15-112 Fundamentals of Programming

Lecture 7

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Announcements

❑ Assignment 2 is due on Tuesday – do not use the "str" function.

❑ On-campus class on Thursday

❑ How can you reach me.

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Repetition

❑Get a sequence of numbers from me and find their average

Using While loops

❑Read grades from the user, until the user enters -1. Print the average of all grades.

While loop

While (some condition is true) :

first statement

second statement

….

Outside of Loop

Inside the loop
(Loop Body)

For Loop

❏Normally used when you want to execute some code a fixed or known number of times

❏Example: Print a name 10 times

name = input("Enter your name")

for x in range(10):

print (name)

Range Function

❑What does range function do?

- range(a,b)
  - Generate a list of numbers from a to b – not including b (It is actually a sequence)
- range(a,b,i)
  - Generate a list of numbers a to b in increments of i
    - range(3,11,2) = [3,5,7,9]
    - range(4,12,5) = [4,9]
    - range(12,4,-2) = [12,10,8,6]

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for Loop

for i in range(4,10)

=

for each value of i in [4,5,6,7,8,9]
During the loop:

First iteration	→	i = 4
Second iteration	→	i = 5
Third iteration	→	i = 6
Fourth iteration	→	i = 7
Fifth iteration	→	i = 8
Sixth iteration	→	i = 9

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Example

```
for x in range(10):
        print (name)
```

Example

❑Print the sum of all numbers from 1 – 10
```
        sum = 0
        for i in range(1,11):
            sum = sum + i
        print sum
```

Problem solving using loops

❑ **isPrime(n)**
❑ hasConsecutiveDigits(n)
❑ PrintnthPrime(n)

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Nested Loops

```
for i in range(0,2):
        for j in range(0,3):
                print (i," ",j)
```

What would be the output?

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Nested Loops

```
for i in range(0,5):
        for j in range(i,5):
                print (i," ",j)
```

What would be the output?

Nested Loops

```
for i in range(0,5):
        for j in range(0,i):
                print (i," ",j)
```

What would be the output?

Conditionals in loops

for i in range(0,20):

if i % 2 == 1:

print (i)

What would be the output?

Lists – Lets start with the "why"

❑Given a sequence of numbers, how do you find the minimum value?

❑How do you find: max, sum, average?

❑How do you find: How many numbers are above average?

Lists as sequence of values

❑Variables can hold one value at a time

❑Lists can hold a number of different values

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Create a list

❑A simple list

myList = [1, 4, 5, 8, 12]

❑An initialized list

*myList = [0] * 5*

myList →[0,0,0,0,0]

❑Adding element to a list

*a = [0] * 5*

b= 12

a = a + [b]

a →[0,0,0,0,0,12]

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Creating Lists

❑Combining two lists

myList = [1, 4, 5, 8, 12]

yourList = [3,7,4,9]

ourList = myList + yourList

→ ourList would be [1, 4, 5, 8, 12, 3, 7, 4, 9]

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Accessing Elements

a = [2, 3, 5, 7, 11, 13]

print a[0]   ➡   2

print a[2]   ➡   5

print a[-1]   ➡   13

print a[-3]   ➡   7

print a[0:2]   ➡   [2,3]

print a[1:4]   ➡   [3, 5, 7]

print a[1:6:2]   ➡   [3, 7, 13]

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Modifying Elements

a = [2, 3, 5, 7, 11, 13]

print a   ➡   [2, 3, 5, 7, 11, 13]
a[2] = 0
print a   ➡   [2, 3, 0, 7, 11, 13]