

People's Democratic Republic of Algeria

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DS & ALGO : Series 01

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Group A5

Exercise 1

Code: Using a third variable *c*

```
1 #include <stdio.h>
2
3 int main() {
4     int a,b,c;
5     printf("Enter the value of a and b : ");
6     scanf("%d %d" ,&a,&b);
7     printf("Before swapping : a = %d , b = %d \n",a,b);
8     c = a;
9     a = b;
10    b = c;
11    printf("After swapping : a = %d , b = %d",a,b);
12    return 0;
13 }
```

Code: Without using a third variable

```
1 #include <stdio.h>
2
3 int main() {
4     int a,b;
5     printf("Enter the value of a and b : ");
6     scanf("%d %d" ,&a,&b);
7     printf("Before swapping : a = %d , b = %d \n",a,b);
8     a = a+b;
9     b = a-b;
10    a = a-b;
11    printf("After swapping : a = %d , b = %d",a,b);
12    return 0;
13 }
```

Exercise 2

Code:

```
1 #include <stdio.h>
2
3 int main() {
4     int a;
5     printf("Enter the value of a in Octal : ");
6     scanf("%o" ,&a);
7     printf("in decimal a = %d, in hexadecimal a = %x",a,a);
8     return 0;
9 }
```

Exercise 3

Code:

```
1 #include<stdio.h>
2
3 int main() {
4     //Version 1 Integer division case
5     int a,b,c;
6     printf("Enter the value of a and b : ");
7     scanf("%d %d" ,&a,&b);
8     c = a/b;
9     printf("The integer division a/b = %d",c);
10    //Version 2 Real division with precision 3
11    int a,b;
12    float c;
13    printf("Enter the value of a and b : ");
14    scanf("%d %d" ,&a,&b);
15    c = (float) a/b;
16    printf("The integer division a/b = %.3f",c);
17    return 0;
18 }
```

Exercise 4

Code:

```
1 #include <stdio.h>
2 #include <math.h>
3 int main(){
4     float P,S,R;
5     printf("Enter the value of the circle radius R : ");
6     scanf("%f" ,&R);
7     S = M_PI*R*R;
8     P = 2*M_PI*R;
9     printf("The Area of the circle: %f\n",S);
10    printf("The Perimeter of the circle: %f\n",P);
11    return 0;
12 }
```

Exercise 5

Code:

```
1 #include <stdio.h>
2 int main() {
3     int A, B, C, D;
4     A = 4, B = 1, C = A++ > B || B++ != 2;
5     printf("Resultat 1 : A = %d B = %d C = %d\n", A, B, C);
6     // Resultat 1 : A = 5 B = 1 C = 1
7     A = 4 ; B = 1 ; C = ++A == 5 && ++B == 2;
8     printf("Resultat 2 : A = %d B = %d C = %d\n", A, B, C);
9     // Resultat 2 : A = 5 B = 2 C = 1
10    A= 1, D = ++A == (B = C = 2) ;
11    printf ("Reaultat 3 : A = %d B = %d C = %d D = %d\n", A, B, C, D
12            );
13    // Reaultat 3 : A = 2 B = 2 C = 2 D = 1
14    A = B = C = 10 ; A += B += C ;
15    printf("Resultat 4 : A = %d B = %d C = %d\n", A, B, C);
16    // Resultat 4 : A = 30 B = 20 C = 10
17    A = 5; C = A << 1; B = A >> 2;
18    printf("Resultat 5 : A = %d B = %d C = %d\n", A, B, C);
19    // Resultat 5 : A = 5 B = 1 C = 10
20    A= 4, B = 1; C = A & B; A = B | 2; B ^= 4;
21    printf("Resultat 6 : A = %d B = %d C = %d\n", A, B, C);
22    // Resultat 6 : A = 3 B = 5 C = 0
23    char X = 'C' ;
24    printf("Entier = %d,\n Octal = %o,\n Hexa = %x\n", X, X, X);
25    // Entier = 67, Octal = 103, Hexa = 43
26    int T = "ABC";
27    printf(" T comme entier = %d \n", T) ;
28    // ???
29    return 0;
}
```

Exercise 6

Code:

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

```

9      rectangle: ");
10     scanf("%f %f" ,&TR_X ,&TR_Y);
11     printf("Enter the coordinates of the point: ");
12     scanf("%f %f" ,&A_X ,&A_Y);
13     if (A_X >= BL_X && A_X <= TR_X && A_Y >= BL_Y && A_Y <= TR_Y) {
14         printf("The point is inside the rectangle \n");
15     } else {
16         printf("The point is outside the rectangle \n");
17     }
18     //Version 2 Testing point inside a circle
19     float A_X ,A_Y ,O_X ,O_Y ,R;
20     printf("Enter the coordinates of the point A: ");
21     scanf("%f %f" ,&A_X ,&A_Y);
22     printf("Enter the coordinates of the point center point O: ");
23     scanf("%f %f" ,&O_X ,&O_Y);
24     printf("Enter the radius of the circle: ");
25     scanf("%f" ,&R);
26     if ((A_X - O_X)*(A_X - O_X) + (A_Y - O_Y)*(A_Y - O_Y) <= R*R) {
27         printf("The point A is inside the circle\n");
28     } else {
29         printf("The point A is outside the circle\n");
30     }
31     return 0;
32 }

```

Exercise 7

Code:

```
1 #include <stdio.h>
2 int main() {
3     //Version 1 Using Conditional Instructions
4     int a,b,c;
5     printf("Enter the value of a, b and c: ");
6     scanf("%d %d %d", &a, &b, &c);
7     if(a >= b) {
8         if(a >= c) {
9             printf("a = %d is the largest number\n",a);
10        } else {
11            printf("c = %d is the largest number\n",c);
12        }
13    } else {
14        if(b >= c) {
15            printf("b = %d is the largest number\n",b);
16        } else {
17            printf("c = %d is the largest number\n",c);
18        }
19    }
20    //Version 2 Using Ternary Operator
21    int a,b,c,max;
22    printf("Enter the value of a, b and c: ");
23    scanf("%d %d %d", &a, &b, &c);
24    max = (a >= b) ? (a >= c ? a : c) : (b >= c ? b : c);
25    printf("The maximum value is %d\n",max);
26    return 0;
27 }
```

Exercise 8

Code:

```
1 #include <stdio.h>
2 int main() {
3     int A,B,C,D,E;
4     A = 5; B= (A<0) ? 1 ,2 ,3:10 ,20 ,30; printf("B=%d\n",B); /*B = 10*/
5     A = -5; B = (A<0) ? 1 ,2 ,3:10 ,20 ,30; printf("B=%d\n",B); /*B = 3
6     */
7     A = 5; C= (A<0) ? (1,2,3) :(10 ,20 ,30); printf("C=%d\n",C); /*C =
8     30*/
9     A = -5; C= (A<0) ? (1,2,3) :(10 ,20 ,30); printf("C=%d\n",C); /*C =
10    3*/
11    D = -1,-2,-3; printf("D=%d\n",D); /*D = -1*/
```

```
9 E = (-1,-2,-3); printf("E=%d\n",E); /*E = -3*/
10 return 0;
11 }
```

Exercise 9

Code:

```
1 #include <stdio.h>
2 int main() {
3     //Version 1 Using Conditional Instructions
4     int age;
5     printf("Enter the kid's age: ");
6     scanf("%d", &age);
7     if (age > 14 || age < 6) {
8         printf("The age must be between 6 and 14 to be in junior
9             categories\n");
10    } else {
11        printf("Poussin");
12        else if(age >= 8 && age <= 9) {
13            printf("Pupille");
14        else if(age >= 10 && age <= 11) {
15            printf("Minime");
16        else{
17            printf("Cadet");
18        }
19    //Version 2 Using Switch Cases
20    int age;
21    printf("Enter the kid's age: ");
22    scanf("%d", &age);
23    if (age > 14 || age < 6) {
24        printf("The age must be between 6 and 14 to be in junior
25            categories\n");
26    } else {
27        switch (age) {
28            case 6: case 7:
29                printf("Poussin");
30                break;
31            case 8: case 9:
32                printf("Pupille");
33                break;
34            case 10: case 11:
35                printf("Minime");
36                break;
37            default:
38                printf("Cadet");
39                break;
40        }
41    }
```

```
38     }
39 }
40 return 0;
41 }
```

Exercise 10

Code:

```
1 #include <stdio.h>
2 #include <math.h>
3 int main() {
4     float A, B, C;
5     float delt , x_1 , x_2 , re , im;
6     printf("Enter coefficients A, B, and C: ");
7     scanf("%f %f %f", &A, &B, &C);
8     if (A == 0) {
9         if (B == 0) {
10             printf("No solution\n");
11         } else {
12             printf("The solution: x = %.2f\n", -C / B);
13         }
14     } else {
15         delt = B * B - 4 * A * C;
16         if (delt > 0) {
17             x_1 = (-B + sqrt(delt)) / (2 * A);
18             x_2 = (-B - sqrt(delt)) / (2 * A);
19             printf("The solutions : x1 = %.2f, x2 = %.2f\n", x_1 ,
20                 x_2);
21         } else if (delt == 0) {
22             x_1 = -B / (2 * A);
23             printf("The solution : x = %.2f\n", x_1);
24         } else {
25             re = -B / (2 * A);
26             im = sqrt(-delt) / (2 * A);
27             printf("The complex olutions: x1 = %.2f + %.2fi , x2 =
28                 %.2f - %.2fi\n",re ,im ,re ,im);
29         }
30     }
31     return 0;
32 }
```


Exercise 11

Code:

```
1 #include <stdio.h>
2 int main() {
3     int birth_day , birth_month , birth_year;
4     int current_day , current_month , current_year;
5     int age;
6     printf("Enter your birth date : ");
7     scanf("%d %d %d", &birth_day , &birth_month , &birth_year);
8     printf("Enter today 's date : ");
9     scanf("%d %d %d", &current_day , &current_month , &current_year)
10    ;
11    age = current_year - birth_year;
12    if (current_month < birth_month || (current_month == birth_month
13    && current_day < birth_day)) {
14        age --;
15    }
16    printf("Your age is: %d years , Happy Birth Day!", age);
17    return 0;
18 }
```