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جامعة المسيلة
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قسم الإعلام الآلي

**Level**: 1st year of computer science
**Course**: ADS1

# Typical solution
# TD/TP N°: 07

**Academic year:**2024/2025
**Chapter 5** : Matrices & strings

## Exercise 1: TD/TP

Write a program that performs the addition of two real-type matrices of size m/n."

```
Algorithm addition
Var i, j, M, N :integer
    A[100][100],B[100][100],S[100][100]:
    array [100] ofreal
begin
write("entrer les dimensions des matrices
<=100")
read(M,N)
write("entrer la 1ere matrice")
for i←0 to M-1 do
for j←0 to N-1 do
  write("A["i,"،",j,"]=>")
  read(A[i][j])
end for
end for
write("entrer la 2eme matrice")
for i←0 to M-1 do
for j←0 to N-1 do
  write("B["i,"،",j,"]=>")
  read(B[i][j])
end for
end for
for i←0 to M-1 do
for j←0 to N-1 do
  S[i][j] ← A[i][j]+ B[i][j]
end for
end for
write("voici la somme")
for i←0 to M-1 do
for j←0 to N-1 do
  write(S[i][j)
end for
end for
end
```

```
#include <stdio.h>
int main(){
int i, j, M, N;
float A[100][100],B[100][100],S[100][100];
printf("entrer les dimensions des matrices
<=100");
scanf("%d%d", &M, &N) ;
printf("entrer la 1ere matrice\n");
for (i=0 ;i<M ;i++)
 for (j=0 ;j<N ;j++){
  printf("A[%d،%d]=>",i, j);
  scanf("%f", &A[i][j]);
 }
printf("entrer la 2eme matrice\n");
for (i=0 ;i<M ;i++)
 for (j=0 ;j<N ;j++){
  printf("B[%d،%d]=>",i, j);
  scanf("%f", & B[i][j]);
 }
for (i=0 ;i<M ;i++)
 for (j=0 ;j<N ;j++)
  S[i][j]= A[i][j]+ B[i][j];
printf("voici la somme ") ;
for (i=0 ;i<M ;i++){
  for (j=0 ;j<N ;j++)
    printf("%.2f\t",S[i][j]);
 printf("\n");
}
return 0 ;
}
```

## Exercise 2: TP

Write a program that calculates the sum of the elements on the main diagonal. This sum is called the trace of the matrix.

```
Algorithm trace
Var i, j, N :entire
    tr: reel
    A[100]: array [100] ofreal
begin
write("entrer la taille de la matrice
<=100")
read(N)
write("entrer la matrice")
for i←0 to N-1 do
for j←0 to N-1 do
  write("A["i,"،",j,"]=>")
```

```
#include <stdio.h>
int main(){
int i, j N;
float tr, A[100][100];
printf("entrer la taille de la matrice
<=100");
scanf("%d", &N) ;
printf("entrer la matrice\n");
for (i=0 ;i< N ;i++)
 for (j=0 ;j<N ;j++){
  printf("A[%d،%d]=>",i, j);
  scanf("%f", &A[i][j]);
```

```
  read(A[i][j])
end for
end for
tr←0
for i←0 to N-1 do
  tr← tr + A[i][i]
end for
write("la trace=", tr)
end
```

```
 }
tr=0;
for (i=0 ;i< N ;i++)
  tr+= A[i][i];
printf("la trace=%.2f ", tr) ;
return 0 ;
}
```

**Exercise 3: TD**

```
Algorithm multi_X
Var i, j, k, L,C, X  :integer
    A: array [50] [50]of integer
    T: array [50*50] of integer
begin
write("enter matrix size <=50")
read(L,C)
write("enter matrix ")
for i←0 to L-1 do
for j←0 to C-1 do
  write("A["i,"،",j,"]=>")
  read(A[i][j])
end for
end for
write("enter a number")
read(X)
k←0
for i←0 to L-1 do
for j←0 to C-1 do
  if(M[i,j]=X)
    T[k]← M[i, j]
    K←k+1
  end if
end for
end for
write("here is multiples of ",X)
for i←0 to k-1 do
  write(T[i])
end for
end
```

**Exercise 4: TP**

A symmetric matrix M of order n is a square matrix (number of rows = number of columns) that satisfies the following condition: M[i, j] = M[j, i] for all i and j.

Write a program that checks if a matrix is symmetric or not.

```
Algorithm Symetric
Var i, j, N :integer
    M: array [100][100] of real
    isSymetrique : booleen
begin
write("enter matrix size <=100")
read(N)
write("enter matrix ")
for i←0 to N-1 do
for j←0 to N-1 do
  write("M["i,"،",j,"]=>")
```

```
#include <stdio.h>
int main(){
int i, j, N, isSymetrique ;
float M[100][100];
printf("enter matrix size <=100");
scanf("%d", &N) ;
printf("enter matrix \n");
for (i=0 ;i< N ;i++)
 for (j=0 ;j<N ;j++){
  printf("M[%d،%d]=>",i, j);
  scanf("%f", &M[i][j]);
```

```
  read(M[i][j])
end for
end for
isSymetrique ← true
for i←0 to N-2 do
for j←i+1 to N-1 do
  if M[i][j]≠ M[j][i] then
    isSymetrique ←false
  end if
end for
end for
if isSymetrique then
 write("the matrix is symmetrical ")
else
 write("the matrix is not symmetrical ")
end if
end
```

```
 }
isSymetrique=1 ;

for (i=0 ;i< N ;i++)
 for (j=0 ;j<N ;j++)
  if(M[i][j] != M[j][i]) isSymetrique=0;

if(isSymetrique)
  printf("the matrix is symmetrical ");
else
  printf("the matrix is symmetrical ");
return 0 ;
}
```

## Exercise 5: TD

Write a program that, given a string of characters S, displays whether S is a palindrome (symmetric) or not.

```
Algorithm palindrome
Var i, j :integer
     S: string
     isPalindrome : booleen
begin
write("enter a string ")
read(S)
i←0
j←strlen(S)-1
isPalindrome←true
while i<j and isPalindrome do
  if S[i]≠ S[j] then
    isPalindrome ←false
  end if
  i←i+1
  j←j-1
end while
if isPalindrome then
 write("the string is Palindrome ")
else
 write("the string is not Palindrome ")
end if
end
```

```
#include <stdio.h>
#include <string.h>
int main(){
int i, j, isPalindrome ;
char S[100];
printf("enter a string ");
gets(S);
i=0;
j=strlen(S)-1;
isPalindrome=1;
while(i<j && isPalindrome) {
  if (S[i] != S[j]) isPalindrome=0;
  i++;
  j--;
}
if(isPalindrome)
 printf("the string is Palindrome ");
else
 printf("the string is not Palindrome ");
return 0 ;
}
```

## Exercise 6: TD/TP

Write a program that removes all occurrences of a character in a string by shifting the rest to the left.

```
Algorithm supprime_ occurrences
Var i, j :integer
     S: string
     x : character
begin
write("enter a string ")
read(S)
write("enter the character you want to
delete ")
read(x)
i←0
j←0
while S[i]≠'\0' do
```

```
#include <stdio.h>
#include <string.h>
int main(){
int i, j;
char S[100],x;
printf("enter a string ");
gets(S);
printf("enter the character you want to
delete ");
x=getch();
i=0;
j=0;
while(S[i]!='\0') {
```

```
  if S[i]≠ x then
    S[j]← S[i]
    j←j+1
  end if
  i←i+1
end while
S[j]←'\0'
write("Here is the new channel ")
write(S)
end
```

```
  if (S[i] !=x) {
    S[j]= S[i];
    j++;
  }
  i++;
}
S[j]='\0';
printf("Here is the new channel \n%s",S);
return 0 ;
}
```