Demo A: While loops

1. Run this demo. Step through one step at a time. What is the final value of x? What is the final value of y?

x=2 y=16

2. If statements and while loops look similar. They both have a condition that can be true or false, and a block of code under the statement. In your own words, compare and contrast if statements and while loops. What is one similarity? What is one difference?

Both statements take a boolean expression to determine their output

While loops can be repeated while if statements cannot.

3. A for loop iterates over a list or a range of numbers. In your own words, compare and contrast for loops and while loops. What is one similarity? What is one difference?

Both loops can repeat themselves

While loops take a boolean while For loops take collections.

Demo B: A counter variable

4. Run this script. What is x at the end of the loop? What is count?

x=16 count=4

5. Change the loop condition to x < 100. Run the script again. What is x at the end? What is count?

x=128 count=7

Demo C: Approximate square root

6. Run this script. What is x at the end?

x=5

7. Change num to 49. Run the script again. What is the final value of x this time?

x=7

8. Change num to 100. Run the script again. What is the final value of x this time?

x=10

9. Now change num to 70. Run the script again. What is the final value of x?

x=9

10. When finding an approximate square root, does this script round up or down? Why?

The script rounds up when finding the approximate square root. This is due to how the script will only stop once x^2 is greater than num. If x were to round down then it would end up being less than the square root.

Demo D: Counting digits

11. Run this script. Notice num starts at 735. What are the different values of num over the steps of the loop? What is the final value of num?

Num starts at 735, then is reduced to 73, then is reduced to 7, and is reduced 1 more time to end up with a final value of 0.

12. What is count at the end of this loop?

count=3

13. How does this script get the right answer for the number of digits in num?

Each instance of the while loop removes one digit from the number by using integer division by ten. Each time it does this it will add 1 to the counter for the number of digits in the number. It will repeat this until the number is equal to zero which will tell the loop to stop because num will no longer be greater than 0.

14. Try changing num to a 4 or 5 digit number. What number did you pick? When you run the script, what were the different values of num? Did the script end up getting the right answer for the number of digits?

I picked the number 6743. Num started at 6743, then was reduced to 674, then was reduced to 67, then was reduced to 6, and was reduced 1 more time to end up with a final value of 0. The script did end up getting the correct number of digits.

Demo E: The break command

15. This script has the statement: while True. This would run forever, except for the break command, which automatically quits the loop even if the loop condition is still True. Run the script. What are the different values that ans gets? What is the value of ans at the end?

Ans values are, 6, 12, 18, 24, and end up at 30.

16. The two "input" numbers were x = 6 and y = 15. If ans is the "answer," what do you think is the purpose of this script? What is it trying to do with x and y? Change x and y to different numbers to see what ans becomes. Some good pairs are:

x = 8, y = 10

x = 9, y = 6

x = 12, y = 20.

See if you can find the pattern.

This script is attempting to find the Least Common Multiple of each pairing.

Demo F: Another break demo

17. Here is a script that has two while loops. Run the script. What is x at the end? What is y at the end?

x=256 y=256

18. Do the two while loops do the same thing, or different things? Explain.

The two scripts of code do the same thing, they just have multiple different ways of going about it. They run the same test to determine whether to stop the script after running the same function.

19. Change limit to another higher number like 1000. What are the final values of x and y now? Do the two loops still do the same thing?

x=65536 y=65536

The two loops still do the same thing as changing the limit will apply to both sets of loops.

20. Which way makes more sense to you? Which way seems like better "style?" This is subjective; there is no wrong answer.

The way that makes more sense to me is to use the while condition to determine whether to break a loop or not. Although depending on the scenario this could change as break has certain benefits such as its ability to go anywhere in a loop rather than only when the loop restarts.

21. When writing Python code, is it better to never use break, always use break, or use break sometimes, if it makes sense for that problem?

It would be best to use break sometimes when it is appropriate for the problem. Each of the formats have their benefits for different scenarios. Break is also not only appropriate in while loops, it can also be used in for loops which is very useful if their needs to be some way to

22. Do you have any questions about while loops that you want to go over tomorrow?

I have no questions.