Chapter – 03

Programming Exercise

3.1 Given the value of the variables x, y and z, write a program to rotate their values such that x has the value of y, y has the value of z and z has the value of x.

Answer:

```
#include <stdio.h>
int main()
{
  int x,y,z,t;
  printf("enter value of x,y,z\n");
  Scanf("%d %d %d",&x, &y, &z);
  t=x;
  x=y;
  y=z;
  z=t;
  printf("%d %d %d",x,y,z);
  return 0;
}
```

Output:

```
x=2
y=3
z=4

x=3
y=4
z=5
```

3.2 Write a program that reads a floating point number and then displays the right most digit of the integral part of the number.

Answer:

```
#include <stdio.h>
int main()
{
int a, e;
float p;
printf("Enter a float number \n");
scanf("%f", &p);
a = (int) p;
e = a % 10;
printf("%d \n", e);
return 0;
}
```

Output:

```
Enter a float number : 123.4
3
```

3.3 Modify the above program to display the two right most digits of the integral part of the number.

Answer:

```
#include <stdio.h>
int main()
int a, e;
float P;
printf("Enter a float number\n");
scanf("%f", &P);
a=(int)P;
e=(a%100);
printf("%d\n", e);
return 0;
}
```

output: Enter a float number: 123.4

23.

3.4 Write a program that will obtain the length and width of a rectengal from the user and computers its area and perimeter.

Answer:

```
#include <stdio.h>
int main()
{
 int len, wid, area, perimeter;
 printf("Enter the value of length width \n");
 Scanf("%d%d", &len, &wid);
 area = (len * wid);
 perimeter = 2* (len+ wid);
 printf("area is =%d\n 'perimeter is =%d", area, perimeter);
 return 0;
}
```

Output:

Enter the value of length width 3,2

area = 6

perimeter = 10.

3.5 Given an integer number, write a program that displays the number as follows.

Answer:

```
#include <stdio.h>
int main()
{
 int a,b,c,e,x;
 float P;
 printf("Enter the number \n");
 Scanf("%f", &P);
 a = (int)(P);
 printf(" the digit are \n");
 e = a % 10000;
 b = e % 1000;
 c = b % 100;
 d = c % 10;
 if (a > 10000)
 printf("%d\n %d\n %d\n %d\n", a,e,b,c,x);
 else if (a>1000)
 printf("%d\n %d\n %d\n", a,b,c,x);
 else if (a>100)
 printf("%d\n %d\n %d\n", a,c,x);
 else if (a>10)
 printf("%d\n %d\n", a,x);
 printf("%d\n", a%10);
}
```

Output:

5678
678
78
8

3.6 The Straight line method of computing yearly depreciation of the value of an item is given by Depreciation $= \frac{\text{purchase} - \text{Salvage Value}}{\text{Years of service}}$

Write a program to determine the Salavage value of an item when the purchase price, years of service and the annual depreciation are given.

Answer:

```
#include <stdio.h>
int main()
{ int years;
  float S,d,P;
  printf ("Enter the value of years, %d, \n");
  scanf ("%d %f %f", &year, &d, &P);
  S= p- (years * d);
  printf ("Salavage Value is : %0.3f\n", S);
  return 0;
}
```

3.7 Write a program that will read a real number from the keyboard and print the following output in one line : Smallest integer not less that the number. the given number. Largest integer not greater than the number.

Answer:

```
#include <stdio.h>
int main()
{ float m;
  int n,p;
  printf("give me the value of m \n");
  Scanf("%f", &m);
  n= (m/1)+1;
  p=m;
  printf("%d %0.2f ", n,m,p);
  return 0;
}
```

3.8 The total distance travelled by a vehicle in t seconds is given by : distance $= ut + (at^2)/2$ where u is the initial velocity, a is the accelaration. Write a program to evaluate the distance travelled at regular intervals of time, given the values of u and a.

Answer:

```
#include <stdio.h>
int main()
{ int a,u,t;
  float dis;
  printf("Enter the value of a,u,t\n");
  scanf("%d %d %d",&a, &u, &t);
  dis = u*t +(a*t*t)/2;
  printf("distance is : %0.3f\n", dis);
  return 0;
}
```

Output:

```
Enter the value of a,u,t
2,3,4
Distance is : 36.000
```

[3.9] In inventory management, the economic order quantity for a single item is given by

$$EOQ = \sqrt{\frac{2 \times \text{demand rate} \times \text{setup costs}}{\text{holding costs per item per unit item}}}$$

and the optimal time between orders:

$$TBQ = \sqrt{\frac{2 \times \text{Setup costs}}{\text{demand rate} \times \text{holding cost per unit.}}}$$

Write a program to compute EOQ and TBQ given demand rate setup costs and holding costs.

Answer:

```
#include <stdio.h>
#include <Math.h>
int main()
{
float Dr, Sc, Hc, TBO, EOQ;
printf("Enter Demand Rate \n");
Scanf("%f \n", &Dr);
printf("Enter Setup costs \n");
Scanf("%f \n", &sc);
printf("Enter Holding cost \n");
Scanf("%f/n", &Hc);
```

[3.10]

```
EOQ =sqrt((2* Dr *Sc) /HC);
TBO = sqrt((2* Sc)/(Dr * HC));
printf(" The Economic order Quantity: %f\n", EOQ);
printf(" The time between order: %f", TBO);
return 0;
}
```

Output:

```
Enter Demand Rate 23
Enter Setup cost 24
Enter Holding cost 45
The Economic oder Quantity is : 1.384437
The time between oder : 0.060193
```

3.10 For a certain electrical circuit with an inductance L and resistance R, the damped natural frequency is given by

$$\text{Frequency} = \sqrt{\frac{1}{LC} - \frac{R^2}{4C^2}}$$

It is desired to study the variation of this frequency with C. Write a program to calculate the frequency for different values of C starting from 0.01 to 0.1 in steps of 0.01.

Answer

```
#include <stdio.h>
#include <math.h>
int main ()
{
double L, R, C;
double Freq, Tem 1, Tem 2;
printf ("Enter Inductance, Resistance, Capacitance \n");
Scanf ("%lf %lf %lf", &L, &R, &C);
Tem1 = (1/(L*C))
Tem 2 = ((R*R)/(4*C*C))
Freq = Sqrt (Temp 1 - Tem 2)
printf ("The Frequency is : %lf \n", Freq);
Return 0;
}
```

Output: Enter Inductance, Resistance, Capacitance

2, 3, 4

The Frequency is .

3.11 Write a program to read a four digit integer and print the sum of the digits.

Answer:

```
#include <stdio.h>
# include <conio.h>
Void main()
{
int Num, Sum, Sum1, Sum2, Sum3, Sum4;
Sum1= Sum2 = Sum3 = Sum4 =0;
Sum=0;
printf ("Enter a four digits number \n", &Num);
Scanf ("%d", &Num);
Sum1 = Num %10;
Num = Num /10;
Sum2 = Num %10;
Num = Num/10;
Sum3 = Num %10;
Num = Num/10;
Sum4 = Num %10
Num = Num/10;
Sum = Sum1 + Sum2 + Sum3 + Sum4;
printf ("\n Sum of Digits are: %d\n", Sum);
return 0;
}
```

Output :

```
Enter a four digits Number
1234
Sum of Digits are : 10
```

3.12 Write a program to print the Size of various data types in C.

Answer :

```
#include <stdio.h>
int main()
{
printf("Size of Integer Data type : %d \n", Size of (int));
printf("Size of character Data type : %d \n", Size of (char));
printf("Size of float Data type : %d \n", Size of (float));
printf("Size of Double Data type : %d \n", Size of (double));
return 0;
}
```

Output :

```
Size of integer Data type : 2
Size of character Data type : 1
Size of Float Data type : 4
Size of Double Data type : 8
```

3.13 Given three values, write a program to read three values from computer and print out the largest of them without using if statement.

Answer:

```
#include <stdio.h>
int main()
{ int x,y,z;
  print("Enter three Numbers: \n");
  Scanf("%d %d %d", &x, &y, &z);
((x>y) && (x>z))? printf("Largest num is x: %d",x):
                  ((y>x) && (y>z))
printf("Largest Num is y: %d",y):
                  printf("Largest num is z: %d", z);
  return 0;
}
```

Output:

```
Enter three numbers
1 2 3
Largest number is 3
```

3.14 Write a program to read two integer values m and n and to decide and print whether m is multiple of n.

Answer:

```
#include <stdio.h>
int main ()
{
int m,n,x;
printf ("%d %d", &m, &n);
x = m % n;
if (x==0)
printf ("m is the multiple of n \n");
else {
printf ("m is not multiple of n \n");
return 0;
}
```

Output:

```
Enter two numbers:
6
3
m is the multiple of n
```

3.15 Write a program to read three values using scanf and printf the following results.

a) Sum of the values.

```
#includes <stdio.h>
int main()
{
  int x, y, z, Sum;
  printf ("Enter three numbers : \n");
  Scanf ("%d %d %d", &x, &y, &z);
  Sum = x+y+z;
  printf ("%d\n", Sum);
  return 0;
}
```

Output:

```
Enter three number
1 2 3
6
```

b) Average of the three values.

```
#include <stdio.h>
int main()
int x,y,z;
float, avg;
printf ("Enter three num: \n");
Scanf ("%d %d %d",&x, &y, &z);
avg = ((x+y+z) /3);
printf ("Average is = %f", avg);
return 0;
}
```

Output: Enter three numbers
2 3 4
average is = 3.00

3.16 The cost of one type of mobile service is Rs 250 plus Rs. 1.25 for each call made over and above 100 calls. Write a program to read customers codes and calls made and print the bill for each customers.

Answer:

```
#include <stdio.h>
int main()
{
 float Cus1, Cus2, Bill1, Bill2;
 printf("Enter Num of Call of Cus1: \n");
 Scanf("%f", Cus1);
printf("Enter Num of call of cus2: \n");
 Scanf("%f", Cus2);
if (Cus1 <= 100){
    Bill =250;}
else {
   Bill =(250+Cus1*1.25);}
if (cus2<= 100){
   Bill2=250;}
else {
   Bill2=(250+Cus1*1.25);}
printf("Mobile Bill of Customer 1: %f\n", Bill1);
printf(" Mobile Bill of Customer 2: %f\n", Bill2);
return 0;
}
```

Output:

Enter num of call of cus 1: 100

Enter num of call of cus 2: 150

Mobile Bill of customer 1 : 250.000 000

Mobile Bill of Customer 2 : 375.000 000

3.17 Write a program to print a table of sin and cos functions for the interval from 0 to 180 degree in increments of 15.

```
#include <stdio.h>
# include <Math.h>
# define PI =3.14
int main()
{
 int i = 0;
 float theta =0;
 printf ("ANGLE \t SIN \t COS \n");
 for (i; i<181 ; i =+15) {
 theta =(PI *i)/90;
 printf ("%d \t %.2f %.2f \n", sin (theta), cos (theta);
 }
 return 0;
}
```

Output:

ANGLE	SIN	COS
0	0.00	1.00
15	0.50	0.87
30	0.87	0.50
45	1.00	0.00
60	0.87	-0.5
90	0.00	-1.00
105	-0.50	-0.87
120	-0.86	-0.50
135	-1.00	-0.00
165	-0.50	-0.86
180	-0.00	1.00

3.18 Write a program to compute the values of Square roots and Squares of the numbers 0 to 100 in steps 10 and print the output in a tabular form as shown below.

```
# include <stdio.h>
# include <Math.h>
int main ()
{ int n;
printf ("NO\t SQR. ROOT\t SQR. \n");
```

```
for (n=0; n<101; n+=10)
{
printf ("%d \t %0.2f \t %d ", n, Sqrt(n), n*n);
}
return 0;
}
```

Output:

NO	SQR ROOT	SQR
0	0.00	0
10	3.16	100
20	4.47	400
30	5.48	900
40	6.32	1600
50	7.07	2500
60	7.75	3600
70	8.37	4900
80	8.94	6400
90	9.49	8100
100	10.00	10000

3.19 Write a program that determines whether a given integer is odd or even and displays the number.

```
#include <stdio.h>
int main()
{
int n;
printf("Enter a Number:");
scanf("%d", &n);
if (n%2)
printf("The number %d is odd \n", n);
else
printf("The number %d is even \n", n);
return 0;
}
```

Output:

```
Enter a number: 3
The number is odd
```

3.20 Write a program to illustrate the use of cast operation in real like situation.

```
#include <stdio.h>
#include <unistd.h>
int main()
{
  int n=4;
  printf("Hey !! \n");
  printf("Refer 3.3 \n");
  printf("Here is a Sony for you \n");
  sleep(n);
  printf("\a");
  printf("Bye! ):-):-)\n");
  return 0;
}
```