



Level: 1st year of computer science
Course: ADS1

Typical solution TD/TP N°: 04

Academic year: 2024/2025
Chapter 3 : TESTS

Exercise 1 : TD

Write an algorithm that allows entering 3 integers. Then, this algorithm only displays the even numbers.

<pre> Algorithm even Var n1, n2 , n3 : integer begin write("enter 3 nbrs ") read (n1, n2 , n3) if n1 mod 2 =0 then write(n1) end if if n2 mod 2 =0 then write(n2) end if if n3 mod 2 =0 then write(n3) end if end. </pre>	<pre> #include <stdio.h> int main() { int n1, n2 , n3; printf("enter 3 nbrs "); scanf("%d%d%d", &n1, &n2, &n3); if (n1 % 2 ==0) printf("%d\n", n1); if (n2 % 2 ==0) printf("%d\n", n2); if (n3 % 2 ==0) printf("%d\n", n3); } </pre>
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Exercise 2: TP

Write a program that calculates the maximum between 2 numbers and another one that calculates the maximum between 3 numbers.

<pre> Algorithm max2 Var n1, n2 , max: real begin write("enter 2 nbrs ") read (n1, n2) if n1 > n2 then max←n1 else max←n2 end if write("the max is ", max) end. </pre>	<pre> #include <stdio.h> int main() { float n1, n2 , max; printf("enter 2 nbrs "); scanf("%d%d", &n1, &n2); if (n1 > n2) max= n1; else max= n2; printf("the max is %.2f\n", max); } </pre>
<pre> Algorithm max3 Var n1, n2, n3, max: real begin write("enter 3 nbrs") read (n1, n2, n3) if n1 > n2 then if n1 > n3 then max←n1 else max← n3 end if else if n2 > n3 then max← n2 else max← n3 end if end if write("the max is ", max) end. </pre>	<pre> #include <stdio.h> int main() { float n1, n2, n3 , max; printf("enter 3 nbrs "); scanf("%d%d", &n1, &n2, &n3); if (n1 > n2) if (n1 > n3) max= n1; else max= n3; else if (n2 > n3) max= n2; else max= n3; printf("the max is %.2f\n", max); } </pre>
	<pre> Max2= n1 > n2 ? n1 : n2; Max3= n1 > n2 ? (n1 > n3 ? n1 : n3) : (n2 > n3 ? n2 : n3); </pre>

Exercise 3: TD/TP

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Write an algorithm with its C program that calculates the alms (aumône) or zakat. This algorithm receives a person's wealth along with the price of one gram of gold. Then, it displays the zakat amount. Knowing that the zakat rate is 2.5% and the Nisab threshold is 85 grams of gold.

<pre> Algorithm zakat Const Nissaabe=85 Var money, zkt , Nsb_arg, gold_price: real begin write("enter your amount ") read (money) write("enter the price of gold ") read (gold_price) Nsb_arg← gold_price* Nissaabe if money >= Nsb_arg then zkt ← money*2.5/100 else zkt ← 0 end if write("le montant du zakat est ", zkt) end. </pre>	<pre> #include <stdio.h> int main() { Const int Nissaabe=85; float money,zkt , Nsb_arg,gold_price; printf("enter your amount "); scanf("%f",&money); printf("enter the price of gold "); scanf("%f",&gold_price); Nsb_arg= gold_price* Nissaabe ; if (money >= Nsb_arg) zkt = money*2.5/100; else zkt = 0; printf("the amount of zakat is %.2f\n", zkt); } </pre>
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Exercise 4: TD

Write an algorithm that reads a year A and informs us if this year is a leap year (February has 29 days) or not.

<pre> Algorithm leap_year Var A: integer begin write("enter a year ") read (A) if A mod 4 ≠ 0 then write(A, " is not a leap year ") else if A mod 400 = 0 then write(A, " is a leap year ") else if A mod 100 = 0 then write(A, " is not a leap year ") else write(A, " is a leap year ") end if end if end if end. </pre>	<pre> #include <stdio.h> int main() { int A; printf("enter a year "); scanf("%d",&A); if (A % 4 !=0) printf("%d is not a leap year ", A); else if (A % 400 ==0) printf("%d is a leap year ",A) else if (A % 100 ==0) printf("%d is not a leap year ",A) else printf("%d is a leap year ", A) } </pre>
<pre> If (A mod 4 =0 and A mod 100 ≠ 0) or (A mod 400 =0) then write(A, " is a leap year ") else write(A, " is not a leap year ") end if </pre>	<pre> if ((A mod 4 =0 et A mod 100 ≠ 0) ou (A mod 400 =0)) then printf("%d is a leap year ", A) else printf("%d is not a leap year ", A) </pre>

Exercise 5: TP

Write an algorithm with its C program that allows reading two integers A and B and checks if A is divisible by B , or if B is divisible by A. If neither is divisible, output a message indicating that.

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<pre> Algorithm divisible Var A, B: integer begin write("Enter two integers A and B ") read(A, B) if A mod B = 0 then write(A, " is divisible by ", B) else if B mod A = 0 then write(B, " is divisible by ", A) else write("Neither A is divisible by B nor B is divisible by A") end if end if end. </pre>	<pre> #include <stdio.h> int main() { int A, B; printf("Enter two integers A and B: "); scanf("%d %d", &A, &B); if (A % B == 0) printf("%d is divisible by %d\n", A, B); else if (B % A == 0) printf("%d is divisible by %d\n", B, A); else printf("Neither %d is divisible by %d nor %d is divisible by %d\n", A, B, B, A); return 0; } </pre>
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Exercise 6: TD

Write an algorithm that calculates the average of the analysis (exam and tutorials). Then, it calculates the final average, and if the average is below 10/20, it asks the user to provide the make-up grade. In this case, the calculation of the final average considers the better grade between the original exam and the make-up exam, and finally, the algorithm displays the final average.

<pre> Algorithm avg_analysis Var exam, TD, avg, rat : real begin write("exam : ") read (exam) write("TD: ") read (TD) avg ← (exam *3+ TD*2)/5 if avg<10 then write("Rattrapage : ") read (rat) if rat > exam then avg ← (rat *3+ TD*2)/5 end if end if write("the average =", avg) end. </pre>	<pre> #include <stdio.h> int main() { float exam,TD ,avg, rat; printf("exam :"); scanf("%f",&exam); printf("TD:"); scanf("%f",&TD); avg = (exam *3+ TD*2)/5; if (avg<10){ printf("Rattrapage : ") ; scanf("%f",&rat); if (rat > exam) avg= (rat *3+ TD*2)/5 ; } printf("the average =%.2f", avg); } </pre>
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Exercise 7: TD/TP

Write an algorithm and its program that calculates i^n where i is the imaginary number $i = \sqrt{-1}$

<pre> Algorithm imaginary Var n: integer begin write("Enter an integer n ") read(n) case n mod 4 of 0: write("i^n = 1") 1: write("i^n = i") 2: write("i^n = -1") 3: write("i^n = -i") end case end. </pre>	<pre> #include <stdio.h> int main() { int n; printf("Enter an integer n: "); scanf("%d", &n); switch (n % 4) { case 0: printf("i^%d = 1\n", n); break; case 1: printf("i^%d = i\n", n); break; case 2: printf("i^%d = -1\n", n); break; case 3: printf("i^%d = -i\n", n); break; } return 0; } </pre>
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Exercise 8: TP



Write a program that reads a character, and if it is a letter, it displays it in uppercase; otherwise, it displays it as it is.

```
#include <stdio.h>
int main() {
    char ch;
    printf("Enter a character: ");
    scanf("%c", &ch);
    if (ch >= 'a' && ch <= 'z')
        ch = ch - ('a' - 'A');
    printf("The character is: %c\n", ch);
    return 0;
}
```

Exercise 9: at home

Write an algorithm and its program for a mini-calculator that offers the user to perform one of the following operations (addition of two numbers, subtraction of two numbers, division of two numbers, multiplication of two numbers, square root of a number, and power of a number).

```
Algorithm mini_calculator
Var x, y: real
    Choice : character
begin
    write("mini-calculator ")
    write("+ : addition ")
    write("- : subtraction ")
    write("* : multiplication ")
    write("/ : division ")
    write("r : square root ")
    write("^ : power ")
    write("enter your choice ")
    read (Choice)
    if Choice = 'r' then
        write("enter a nbr ")
        read (x)
        write("√", x, "=", √x)
    else
        write("enter two nbrs ")
        read (x, y)
        case Choice of
            '+' : write(x, "+", y, "=", x+y)
            '-' : write(x, "-", y, "=", x-y)
            '*' : write(x, "*", y, "=", x*y)
            '/' : write(x, "/", y, "=", x/y)
            '^' : write(x, "^", y, "=", x^y)
        end case
    end if
fin.
```

```
#include <stdio.h>
#include <math.h>
int main() {
    float x, y;
    char Choice ;
    printf("mini-calculator \n");
    printf("+ : addition \n");
    printf("- : subtraction \n");
    printf("* : multiplication \n");
    printf("/ : division \n");
    printf("r : square root \n");
    printf("^ : power \n");
    printf("enter your choice \n");
    scanf("%c", &Choice);
    if (Choice == 'r') {
        printf("enter a nbr \n");
        scanf("%f", &x);
        printf("√%f=%f", x, sqrt(x));
    } else {
        printf("enter two nbrs ");
        scanf("%f%f", &x, &y);
        switch (Choice) {
            case '+' : printf("%f+%f=%f", x, y, x+y); break;
            case '-' : printf("%f-%f=%f", x, y, x-y); break;
            case '*' : printf("%f*%f=%f", x, y, x*y); break;
            case '/' : printf("%f/%f=%f", x, y, x/y); break;
            case '^' : printf("%f^%f=%f", x, y, pow(x,y));
        } // end of switch
    } // end of else
    Return 0 ;
}
```