Solution Tutorial N° 05: Arrays and character strings

1. Declare an array of 9 reals and initialize it with the value 0.

Solution :

```
Float tab[9]={0,0,0,0,0,0,0,0,0};
```

2. Write the algorithm that fills an array of 9 (real) notes with values requested from the user. Then display the 9 values contained in the table.

Algorithm ex2

```
Var tab=array[9] of real ;
I: integer;
Begin
Write ("give 9 real numbers \n");
For(I = 0 to 8 ) do      read (tab[i]);
End for
For(I = 0 to 8 ) do      write  (tab[i]);
End for
End
```

3. Write the algorithm that calculates the sum and the average of the values in an array.

Algorithm ex2

```
Var tab=array[10] of real ;
I, sum, av: integer;
Begin  sum ←0;
Write ("give 10 real numbers \n");
For(I = 0 to 9 ) do      read (tab[i]);
End for
Write ("calculate the sum and the average \n");
For(I = 0 to 9 ) do      sum←sum+Tab[i];
End for
av←sum/10;
write ("the sum is ",sum,"and the average is ",av);
end
```

4. Identical arrays:

```
Algorithm exo4
Variable i  : integer ;
T1=array [50] : real ;
T2=array  [50] : real ;
Begin
for (i=0 to 49  step 1 ) do
read (T1[i]) ;
endfor ;
for (i=0 to 49  step 1 ) do
read (T2[i]) ;
endfor ;
Rep ←  True ;
I ←  0;
while (rep = true and I <= n) do
if (T1[i] = T2[i]) then
 Rep ←  true ;
  else
   Rep ←  false ;
endif ;      I ←  i+1;
endwhile ;
write (' la comparaison est ', rep) ;
```

5. Even number in array

For example if the user enter 15 , the algorithm fills the array with 0.2.4.6.8.10.12.14.

Algorithm exo5

```
Var t1 =array [100] of real ;
I,nbr: integer;
Begin
Write ("give 20 real numbers \n);
nbr←0;
for(i=0 to 19) do read (t1[i]);//remplissage de tableau
for (i=0 to 19) do
if (t1[i] mod 2 =0) then
nbr←nbr +1;
write("t1[i]);
end for
write (" ther are ", nbr ," even numbers ");
end.
```

6. Number of occurrences of a given value

Write the algorithm that allows you to display the number of occurrences of a given number X in an array T of N elements.(the solution is in the lesson)

7. Write an algorithm that calculates the smurf of two arrays. To calculate the smurf, Var t=array [100] of real ;

Algorithm ex07

```
Var    T2=array [50] of real;
       I,j:integer;  s: real;
Begin
Write ("give 100 real number \n");
For(i=0 to 99 )do  read(t[i]);
Write ("give  50 real number \n");
For (j=0 to 49 ) do read (t2[j]);
s←0;
for (i=0 to 99 ) do
for (j=0 to 49 ) do
s←s+t[i]*t2[j];
end for
end for
write (" the smurf is ", S);
end
```

8. Consider the algorithm below which allows you to manipulate an array containing 10 integers.

Algorithme Exo2

```
Var T : tabarray of  [10] integer ;   i : integer ;
begin
for i <-- 0 to 9 do
read(T[I]) ;   if T[i] = 0 then write (i) ; end.
```

1. What does this algorithm do? **Display the index of numbers = 0.**

2. Using the following example: T = {2, 0, -5, 3, 0, 4, -1, 0, 0, 15}, what displayed on the screen?

1,4;7;8

3. Give the equivalent C program.

```
#include<stdio.h>
main() {
int i,t[10];
for(i=0;i<=9;i++) {
if(t[i]%2==0) printf("%d",i);
}}
```

9. Fill in the empty fields:

Algorithm calcule

Var **T** : array [100] of real ;
S,moy : real ;
i,n : integer ;

begin

write (''this algorithm calculates the average of even numbers') ;
write (''Please fill in the array with real numbers) ;
for (i= 0 to i= 99 step 1)do
read (T[i]) ;
end do
write ('' test the parity of numbers and calculate their average'') ;
S←0 ;
n←0 ;
for (i= 0 to 99 step 1)do
if (T[i]mod 2 = 0) then
S ← S+ T[i];
n← n+1 ;
endif ;
end for
moy ← **s / n**
write ('' the average of ''n ''even numbers is :'', **moy** ;
end .

10. Let M be a square matrix of size 5x5 containing integers. Write the declaration and initialization to 0 of such a data structure.(lesson)

11. Write an algorithm that asks the user to fill a matrix M of size 5x5.(lesson)

12. Write the algorithms which allow on a 2D matrix of size 5*5:

• To calculate the sum of the elements of a line

Algo sum-lines-column

Var A =aray [10 ,5] : real ;
I, j , n,m : integer ;
Sl=array [10] : real ; SC=array [5] real ;

Begin

for (i = 0 to 9 step 1) do
for (j = 0 to 4 step 1) do
read (A [i, j]) ;
endfor ; endfor **;//calculate the sum of each line**
for (i = 0 to 9) do
Sl[i] ← 0 ;
for (j = 0 à 4) do Sl[i] ← Sl[i] + A [i,j] ; endforj
write (Sl[i]);
end fori ;

//calculate the sum of the elements of a column

for (i = 0 to 4 step 1) do
SC[i] ← 0 ;
for (j = 0 to 9 step 1) do
SC[i] ← SC[i] + **A [j,i]** ;//j represente line
End for j
write (SC [i]); end fori ;

// calculate the sum of the elements of the diagonal

sumdiag ← 0 ;
for(i de 0 à 9 step 1)do
sumdiag ← sumdiag + A[i][i] ;
endfor ;
write ("the sum of diagonal elemnets is ",sumdiag) ;
end

13. Write an algorithm that asks the user for a **sentence** and displays the **number of vowels** Algo vowel

Var
chaine : chaine of characteres ;
nbv ,i : integer
Begin
write ('' give a senytence\n'') ;
read (chaine) ;
nbv ← 0 ; i ← 0
while (chaine [i] <> '\0') do
if ((chaine [i] = 'a' or chaine [i] = 'e' or chaine [i] = 'i' or chaine [i] = 'o' or chaine [i] = 'u' or chaine [i] = 'y')) then
nbv ← nbv +1 ;
endif ;
endfor ;
write ('' the number of vowels : '' , nbv) ;
end.

14. Write an algorithm that asks the user for a **word** and displays the **number of letters** in that word on the screen.(lesson)

15. What does the following code display if we enter the two variables chaine1 and chaine2 ?

```
#include <stdio.h>
#include <string.h>
 main()
{  char chaine1[]= "my name is ";
   char chaine2 [ ]="Mohamed Amine" ;
    gets(chaine1) ;
    scanf("%s",chaine2) ;
    printf("%s\n",strncat(chaine1,chaine2,3)) ;
    printf(strcpy(chaine1,chaine2)) ;
}
```

1. My name is Mohamed amine
   Mohamed amine
2. My name is Mohamed
   Mohamed amine
3. **My name isMoh**
   Mohamed
4. My name isMoh
   Mohamed amine