

Correction of the Third series

Exercise 1.

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

	a=14					a=37			
Instructions	A	b	c	p		A	b	C	p
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): $h=1/2gt^2$ 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

Algorithm Var h, t : real Begin Write (" Enter a number of seconds : "); Read(t) $h \leftarrow (9.81 * t * t) / 2.0;$ write ("A t = ", t, h = ", h); End	<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.

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

<i>Algorithm Conversion_Temp</i> Var <i>celsius, fahrenheit : real</i> Begin write("Enter a temperature in Fahrenheit degrees : "); read(fahrenheit) <i>celsius</i> ← (5. /9)* (fahrenheit - 32.0); write ("Temperature ", fahrenheit, " = degre Celsius."); End	<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.

<i>Algorithm calcul</i> { <i>valeur , nbPieces : integer</i> Begin write (" Enter an amount : "); read (<i>valeur</i>); write ("To pay it, you will need : ") <i>nbPieces</i> ← <i>valeur</i> div 50 ; write (<i>nbPieces</i> , "coin (s) of 50 dinars "); <i>valeur</i> ← <i>valeur</i> - <i>nbPieces</i> * 50 ; <i>nbPieces</i> ← <i>valeur</i> div 20 ; write (<i>nbPieces</i> , " coin (s) of 20 dinars ") ; <i>valeur</i> ← <i>valeur</i> - <i>nbPieces</i> * 20 ; <i>nbPieces</i> ← <i>valeur</i> div 10 ; write (<i>nbPieces</i>, "coin (s) of 10 dinars \n" .) ; <i>valeur</i> = <i>valeur</i> - <i>nbPieces</i> * 10 ; <i>nbPieces</i> ← <i>valeur</i> div 5 ; write (<i>nbPieces</i> , "coin (s) of 5 dinars " .) ; <i>valeur</i> ← <i>valeur</i> - <i>nbPieces</i> * 5 ; write ("%d coin (s) de 1 dinar \n" , <i>valeurs</i>) ; End	<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);
}
```