

Solutions to Exercise Series N°: 03

Exercise 1.

1. Execution of the algorithm for : a= 14 and for a=37

Instructions	<i>a=14</i>				/	<i>a=37</i>			
	<i>A</i>	<i>b</i>	<i>c</i>	<i>p</i>		<i>A</i>	<i>b</i>	<i>C</i>	<i>p</i>
c←0, p←1	/	/	0	1	/	/	0	1	
read(a)	14	/	0	1	/	37	/	0	1
b←a mod 8	14	6		1	/	37	5	0	1
a← a div 8	1	6	0	1	/	4	5	0	1
c←c+ b*p;	1	6	6	1	/	4	5	5	1
p←p*10;	1	6	6	10	/	4	5	5	10
b←a mod 8	1	1	6	10	/	4	4	5	10
a← a div 8	0	1	6	10	/	0	4	5	10
c←c+ b*p;	0	1	16	10	/	0	4	45	10
p←p*10;	0	1	16	100	/	0	4	45	100

What does the algorithm do? *The algorithm converts a decimal into octal code*

if the value of "a" exceeds 64? *Erroneous result, the conversion requires more division operations*

2. Translate the algorithm into a C program.

```
#include<stdio.h>
int main()
{ int a, b, c, p ;
c=0; p=1;
printf ("enter a nbr < 64\n");
scanf ("%d", &a);
b=a % 8;
a= a / 8;
c = c+ b*p;
p = p*10;
b = a % 8;
a= a / 8;
c= c +b*p;
p = p *10;
Printf (" resultat : %d ", c); }
```

Exercise 2.

A lead ball is dropped from the top of a building and falls in free fall. After a time t (expressed in seconds), the ball has descended a height (in meters): $h=12gt^2$ with $g = 9.81$ (expressed in $(m.s^{-2})$)

Write an algorithm which calculates the height descended after a time t entered on the keyboard.

Example $t=4$ seconds $\rightarrow h = 78.48$ meters

<p><i>Algorithm</i> <i>Var h, t : real</i> <i>Begin</i> <i>Write (" Enter a number of seconds : ");</i> <i>Read(t)</i> <i>h ← (9.81 * t * t) / 2.0;</i> <i>write ("A t = ", t, h = ", h);</i> <i>End</i></p>	<pre>int main(int) {float h, t; printf("enter a number of seconds : "); scanf("%f", &t); h = (9.81 * t * t) / 2.0; printf("A t = %f, h = %f\n", t, h); return 0; }</pre>
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Exercise 3.

$$C = (5/9) * (F - 32)$$

<pre> Algorithm Conversion_Temp Var celsius, fahrenheit : real Begin write("Enter a temperature in Fahrenheit degrees : "); read(fahrenheit) celsius ← (5./9)* (fahrenheit - 32.0); write ("Temperature ", fahrenheit, " = degre Celsius."); End </pre>	<pre> int main(void) { float celsius, fahrenheit; printf("Entrer a temperature in Fahrenheit degrees : "); scanf("%f", &fahrenheit); celsius = (5./9)* (fahrenheit - 32.0); printf("Temperature %f degre Celsius.\n", celsius); return 0; } </pre>
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Exercise 4.

<pre> Algorithm calcul { valeur , nbPieces : integer Begin write (" Enter an amount : "); read (valeur) ; write ("To pay it, you will need : ") nbPieces ← valeur div 50 ; write (nbPieces , "coin (s) of 50 dinars "); valeur ← valeur - nbPieces * 50 ; nbPieces ← valeur div 20 ; write (nbPieces , " coin (s) of 20 dinars ") ; valeur ←valeur - nbPieces * 20 ; nbPieces ←valeur div 10 ; write (nbPieces, " coin (s) of 10 dinars \n" .) ; valeur = valeur - nbPieces * 10 ; nbPieces ← valeur div 5 ; write (nbPieces , "coin (s) of 5 dinars " ,) ; valeur ← valeur - nbPieces * 5 ; write ("%d coin (s) de 1 dinar \n" , valeurs) ; End </pre>	<pre> #include<stdio . h> int main () { int valeur , nbPieces ; printf (" Enter an amount : ") ; scanf ("%d " , &valeur) ; printf (" To pay it, you will need : \n") ; nbPieces = valeur / 50 ; printf ("%d coin (s) of 50 dinars \n" , nbPieces) ; valeur = valeur - nbPieces * 50 ; nbPieces = valeur/ 20 ; printf ("%d coin(s) of 20 dinars \n" , nbPieces) ; valeur = valeur - nbPieces * 20 ; nbPieces = valeur / 10 ; printf ("%d coin(s) of 10 dinars \n" , nbPieces) ; valeur = valeur - nbPieces * 10 ; nbPieces = valeur / 5 ; printf ("%d coin (s) de 5 dinars \n" , nbPieces) ; valeur = valeur - nbPieces * 5 ; printf ("%d coin (s) de 1 dinar \n" , valeurs) ; return 0 ; } </pre>
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Practical work**Exercise 1**

Write an algorithm that reads a positive number of seconds and converts it to hours, minutes, and seconds.

```

int main(int) {
float T, h,m,s;
printf("Enter number of seconds : ");
scanf("%d", &T);
s= T % 60;
h= T /3600;
s= T / 60 % 60;
printf("T= %d seconds = %dh %d mn %d sec\n", T, h,m,s);
return 0;
}

```

Exercise 2

Write a program that converts a given number in bits into Bytes, Kilobytes, and Megabytes.

```
int main(int)
{
int bit,oct;
float Kil, Meg;
printf("Enter number of bits :");
scanf("%d", &bit);
oct = bit /8 ;
Kilo = 1.0 *oct /1024 ;
Meg = 1.0 *Kil /1024 ;
printf(" %d bits = %d Bytes =%d Kilobytes = %d Megabytes= %d \n", bit, oct,Kilo,Meg);
}
```