

Loops

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Computers are really good at doing [repetitive](#) tasks. Everything we have asked of Python so far have been things that you can do easily without a computer. The power of computers is their ability to do boring things over and over and over again without whining! Now, we'll learn how to make them do repetitive tasks by using loops.

We'll discuss loops together in class, so I'm only going to provide examples here and some programming assignments. Save each example in this section as a .py file, then run them.

Assignment: There are both programming assignments and questions in this document. Create a .py file for each programming assignment, save all assignments in one folder, and email the folder to Mr. Herzog. **Be sure to comment your code!**. Put your answers to all questions in a document and turn that in as well.

1 Example: Printing elements in a list

This example should print each element from a list on a new line. Try it!

```
MyList = ["Welcome", "to", "loops", "in", "Python!"]
for MyString in MyList:
    print MyString
```

2 Example: Printing elements in a list, take 2

This example should print each element from a list on a new line. This should do exactly the same thing as the previous example, but here we don't define the list before the `for` statement. Try it!

```
for MyString in ["Welcome", "to", "loops", "in", "Python!"]:
    print MyString
```

3 Question 1

The below is identical to the code in Example: Printing elements in a list, take 2 above except it has one more print statement. How is the behavior of this code different from in the previous example? Why?

```
for MyString in ["Welcome", "to", "loops", "in", "Python!"]:  
    print MyString  
print MyString
```

4 Example: Printing “Hello, World!”

This example should print “Hello, World!” five times. Remember that `range(5)` creates the list `[0, 1, 2, 3, 4]`. Try it!

```
for i in range(5):  
    print "Hello, World!"
```

5 Example: Printing Numbers

This example should print the integers 1 through 5. Try it!

```
for i in range(5):  
    print i
```

6 Programming Assignment 1

Write a short program (two lines of code) that prints the integers 10 through 16.

7 Programming Assignment 2

Write a short program (two lines of code) that prints the even integers 10 through 16.

8 Programming Assignment 3

Write a short program (two lines of code) that prints the integers -35 through -39.

9 Programming Assignment 4

Write a short program (two lines of code) that prints the multiples of 5 that are less than 100.

10 Example: Summing Numbers

This example sums the numbers 1 through 100. Try it!

```
sum = 0;
for i in range(1, 101):
    sum = sum + i
print sum
```

11 Programming Assignment 5

Write a program that asks the user for two inputs, n and m , then computes the sum of the integers n through m , and prints out the result. Here is an examples of how this program should look when it is run:

```
This program sums the integers n through m.
n: 5
m: 8
The sum of 5 through 8 is 26
```

Your program should behave similarly, but feel free to write your own messages to the user.

12 Programming Assignment 6

Write a program that asks the user for two inputs, n and m , the computes the [product](#) of the integers n through m , and prints out the result. Here is an examples of how this program should look when it is run:

```
This program multiplies the integers n through m.
n: 5
m: 8
The product of 5 though 8 is 1680
```

13 Question 2:

There is exactly one difference between the code below and the code in “Example: Summing Numbers” given earlier. What is it, and what effect does it have on the behavior of the program?

```
sum = 0;
for i in range(1, 101):
    sum = sum + i
    print sum
```

14 Example: Printing Strings

This example prints a string one character at a time. Try it!

```
MyString = "Computer"
for i in range(len(MyString)):
    print MyString[i]
```

15 Programming Assignment 7

Write a program that asks the user for a word then prints that word out one letter at a time. Here is an example:

```
What is your favorite word? onomatopoeia
o
n
o
m
a
t
o
p
o
e
i
a
```

16 Programming Assignment 8

Write a program that asks the user for a word then prints **every other** letter in that word. Here is an example:

```
What is your favorite word? onomatopoeia
```

```
o  
o  
a  
o  
o  
i
```

17 Programming Assignment 9

Write a program that asks the user for a word then prints the word out one letter at a time [backwards](#). Here is an example:

```
What is your favorite word? onomatopoeia
```

```
a  
i  
e  
o  
p  
o  
t  
a  
m  
o  
n  
o
```