The While Loop

A while loop can be used like a for loop, such as the following:

Example #1

```
# loop1.py
x = 1
while x < 20:
      x = x+1
      print (x)
```

The indent creates a block the same way that the if statement does. Everything that is indented happens as long as the condition is true. The condition is checked at the start of each loop iteration and only there. You will notice that x = x + 1 caused x to become 20, which makes the condition false but the print x is still executed.

However, the real strength of the while loop is that it can be used to "loop until something happens", as in the following code:

Example #2

```
# loop2.py
name = ""
while name != "end":
      name = input("Enter name: <end to exit>")
      print ("Hello", name)
```

As you can see we can use any condition to continue our loop, but in this case, because we only exit at the beginning of the loop we have that awkward moment where we say hello to "end".

Example #3

```
# loop3.py
while True:
      name = input("Enter name: <end to exit>")
      if name == "end":
            break
      #end if
      print ("Hello", name)
#end while
```

while True: will loop forever, because True is always True. It's like saying while 1==1. This can be useful if we want to exit the loop at some other location. The break command exits the loop. If we were inside more than one loop, break would only exit the inner loop.

Example #4

```
# loop4.py
# enter marks (out of 100) until -1 is entered and display the number of
# marks and the average of all the marks.
count = 0
total = 0

while True:
    mark = int(input("Enter a mark (0-100) <-1 to exit> "))
    if mark == -1:
        break
    count += 1
    total += mark

print ("There were", count, "marks")
print ("The average is", total / count)   # float(total) / count)
```

While Loop Questions:

Write each of the following using a while loop:

1) Write a program that counts from 100 to 0.

2) Write a program that asks the user to input their favorite colours until they type done.

3) Write a program that asks the user to input the ages of everyone in their family. The user should type -1 when done. Display the average age.

4) (University Only) Write a program that asks the user for a number.

Your program displays how many times that number is divisible by 2.

For example:
Please enter your number. 24

24 is divisible 3 times.

Hint: Remember the modulus operator (%).

Challenge:

Given a positive integer from the user, display all the factors of that integer.
e.g 72 is 72, 36, 24, 18, 12, 9, 8, 6, 4, 3, 2, 1