

Analysis of Environmental Data Lab

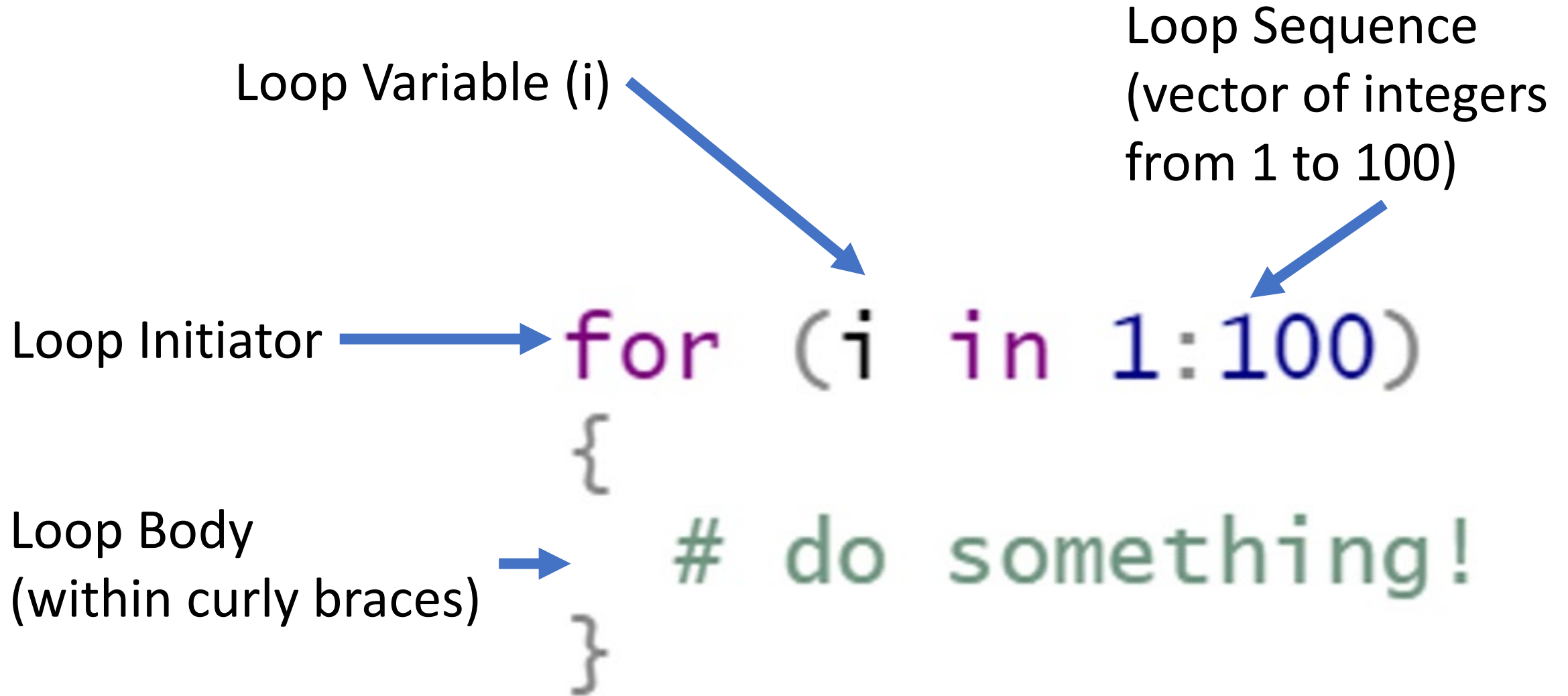
Loops

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

- Loop initiation
- Loop variables
- Loop sequences
- Loop 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


```
for (i in 1:2)
{
  print(i)
}
```

Output

```
> for (i in 1:2)
+ {
+   print(i)
+ }
[1] 1
[1] 2
> |
```

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

Global Environment ▾



Environment is empty

After Loop

Global Environment ▾



Values

i

100L

Loop Variables: Loop variable is defined outside loop

Before Loop

Global Environment

Values

i	456
---	-----

After Loop

Global Environment

Values


i	100L
---	------

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)



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

What happens in this loop?

Input

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

Output

```
> 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

Global Environment

Environment is empty

After Loop



Loop Variables: Loop variable not defined outside loop

Before Loop

Global Environment ▾



Environment is empty

After Loop

Global Environment ▾



values

i

77

Loop Types

For-Loops

- Evaluates loop variable sequentially according to loop sequence.
- Exits when the sequence is finished
- No infinite loops

While-loops

- Executes until a logical test is TRUE
- You can get stuck in an infinite loop!