People's Democratic Republic of Algeria

Echahid Hamma Lakhdar University

DS & ALGO : Series 01

Drici Mohammed Hachem

Group A5

Exercise 1

Code: Using a third variable c

```c
#include <stdio.h>

int main() {
    int a,b,c;
    printf("Enter the value of a and b : ");
    scanf("%d %d" ,&a,&b);
    printf("Before swapping : a = %d , b = %d \n",a,b);
    c = a;
    a = b;
    b = c;
    printf("After swapping : a = %d , b = %d",a,b);
    return 0;
 }
```

Code: Without using a third variable

```c
#include <stdio.h>

int main() {
    int a,b;
    printf("Enter the value of a and b : ");
    scanf("%d %d" ,&a,&b);
    printf("Before swapping : a = %d , b = %d \n",a,b);
    a = a+b;
    b = a-b;
    a = a-b;
    printf("After swapping : a = %d , b = %d",a,b);
    return 0;
}
```

Exercise 2

Code:

```c
#include <stdio.h>

int main() {
    int a;
    printf("Enter the value of a in Octal : ");
    scanf("%o" ,&a);
    printf("in decimal a = %d, in hexadecimal a = %x",a,a);
    return 0;
}
```

Exercise 3

Code:

```c
#include<stdio.h>

int main() {
    //Version 1 Integer division case
    int a,b,c;
    printf("Enter the value of a and b : ");
    scanf("%d %d" ,&a,&b);
    c = a/b;
    printf("The integer division a/b = %d",c);
    //Version 2 Real division with precision 3
    int a,b;
    float c;
    printf("Enter the value of a and b : ");
    scanf("%d %d" ,&a,&b);
    c = (float) a/b;
    printf("The integer division a/b = %.3f",c);
    return 0;
}
```

Exercise 4

Code:

```c
#include <stdio.h>
#include <math.h>
int main(){
    float P,S,R;
    printf("Enter the value of the circle radius R : ");
    scanf("%f" ,&R);
    S = M_PI*R*R;
    P = 2*M_PI*R;
    printf("The Area of the circle: %f\n",S);
    printf("The Perimeter of the circle: %f\n",P);
    return 0;
}
```

Exercise 5

Code:

```c
#include <stdio.h>
int main() {
    int A, B, C, D;
    A = 4, B = 1, C = A++ > B || B++ != 2;
    printf("Resultat 1 : A = %d B = %d C = %d\n", A, B, C);
    // Resultat 1 : A = 5 B = 1 C = 1
    A = 4 ; B = 1 ; C = ++A == 5 && ++B == 2;
    printf("Resultat 2 : A = %d B = %d C = %d\n", A, B, C);
    // Resultat 2 : A = 5 B = 2 C = 1
    A= 1, D = ++A == (B = C = 2) ;
    printf ("Reaultat 3 : A = %d B = %d C = %d D = %d\n", A, B, C, D
        );
    // Reaultat 3 : A = 2 B = 2 C = 2 D = 1
    A = B = C = 10 ; A += B += C ;
    printf("Resultat 4 : A = %d B = %d C = %d\n", A, B, C);
    // Resultat 4 : A = 30 B = 20 C = 10
    A = 5; C = A << 1; B = A >> 2;
    printf("Resultat 5 : A = %d B = %d C = %d\n", A, B, C);
    // Resultat 5 : A = 5 B = 1 C = 10
    A= 4, B = 1; C = A & B; A = B | 2; B ^= 4;
    printf("Resultat 6 : A = %d B = %d C = %d\n", A, B, C);
    // Resultat 6 : A = 3 B = 5 C = 0
    char X = 'C' ;
    printf("Entier = %d,\n Octal = %o,\n Hexa = %x\n", X, X, X);
    // Entier = 67, Octal = 103, Hexa = 43
    int T = "ABC";
    printf(" T comme entier = %d \n", T) ;
    // ???
    return 0;
}
```

Exercise 6

Code:

```c
#include <stdio.h>
int main() {
    //Version 1 Testing point inside a rectangle
    float A_X ,A_Y ,BL_X ,BL_Y ,TR_X ,TR_Y;
    printf("Enter the coordinates of the bottom left corner of the
    rectangle: ");
    scanf("%f %f" ,&BL_X ,&BL_Y);
    printf("Enter the coordinates of the top right corner of the
```

```
    rectangle: ");
    scanf("%f %f" ,&TR_X ,&TR_Y);
    printf("Enter the coordinates of the point: ");
    scanf("%f %f" ,&A_X ,&A_Y);
    if (A_X >= BL_X && A_X <= TR_X && A_Y >= BL_Y && A_Y <= TR_Y) {
        printf("The point is inside the rectangle \n");
        } else {
        printf("The point is outside the rectangle \n");
        }
    //Version 2 Testing point inside a circle
    float A_X ,A_Y ,O_X ,O_Y ,R;
    printf("Enter the coordinates of the point A: ");
    scanf("%f %f" ,&A_X ,&A_Y);
    printf("Enter the coordinates of the point center point O: ");
    scanf("%f %f" ,&O_X ,&O_Y);
    printf("Enter the radius of the circle: ");
    scanf("%f" ,&R);
    if ((A_X - O_X)*(A_X - O_X) + (A_Y - O_Y)*(A_Y - O_Y) <= R*R) {
        printf("The point A is inside the circle\n");
        } else {
        printf("The point A is outside the circle\n");
        }
    return 0;
}
```

Exercise 7

Code:

```c
#include <stdio.h>
int main() {
    //Version 1 Using Conditional Instructions
    int a,b,c;
    printf("Enter the value of a, b and c: ");
    scanf("%d %d %d", &a, &b, &c);
    if(a >= b) {
        if(a >= c) {
            printf("a = %d is the largest number\n",a);
            } else {
            printf("c = %d is the largest number\n",c);
            }
        } else {
        if(b >= c) {
            printf("b = %d is the largest number\n",b);
            } else {
            printf("c = %d is the largest number\n",c);
            }
        }
    //Version 2 Using Ternary Operator
    int a,b,c,max;
    printf("Enter the value of a, b and c: ");
    scanf("%d %d %d", &a, &b, &c);
    max = (a >= b) ? (a >= c ? a : c) : (b >= c ? b : c);
    printf("The maximum value is %d\n",max);
    return 0;
}
```

Exercise 8

Code:

```c
#include <stdio.h>
int main() {
int A,B,C,D,E;
A = 5; B= (A<0) ? 1 ,2 ,3:10 ,20 ,30; printf("B=%d\n",B); /*B = 10*/
A = -5; B = (A<0) ? 1 ,2 ,3:10 ,20 ,30; printf("B=%d\n",B); /*B = 3
   */
A = 5; C= (A<0) ? (1,2,3) :(10 ,20 ,30); printf("C=%d\n",C); /*C =
   30*/
A = -5; C= (A<0) ? (1,2,3) :(10 ,20 ,30); printf("C=%d\n",C); /*C =
   3*/
D = -1,-2,-3; printf("D=%d\n",D); /*D = -1*/
```

```
E = (-1,-2,-3); printf("E=%d\n",E); /*E = -3*/
return 0;
}
```

Exercise 9

Code:

```
#include <stdio.h>
int main() {
    //Version 1 Using Conditional Instructions
    int age;
    printf("Enter the kid's age: ");
    scanf("%d", &age);
    if (age > 14 || age < 6) {
        printf("The age must be between 6 and 14 to be in junior
           categories\n");
    } else {
        printf("Poussin");
        else if(age >= 8 && age <= 9) {
        printf("Pupille");
        else if(age >= 10 && age <= 11) {
        printf("Minime");
        else{
        printf("Cadet");
    }
    //Version 2 Using Switch Cases
    int age;
    printf("Enter the kid's age: ");
    scanf("%d", &age);
    if (age > 14 || age < 6) {
        printf("The age must be between 6 and 14 to be in junior
           categories\n");
    } else {
    switch (age) {
        case 6: case 7:
        printf("Poussin");
        break;
        case 8: case 9:
        printf("Pupille");
        break;
        case 10: case 11:
        printf("Minime");
        break;
        default:
        printf("Cadet");
        break;
```

```
        }
    }
    return 0;
}
```

Exercise 10

Code:

```
#include <stdio.h>
#include <math.h>
int main() {
    float A, B, C;
    float delt , x_1 , x_2 , re , im;
    printf("Enter coefficients A, B, and C: ");
    scanf("%f %f %f", &A, &B, &C);
    if (A == 0) {
        if (B == 0) {
            printf("No solution\n");
            } else {
            printf("The solution: x = %.2f\n", -C / B);
            }
        } else {
        delt = B * B - 4 * A * C;
        if (delt > 0) {
            x_1 = (-B + sqrt(delt)) / (2 * A);
            x_2 = (-B - sqrt(delt)) / (2 * A);
            printf("The solutions : x1 = %.2f, x2 = %.2f\n", x_1 ,
            x_2);
            } else if (delt == 0) {
            x_1 = -B / (2 * A);
            printf("The solution : x = %.2f\n", x_1);
            } else {
            re = -B / (2 * A);
            im = sqrt(-delt) / (2 * A);
            printf("The complex olutions: x1 = %.2f + %.2fi , x2 =
            %.2f - %.2fi\n",re ,im ,re ,im);
            }
        }
        return 0;
}
```

Exercise 11

Code:

```c
#include <stdio.h>
int main() {
    int birth_day , birth_month , birth_year;
    int current_day , current_month , current_year;
    int age;
    printf("Enter your birth date : ");
    scanf("%d %d %d", &birth_day , &birth_month , &birth_year);
    printf("Enter today 's date : ");
    scanf("%d %d %d", &current_day , &current_month , &current_year)
        ;
    age = current_year - birth_year;
    if (current_month < birth_month || (current_month == birth_month
    && current_day < birth_day)) {
        age --;
        }
    printf("Your age is: %d years , Happy Birth Day!", age);
    return 0;
}
```