derulo;14;23
Rather Be;Clean Bandit Featuring Jess Glynne
Lifestyle;Rich Gang Featuring Young Thug & R
Cool Kids;Echosmith;15;17
Blank Space;Taylor Swift;-1;1
Blame;Calvin Harris Featuring John Newman;21
Tuesday;I LOVE MAKONNEN Featuring Drake;35;6
```

Talk Like a Pirate Lab