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Python: Loops

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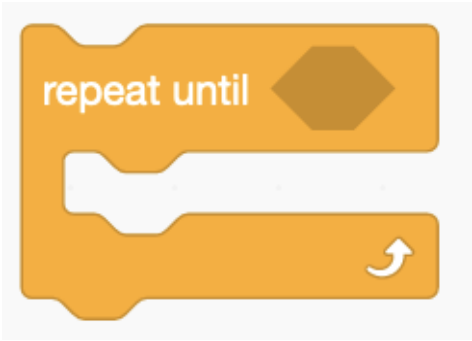
Python: While Loops

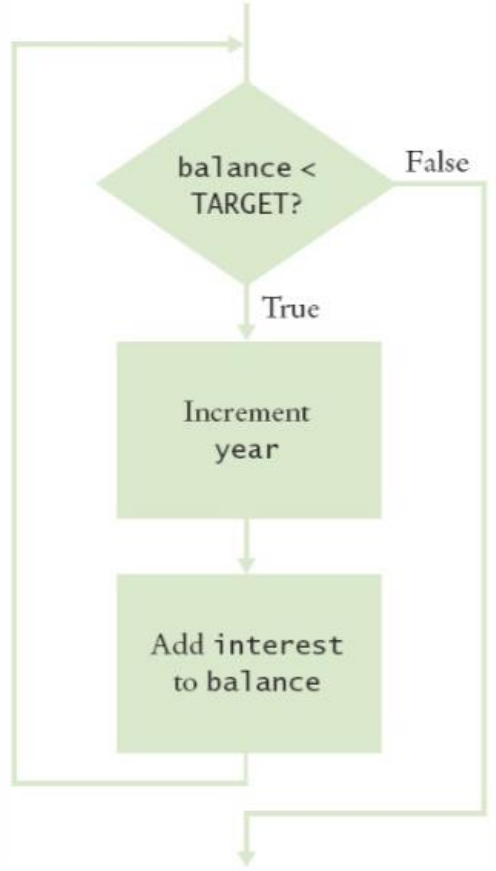
Loops

- Sometimes we might want code to repeat itself – how did we do this in Scratch?
- In python, loops are a lot more versatile than just making code repeat a set number of times
- There are a variety of loops that we can use for specific purposes
- You can actually go back to Scratch and find some of these!



While Loop

- A while loop repeats instructions while a condition is true
- ```
  while x < y:
      x = x + 1
  ```
- This makes while loops very useful for input validation
- …or for processing sentinel values – what's a sentinel value?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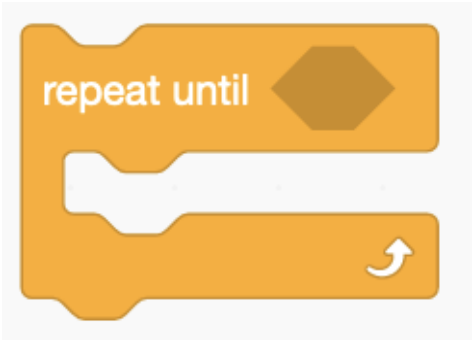
Python:
For Loops

Loops

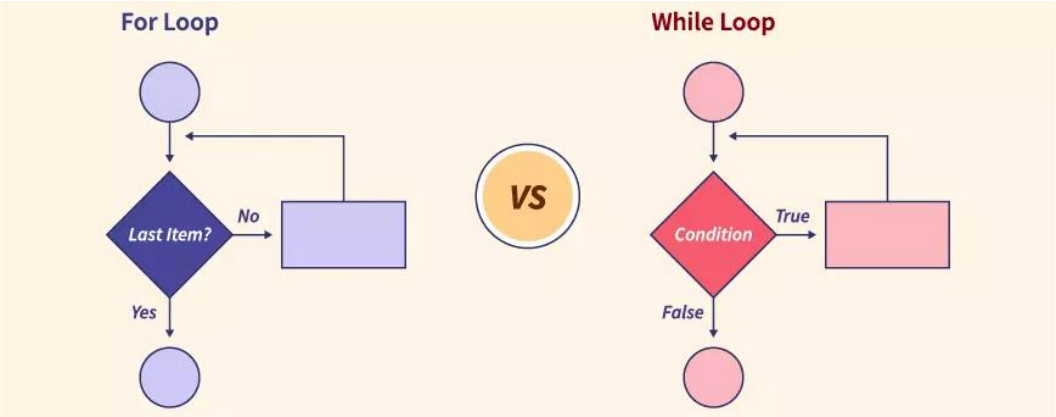
- Sometimes we need to iterate our code but the while loop isn't suitable
- In these situations a for loop may be more appropriate
- Neither loop is better than the other but may be better suited for certain tasks or situations
- Consider while and for loops as different tools in your python toolbox!



Loops

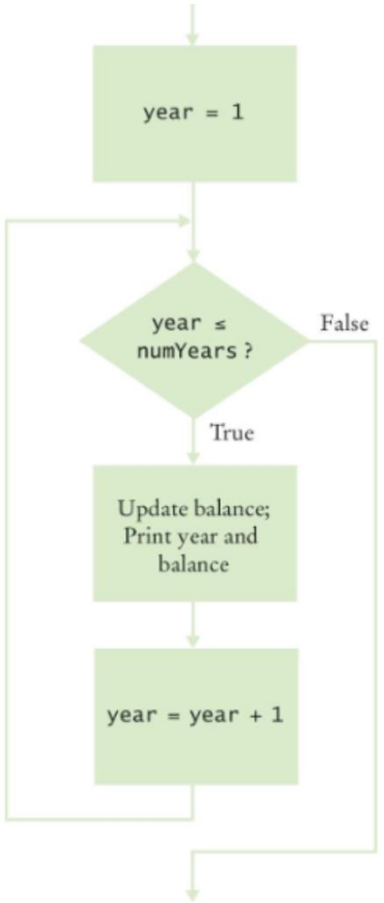
Realistically there are are conventions as to when you use each:

- Use a **For Loop** when you know before starting the loop exactly how many iterations it will run for (i.e. for exactly 10 iterations, or for each element in a static list)
- Use a **While Loop** when you don't know for certain how many iterations are needed (i.e. while the user attempts to enter a valid input, or while there are still elements in a growing list)

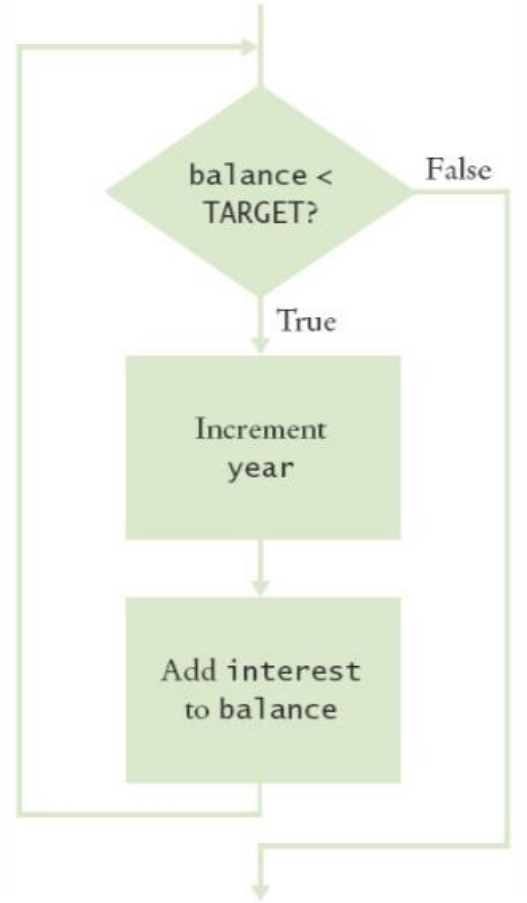


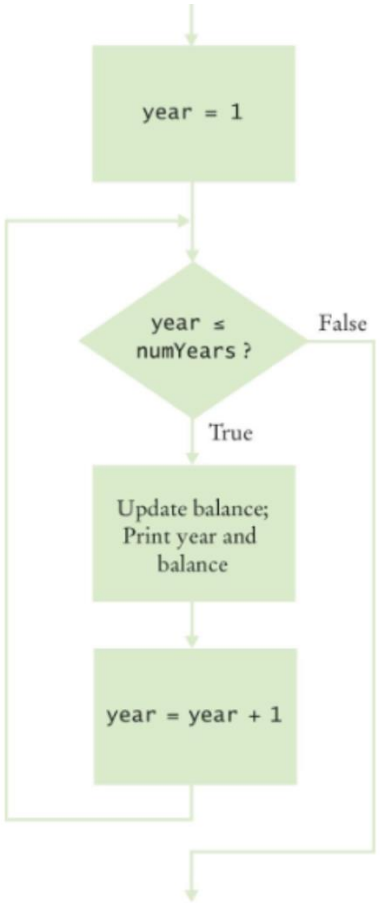
For Loop

- A while loop repeats instructions a specified number of times
- ```
  for x in range(1, 10):
      print x
  ```
- This makes for loops very useful when you know exactly how many time you want to iterate
- For loops can also be used to iterate through every element of a list (more on this next week!)


  ```

While Loop Vs For Loop





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Nested For Loops

Making Tables

By nesting for loops we can print a table with rows and columns:

1. How many rows and columns do we need?

2. Use a for loop to print the table header

3. Use a nested for loop to print the table
   - Loop per row
     - Loop per column

x^1	x^2	x^3	x^4
1	1	1	1
2	4	8	16
3	9	27	81
…	…	…	…
10	100	1000	10,000