

REPUBLICUE ALGERIENNE DEMOCRATIQUE ET POPULAIRE  
 MINISTERE DE L'ENSEIGNEMENT SUPERIEUR ET DE LA RECHERCHE SCIENTIFIQUE

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جامعة المسيلة  
 كلية الرياضيات والإعلام الآلي  
 قسم الإعلام الآلي

**Level:** 1st year computer science  
**Material:** ADS2

**TD/TP Series No.: 03**

**Academic year:** 2023/2024  
**Chapter 1 :** Pointers

**Note** Use dynamic arrays

**Exercise 1: (TD)**

Complete the following table that shows the value of each variable after each statement.

instruction	a	b	c	p1	p2	instruction	a	b	c	p1	p2
int a, b, c, *p1, *p2;	/					++*p2;					
a=1; b=2; c=3;		2				*p1*=*p2;					
p1=&a; p2=&c;				&a		a=++*p2**p1;					
*p1=(*p2)++;						p1=&a;					
p1=p2; p2=&b;						*p2=*p1/=*p2;					
*p1--*p2;											

**Exercise 2: (TP)**

Write a program that fills an array T with real numbers, then creates two arrays TP and TN, and puts all the positive numbers in TP and all the negative numbers in TN, and leaves the null numbers as they are.

**Exercise 3: (TD)**

Let *p* be a pointer pointing to array T:

```
int T[] = {8, 17, 7, 9, 48, 76, 22, 27}; int *p =T;
```

What is the value or address returned by each of the following expressions:

1. *p+3		2. p+(*p-7)		3. &T[5]-p	
4. &p+1		5. *(p+3)		6. *(P+*(P+7) - T[6])	
7. T+2		8. &T[5]-2		9.	

**Exercise 4: (TD/TP)**

Write the *strcat* function, which concatenates two strings into a new string. (use the \* dereferencing operator instead of []).

**Exercise 5: (TP)**

Write the *copy* function that copies part of an array. The function takes the array and its length, start, and copied size, and returns a pointer to the new array.

**Exercise 6 : (TD/TP)**

Suppose we have a black and white image with dimensions n×m, stored as a matrix of integers. Write a function named "flip" that vertically flips the image.

**Exercise 7: (TD)**

Write the *Mat2Tab* function that converts a matrix into an array.

**Exercise 8 : (at home)**

- Write the **lowerMat** function, which allocates memory for only the bottom half of a matrix.
- Write the **Tab2Mat** function that converts an array into a matrix.
- Write the **strContains** function that takes two strings and determines whether the first one contains the second string or not..