**Nested Loops**

A nested loop is a loop inside another loop. A clock is a good example of something that works like a nested loop. The second hand, minute hand, and hour hand all spin around the face of the clock. The hour hand, however, only makes 1 revolution for every 12 of the minute hand’s revolution. And it takes 60 revolutions of the second hand for the minute hand to make 1 revolution. This means that for every complete revolution of the hour hand, the second hand has revolved 720 times. Here is a loop that partially simulates a digital clock. It display the seconds from 0 to 59.

for seconds in range(60):  
 print(seconds)

We can add a minutes variable and nest the loop above inside another loop that cycles through 60 minutes:

for minutes in range(60):  
 for seconds in range(60):  
 print(minutes, ‘:’, seconds)

To make the simulated clock complete, another variable and loop can be added to count the hours:

for hours in range(24):

for minutes in range(60):

for seconds in range(60):

print(hours, ':', minutes, ':', seconds)

The clock output would be:

0:0:0  
 0:0:1  
 0:0:2

(The program will count through each second of 24 hours)

23:59:59

The innermost loop will iterate 60 times for each iteration of the middle loop. The middle loop will iterate 60 time for each iteration of the outermost loop. When the outermost loop has iterated 24 times, the middle loop will have iterated 1,440 times and the innermost loop will have iterated 86,400 times!

Below is the flow chart to the complete clock simulation program above.

