Analysis of Environmental Data Lab

Loops

Eco 602 – University of Massachusetts, Amherst – Fall 2021
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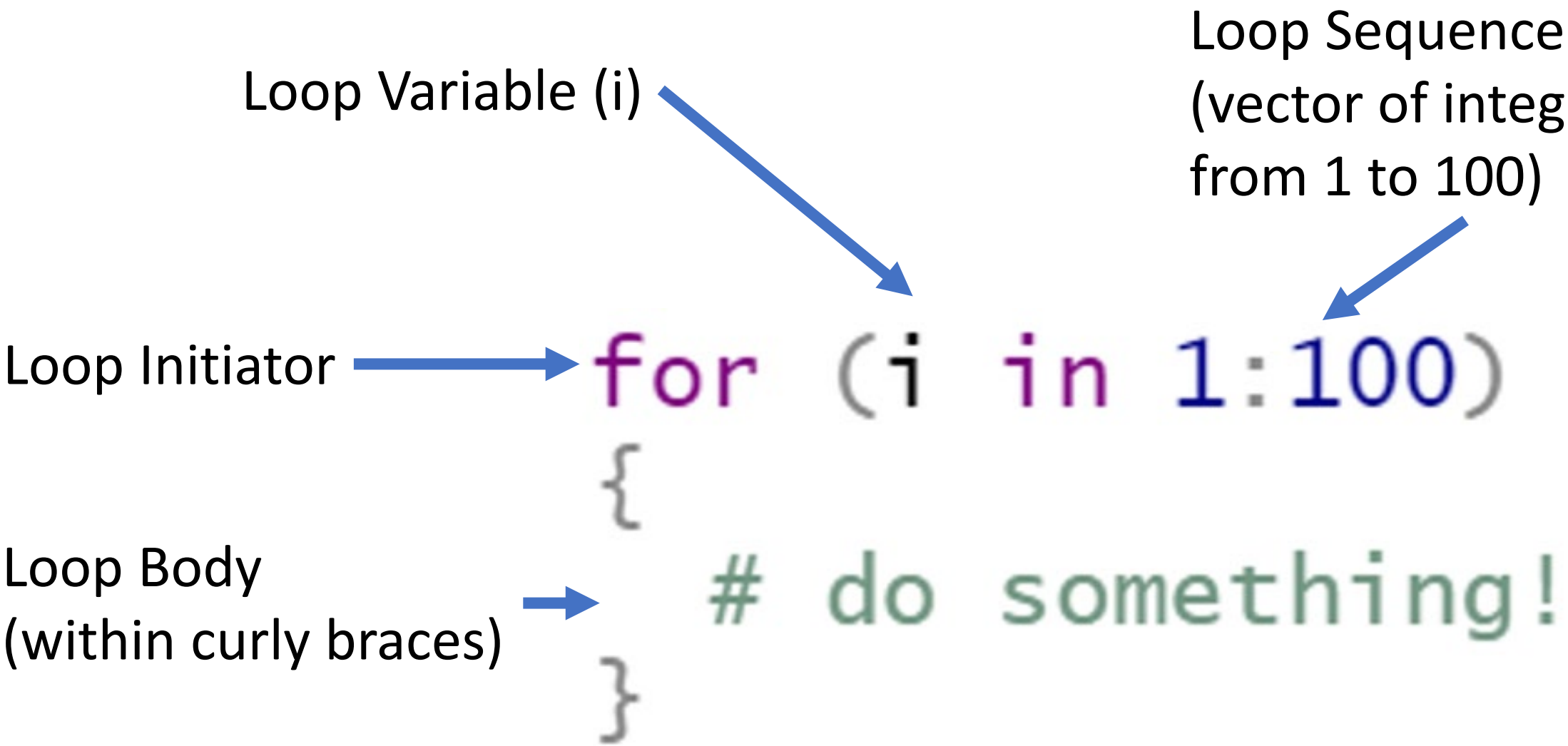
Important Concepts

- Loop initiation
- Loop sequences
- Loop variables
- Loop sequences
- Scope
- For-loops and while-loops
- Loop strategies

Anatomy of a For-Loop

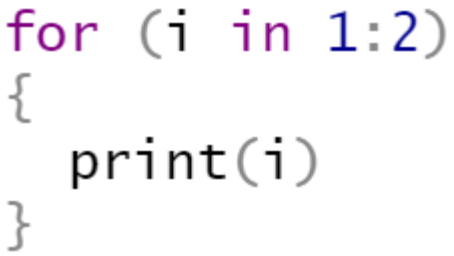
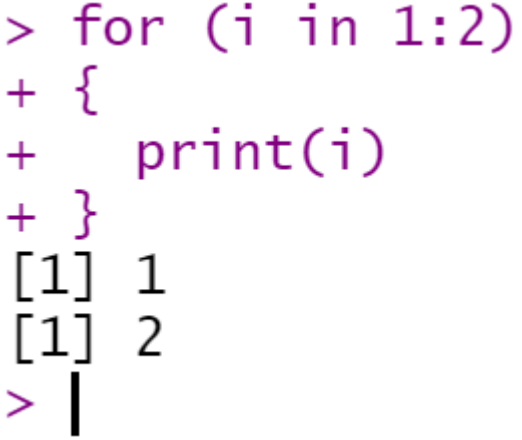


What does a for-loop do?

1. Assigns the first value in the sequence to the loop variable
2. Evaluates the loop body
3. Assigns the next value in the sequence to the loop variable
4. Evaluates the loop body
5. Repeat 3 and 4 until the last value in the sequence
6. Exits

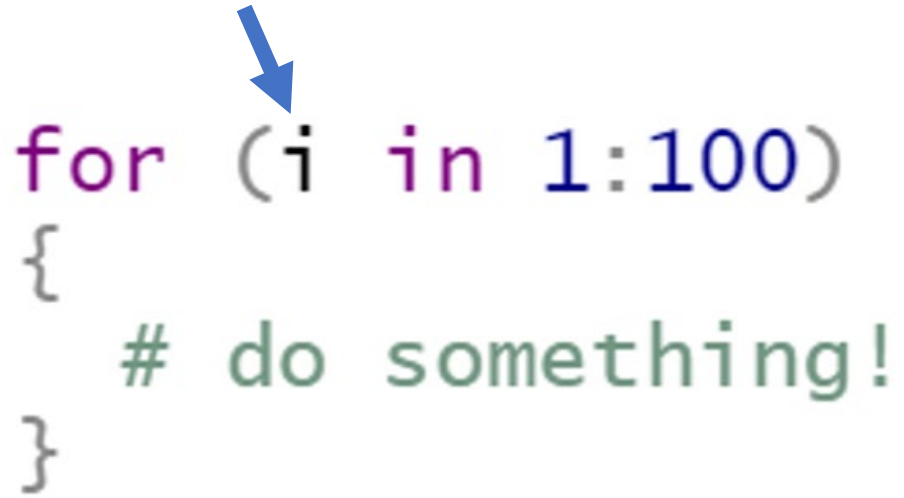
```
for (i in 1:100)
{
  # do something!
}
```

What happens in this loop?

Input	Output
	

Loop Variables

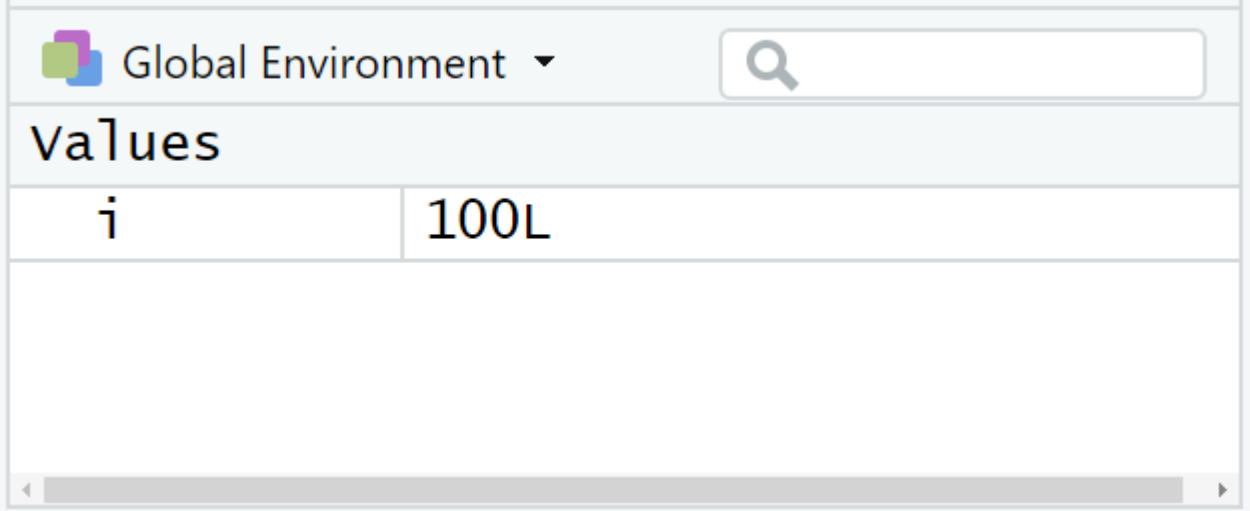
Loop Variable (i)



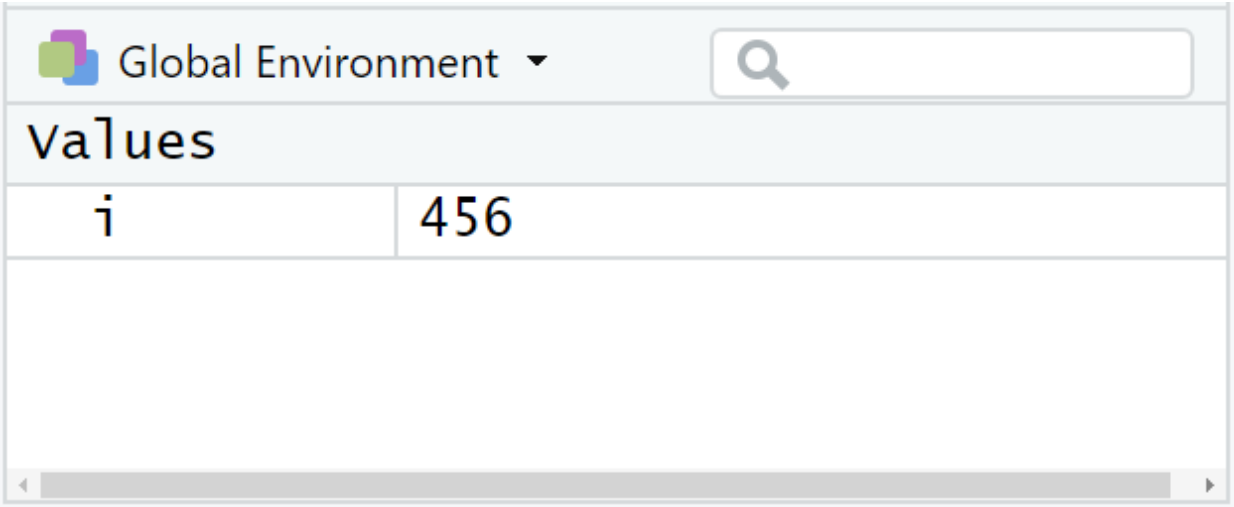
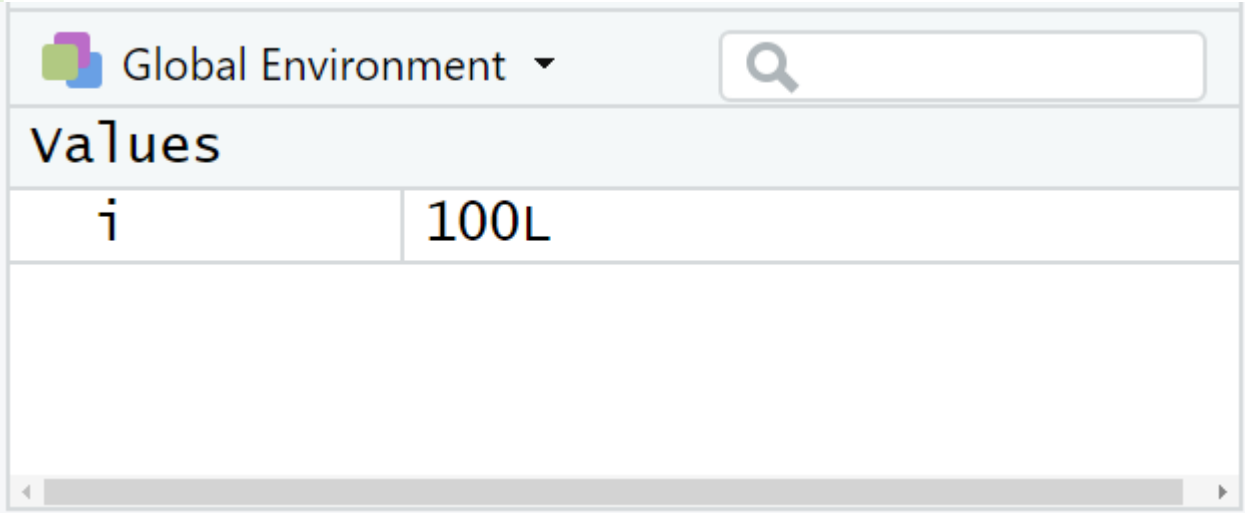
```
for (i in 1:100)
{
  # do something!
}
```

- The loop variable, i, will take on the values 1, 2, 3, …. Successively.
- Within the loop, you can use the loop variable as if it were a variable you had defined outside the loop
- If you use a loop variable that is already defined outside the loop, the loop will override the previous value.

Loop Variables: Loop variable not defined outside loop

Before Loop	After Loop
	

Loop Variables: Loop variable is defined outside loop

Before Loop	After Loop
	

Loop Sequences

- It's just the sequence of values the loop variable will assume in each loop iteration
- The values don't have to be in order!

Loop Sequence
(vector of integers from 1 to 100)

```
for (i in 1:100)
{
  # do something!
}
```

Loop Sequences

- It's just the sequence of values the loop variable will assume in each loop iteration
- The values don't have to be in order!
- What happens with the following sequence?

Loop Sequence
(vector of integers from 1 to 100)

```
for (i in c(3, 6, 77))
{
  print(i)
}
```

What happens in this loop?

Input	Output

`for (i in c(3, 6, 77))`
`{`
`  print(i)`
`}`
	`> for (i in c(3, 6, 77))`
	`+ {`
	`+  print(i)`
	`+ }`
	`[1] 3`
	`[1] 6`
	`[1] 77`

What is the value of i after the loop runs?

Before Loop	After Loop
	

Loop Variables: Loop variable not defined outside loop

Before Loop	After Loop
	

Loop Types

For-Loops	While-loops
• Evaluates loop variable sequentially according to loop sequence. • Exits when the sequence is finished • No infinite loops	• Executes until a logical test is TRUE • You can get stuck in an infinite loop!