

Genome 373 23 April 2009 python practice session

We are currently in week 4 of the course, and have covered a substantial number of programming concepts in python. Various data types, including strings, numbers, lists, and dictionaries; input/output methods such as reading arguments from the command line, printing output to the screen, formatting numbers, reading from files and writing to files; and control concepts such as if statements, while loops, for loops and the use of the 'in' and the 'range' operators have all been introduced and described. Today is a good opportunity to review all of these concepts. Several programming examples and solution have been shown in lecture and with the homework. Be sure to work through all of these examples. The objective is to understand how and why the example programs work and to apply the illustrated concepts in your own programs to solve different tasks.

Here are two additional problems to get started:

Write a program `find-factors.py` that reads a non-negative integer from the command line and prints out all of factors of the integer. If the input has no factors, report that it is prime.

```
python find-factors.py 42
21 is a factor of 42
14 is a factor of 42
7 is a factor of 42
6 is a factor of 42
3 is a factor of 42
2 is a factor of 42
```

```
python find-factors.py 317
317 is prime
```

Write a program `factorial-loop.py` that reads a non-negative integer  $n$  from the command line and prints out the value of  $n!$  ( $n$  factorial). If the input is negative, print out a message indicating that the value is undefined. Solve this problem using a for loop.

```
python factorial-loop.py 10
10! is 3628800
```

```
python factorial-loop.py -3
-3! is not defined
```

find-factors.py

```
import sys
number=int(sys.argv[1])
i=number/2
totFactors=0
while i > 1:
    if number % i == 0:
        print i,'is a factor of',number
        totFactors+=1
    i-=1
if totFactors == 0:
    print number,'is prime'
```

factorial-loop.py

```
import sys
n=int(sys.argv[1])

factorial=1
#check to see if input is negative
if n < 0 :
    print "%i! is not defined" % n
else:
    for i in range(1,n+1):
        factorial=factorial*i
    print "%i! is %i" % (n,factorial)
```