# R-Exercise-matrix-.R

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```
#1.Create two matrices, matrix_A and matrix_B
matrix_A<-matrix(c(1,2,3,4,5,6,7,8,9),nrow = 3,ncol=3,byrow = TRUE)
matrix_A
```

```
##      [,1] [,2] [,3]
## [1,]    1    2    3
## [2,]    4    5    6
## [3,]    7    8    9
```

```
matrix_B<-matrix(c(1,2,3,0,0,6,7,0,0),nrow = 3,ncol=3,byrow = TRUE)
matrix_B
```

```
##      [,1] [,2] [,3]
## [1,]    1    2    3
## [2,]    0    0    6
## [3,]    7    0    0
```

```
#2.Calculate the sum of matrix_A and matrix_B and store the result in a new matrix named matr
ix_sum.
matrix_sum=(matrix_A)+(matrix_B)
matrix_sum
```

```
##      [,1] [,2] [,3]
## [1,]    2    4    6
## [2,]    4    5   12
## [3,]   14    8    9
```

```
#3.Calculate the difference between matrix_A and matrix_B and store the result in a new matri
x named matrix_diff.
matrix_diff<-(matrix_B)-(matrix_A)
matrix_diff
```

```
##      [,1] [,2] [,3]
## [1,]    0    0    0
## [2,]   -4   -5    0
## [3,]    0   -8   -9
```

```
#4.Multiply matrix_A by a scalar value of 2 and store the result in a new matrix named matrix
_mult.
matrix_mult=(matrix_A)*2
matrix_mult
```

```
##      [,1] [,2] [,3]
## [1,]    2    4    6
## [2,]    8   10   12
## [3,]   14   16   18
```

```
#5.Calculate the product of matrix_A and matrix_B and store the result in a new matrix named
matrix_product.
matrix_product=(matrix_B)*(matrix_A)
matrix_product
```

```
##      [,1] [,2] [,3]
## [1,]    1    4    9
## [2,]    0    0   36
## [3,]   49    0    0
```

```
#6.Find the transpose of matrix_A and store the result in a new matrix named matrix_A_transpo
se.
matrix_A_transpose=t(matrix_A)
matrix_A_transpose
```

```
##      [,1] [,2] [,3]
## [1,]    1    4    7
## [2,]    2    5    8
## [3,]    3    6    9
```

```
#7.Calculate the determinant of matrix_B and store it in a variable named determinant_B.
determinant_B=det(matrix_B)
determinant_B
```

```
## [1] 84
```

```
#8.Invert matrix_B to obtain the inverse matrix and store it in a new matrix named matrix_B_i
nverse.
matrix_B_inverse=solve(matrix_B)
matrix_B_inverse
```

```
##      [,1]       [,2]        [,3]
## [1,]  0.0  0.0000000  0.14285714
## [2,]  0.5 -0.2500000 -0.07142857
## [3,]  0.0  0.1666667  0.00000000
```

```
#9.Check if matrix_B is orthogonal (i.e., its transpose is equal to its inverse).
t(matrix_B)==matrix_B_inverse
```

```
##       [,1]  [,2]  [,3]
## [1,] FALSE  TRUE FALSE
## [2,] FALSE FALSE FALSE
## [3,] FALSE FALSE  TRUE
```

```
#10.Calculate the element-wise square root of matrix_A and store the result in a new matrix n
amed matrix_A_sqrt.
matrix_A_sqrt=sqrt(matrix_A)
matrix_A_sqrt
```

```
##          [,1]     [,2]     [,3]
## [1,] 1.000000 1.414214 1.732051
## [2,] 2.000000 2.236068 2.449490
## [3,] 2.645751 2.828427 3.000000
```

```
#11.Calculate the mean of all the elements in matrix_B.
mean_B=mean(matrix_B)
mean_B
```

```
## [1] 2.111111
```

```
#12.Calculate the sum of each column in matrix_A.
colsum_A=colSums(matrix_A)
colsum_A
```

```
## [1] 12 15 18
```

```
#13.Calculate the row means of matrix_B.
rowmean_B=rowMeans(matrix_B)
rowmean_B
```

```
## [1] 2.000000 2.000000 2.333333
```

```
#14.Extract the second row of matrix_A and store it in a vector named second_row_A.
second_row_A<-matrix_A[2,]
second_row_A
```

```
## [1] 4 5 6
```

```
#15.Extract the third column of matrix_B and store it in a vector named third_column_B.
third_column_B<-matrix_B[,3]
third_column_B
```

```
## [1] 3 6 0
```