



ACADGILD

SESSION 3: FOUNDATIONAL R PROGRAMMING

Assignment 1

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1. Introduction

This assignment will help you understand the concepts learnt in the session.

2. Objective

This assignment will test your skills on the basics of R.

3. Prerequisites

Not applicable.

4. Associated Data Files

Not applicable.

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.

ANS: `mat=matrix(0,3,4)`

```
mat
for(row in 1:nrow(mat)){
  for(col in 1:ncol(mat)){
    print(paste('Row is ', row, 'Col is ' , col, 'value =', mat[row,col]))
  }
}
mat= matrix(1:6, 4,4)
lower.tri(mat)
```

```
mat[lower.tri(mat, diag = F)]=0
mat
```

```
> lower.tri(mat)
      [,1] [,2] [,3] [,4]
[1,] FALSE FALSE FALSE FALSE
[2,]  TRUE  FALSE FALSE FALSE
[3,]  TRUE   TRUE  FALSE FALSE
[4,]  TRUE   TRUE   TRUE  FALSE
> mat[lower.tri(mat, diag = F)]=0
> mat
      [,1] [,2] [,3] [,4]
[1,]     1     5     3     1
[2,]     0     6     4     2
[3,]     0     0     5     3
[4,]     0     0     0     4
> |
```

```
#----if condtion-----
# Make a lower triangular matrix (zeroes in upper right corner)
m=10
n=10

# A counter to count the assignment
ctr=0

# Create a 10 x 10 matrix with zeroes
mymat = matrix(0,m,n)

for(i in 1:m) {
  for(j in 1:n) {
    if(i==j) {
      break;
    } else {
      # you assign the values only when i<>j
      mymat[i,j] = i*j
      ctr=ctr+1
    }
  }
  print(i*j)
}

# Print how many matrix cells were assigned
print(ctr)
```

```
+ )
[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
```

