



Chapter 9

Repeating with Loops



Chapter Breakdown

- 9.1 Iteration
- 9.2 `for` loops
- 9.3 Iterating over collections
- 9.4 Breaking down the `for` statement
- 9.5 The Accumulator Pattern
- 9.6 `while` loops
- 9.7 terminating a loop with `break`
- 9.8 choosing which loop to use



9.1 Iteration

Iteration Station

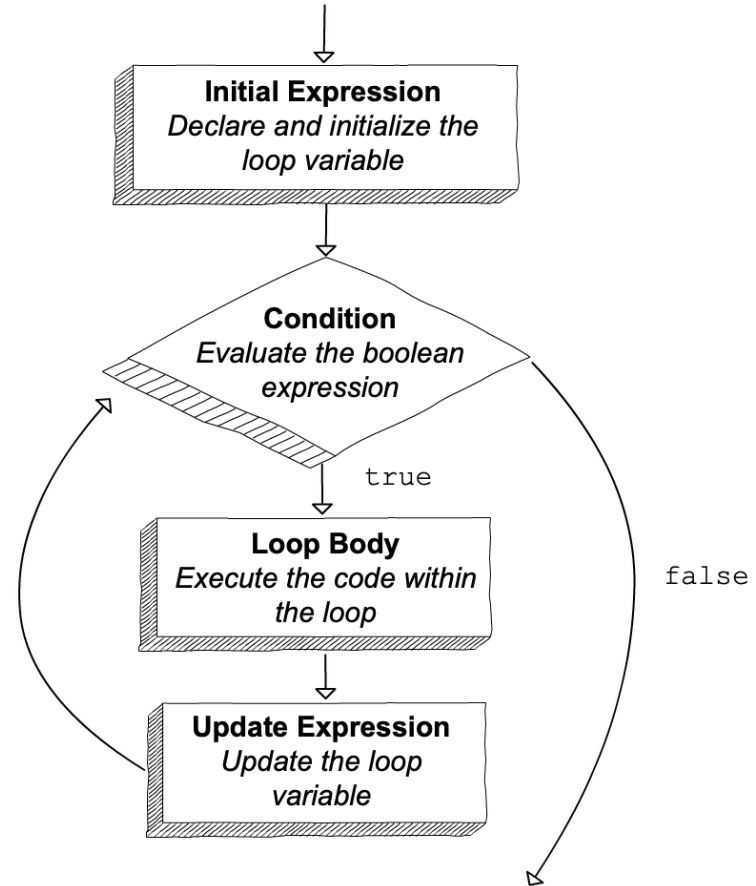
- Repeated execution of a sequence of statements is called **iteration**
- Two iteration types that we will use
 - for Loops
 - while Loops
- Iteration helps you **DRY** your code.



9.2 for Loops

for loop

- Used for repeating specific tasks a specific number of times.
- Contains:
 - Initial expression
 - loop Condition
 - Update expression
- The body is executed each time the loop condition returns true





9.3 Iterating over Collections



Live Coding Time!

Try It!

Write a program that prints each character of your name on a different line.

```
1 | // create a string variable containing your name
2 |
3 | // write a for loop that prints each character in your name on a different line
```

[repl.it](#) 

Try It!

Write a program that prints the name of each member of your family on a different line.

```
1 | // create an array variable containing the names
2 |
3 | // write a for loop that prints each name on a different line
```

[repl.it](#) 

9.4 Breaking down the for statement

for Loop anatomy

- Initial Expression



Executed once, most often than not declares the **loop variable**. *Ex: $i = 0$, $j = 5$, $counter = 10$*

- Loop Condition



Boolean statement, always breaks down to true or false. If True the loop executes, if false loop execution stops. *Ex: $i < str.length$, $j > 20$, $counter \leq array.length$*

- Update expression



Executes after every iteration of the loop. Can increment or decrement the loop. *Ex: $i++$, $j--$, $Counter + 2$*

9.5 The Accumulator Pattern

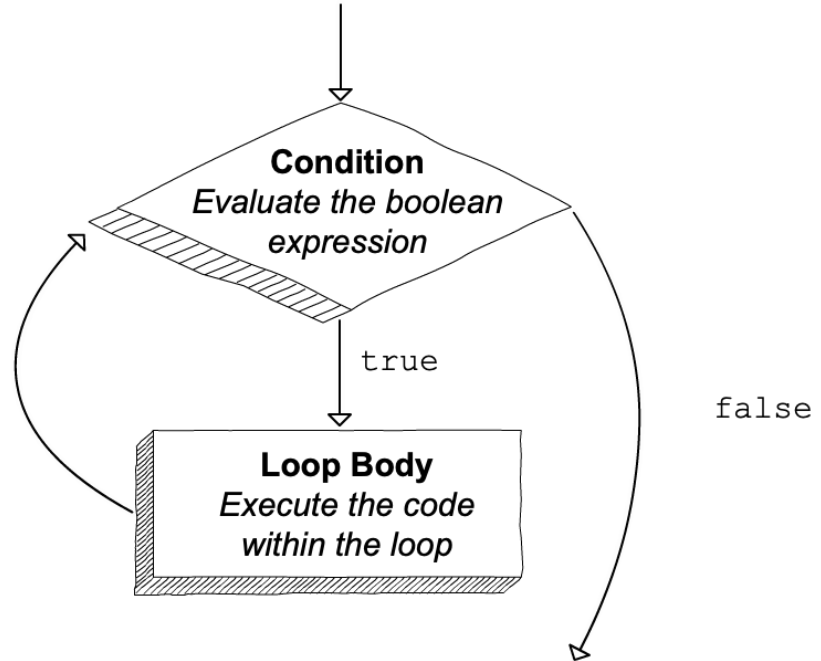
The Accumulation Pattern is a programming pattern.


A Pattern is a common approach to solve a group of similar programming problems

9.6 while loops


while Loops

- Much more general mechanism for iterations.
- Used when you don't know how many iterations you will have
- No initial or update expressions
- Beware the infinite loop!





You can use a while loop to replace a for loop. But you can't use a for loop to replace a while loop!



9.7 Terminating a loop with break

Breaks

- Can be used to “break” out of a loop
 - It immediately terminates the execution of a loop





9.8 Choosing which loop to use



WHOS LOOP IS IT ANYWAY?

for

You use a for loop when you have a definite iteration. When you know exactly how many iterations there are going to be!

while

You use a while loop when you have indefinite iteration. When you don't know exactly how many iterations you will need!