

5. Problem Statement

1. Define an $m \times n$ matrix of zeros and then enters a nested-for loop to fill the locations of the matrix, only if the two indexes differ.

- The purpose is to create a lower triangular matrix, that is a matrix whose elements below the main diagonal are non-zero, the others are left untouched to their initialized zero value.
- When the indexes are equal (if condition in the inner loop, which runs over j , the column index), a break is executed and the innermost loop is interrupted with a direct jump to the instruction following the inner loop, which is a print; then control gets to the outer for condition (over the rows, index i), which is evaluated again.
- If the indexes differ, the assignment is performed and the counter is incremented by 1.
- At the end, the program prints the counter ctr , which contains the

#number of elements that were assigned.

Answer

script.R

```
1  # Make a lower triangular matrix (zeroes in upper right
   corner)
2  m=10
3  n=10
4
5  # A counter to count the assignment
6  ctr=0
7
8  # Create a 10 x 10 matrix with zeroes
9  mymat = matrix(0,m,n)
10
11  for(i in 1:m) {
12    for(j in 1:n) {
13      if(i==j) {
14        break;
15      } else {
16        # you assign the values only when i<j
17        mymat[i,j] = i*j
18        ctr=ctr+1
19      }
20    }
21    print(i*j)
22  }
23
24  # Print how many matrix cells were assigned
25  print(ctr)
```

Run

R Console

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+     }
+   }
+   print(i*j) }
```

R Console

```
[1] 1
[1] 4
[1] 9
[1] 16
[1] 25
[1] 36
[1] 49
[1] 64
[1] 81
[1] 100
>
> # Print how many matrix cells were assigned
> print(ctr)
[1] 45

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