Chapter – 05

Programming Exercise :

[5.1] Write a program to determine whether a given number is "odd" or "even". and print the message : Number is even or Number is odd.

a) Without else option:

```
# include <stdio.h>
int main()
{
  int x;
printf("Enter an integer num:");
scanf("%d", &x);
if (x%2==0)
{printf("The num is even");
  exit(0);
}
printf("The number is odd");
return 0;
}
```

Output: Enter an integer num
20
The number is even.

b) with else option:

```
#include <stdio.h>
int main()
{ int x;
  printf ("Enter an number:");
  scanf ("%d", &x);
  if (x%2==0)
  printf ("The number is odd");
  return 0;
}
```

Output:

```
Enter a number
57
The number is odd
```

5.2 Write a program to find the number and sum of all integer greater than 100 and less than 200. that are divisible by 2.

Answer:

```
#include <stdio.h>
int main ()
{ int i, sum=0;
printf ("The numbers are \n");
for (i=100; i<=200 ; i++) {
  if (i%==0) {
```

```
printf ("%d", i);
Sum = Sum + i
}
}
printf ("\n Sum of this number is: %d", Sum);
return 0;
}
```

Output:

number are

105, 112 119 126 133 140 147 154 161

168, 175, 182, 189, 196.

Sum of this number: 2107.

5.3 A set of two linear equations with two unknows $x1$ and $x2$ is given below.

$$ax_1 + bx_2 = m$$

$$cx_1 + bx_2 = n.$$

The set has a solution: $x_1 = \frac{md - bn}{ad - cb}$; $x_2 = \frac{na - mc}{ad - cb}$

provided the denominator $ad - eb$ is not equal to zero. write a program that will read the value of a, b, c, d, M, n and compile the values of x_1, x_2.

Answer:

```
#includ <Stdio.h>
int main()
{
int a,b,c,d, n, dr;
printf ("Enter the value of a,b,c,d,m,n:");
scanf ("%d %d %d %d %d %d", &a, &b, &c,, &d, &m, &n
dr = (a*d - c*b);
if (dr != 0)
{ x1 = (m* d - b*n) / dr;
  x2 = (n*a - m*c) / dr;
printf ("\n The value of x1=%f \n The value of
    x2 = %f", x1, x2);
}
else
printf (" The division is not possible");
return 0;
}
```

5.4 Given a list of marks ranging from 0 to 100. Write a program to continue compute and print the number of students.

a) who have obtained more than 80 marks.
b) who have obtained more than 40 marks.
c) who have obtained more than 60 marks.
d) who have obtained 40 or less marks.
e) In the range of 81 to 100.
f) In the range of 61 to 80.
g) In the range of 41 to 60.
h) In the range of 0 to 40.

Answer:

```
#include <stdio.h>
int main()
{ int n, num[100], i, J, c;
 printf("enter number of students \n");
 scanf("%d", &n);
 printf("enter marks of all students\n");
 for(i=0; i<n; i++){
 scanf("%d", &num[i]);}
 for(J=80; J>=40; J=J-20){
   c=0;
```

```
for (i=0; i<n; i++){
  if (num[i]>j){
    c++;
  }
}
printf("%d students got more than %d \n", c, j);
}
  c=0;
  for(i=0; i<n; i++){
    if(num[i]<40)
      c++;
  }
  printf("%d student got %d to %d marks \n", c, j, j+20);
  }
  c=0;
  for(i=0; i<n; i++){
    if(num[i]<=40)
    c++;
  }
  printf("%d student got 0 to 40 marks \n", c);
  }
```

5.5 Admission to professional course is subject to the following condition

a) marks in mathematics >= 60

b) marks in physics >= 50

c) marks in chemistry >= 40

d) Total in all three subjects >= 200

or

Total in Mathematics and physics >= 150

Given the marks in the three subjects, write a program to process the applications to list the candidates.

Answer:

```
#include <stdio.h>
int main()
{int n,m,P.C, can [100], i,j;
printf (" enter how many candidates \n");
scanf ("%d", &n);
printf ("Enter mark of all candidate math,
        physics. and chemistry \n");
for (i=1; i<=n, i++){
Scanf ("%d %d %d", &m, &P, &C);
ib ((m>=60 && P>=50 &&C>=40) &&
    ((m+P+c)>=200 || (m+P)>=150))
printf ("candidate %d is Eligible \n", c);
}
```

5.6 Write a program to print a two dimensional square root table as shown below, to provide the square root of any number from 0 to 9.9. For example, the value of x will give the square root of 8.2 and y the square root of 3.9.

```
#include <stdio.h>
#include <math.h>
int main()
double i, j, sq;
for (i=0; i<=0.9; j=j+0.1) {
sq = sqrt (i+j);
printf("%.2f \t", sq);
}
printf ("\n");
}
return 0;
}
```

5.7 Shown below is a Floyd's triangle.

```
1
2 3
4 5 6
7 8 9 10
- - - - -
- - - - -
79 - -  - 91
```

a) Write a program to print the triangle.

```
#include <stdio.h>
int main()
{int i, J, n=1;
for (i=1; i<=13; i++) {
for (J=1; J<=i ; J++){
    printf ("%d", n);
  n++;
 }
printf ("\n");
}
return 0;
}
```

b) Modify the program to produce the following form of floyd triangle

```
1
0 1
1 0 1
0 1 0 1
1 0 1 0 1
```

Answer:

```
#include <stdio.h>
int main()
{ int i, j, n=1;
for (i=1; i<=5, i++) {
```

```
for(J=1;J<=i;J++){
  (i+J)%2==0 ? printf("1") : printf("0");
}
printf("\n");
}
return 0;
}
```

Output:

```
1
0 1
1 0 1
0 1 0 1
1 0 1 0 1
```

5.8 A cloth showroom has announced the following seasonal discounts on purchase of iteams. write a program using switch and if statements compute the net amount to be paid by a customer.

```
#includ <stdio.h>
Void main()
{ int ch, pamnt, p, dis;
  printf("Press 1 for mill cloth \n Press 2 for handloom items \n");
  printf("\n Press 0 for End \n");
```

```
input:
Scanf ("%d", &ch);
printf ("enter purchage amount \n");
Scanf ("%d", & Pamnt);
if (ch == 0)
go to end;
Switch (ch)
{ Case 1: if (Pamnt <=100)
dis =0;
else if (Pamnt <=200)
dis = Pamnt * 0.075;
else,
if (Pamnt >300)
dis =pamnt * 0.10;
break;
Case 2: if (Pamnt <=100)
dis = Pamnt * 0.05;
else if (pamnt <=200)
dis =pamnt * 0.075;
else
if (Pamnt <=300)
dis =Pamnt * 0.10;
```

```
else
if (pamnt > 300)
dis = pamnt * 0.15;
break;
default : printf ("Your choise is Error ");
go to end;
}
p = pamnt - dis;
printf ("You have to pay %d ", p);
go to input;
end :
printf ("Welcome");
return 0;
}
```

Output:

```
press 1 for mill cloth
press 2 for handloom item
press 0 for end:
1
enter purchage amount
3290
You have to pay 2961
2
enter purchage amount 9765
You have to pay 8301
```

5.9 Write a program that will read the value of x and evaluate the following function.

$$y = \begin{cases} 1 & \text{for } x < 0 \\ 0 & \text{for } x = 0 \\ -1 & \text{for } x > 0 \end{cases}$$

a) nested if :

```
#include <stdio.h>
int main (){
int y;
float ;
printf (" Enter the value of x :");
Scanf ("%f",&x);
if (x>0) {
y=1
printf (" The value of y and x =%d and %f, y, x);
}
else {
if (x==0){
y=0;
printf (" The value of y and x = %d and %f, y,x);}
else {
y=-1
printf (" The value of y and x= %d and %f, y,x);}
}
return 0;
}
```

Output:

The value of x = 3

The value of y and x = 1 and 3

b) Conditional operator:

```
#include <stdio.h>
int main (){
int y;
float x;
printf ("Enter the value of x: ");
Scanf ("%f", &x);
(x>0) ? (y=1): (x==0) ? (y=0): (y=-1));
printf (" The value of y = %d \n", y);
return 0;
}
```

Output: Enter the value of x : 3

The value of y = 1.

5.10 Write a program to compute the real roots of a quadratic equation. The roots are given by,

$$x_1 = -b + \frac{\sqrt{b^2-4ac}}{2a}$$

$$x_2 = -b - \frac{\sqrt{b^2-4ac}}{2a}$$

```
#include <stdio.h>
int main (){
int x1, x2, a, b, c, v, x;
printf ("enter value of equation a, b, c \n");
Scanf ("%d%d %d", &a, &b, &c);
v = Sqrt (b*b - (4*a*c));
x = (c/b);
x1 = -b + (v/(2*a));
x2 = -b - (v/(2*a));
if (a==0 && b==0){
printf (" there are no roots for this equation \n"); }
else if (a==0){
printf (" there are only one roots for the equation x=%d \n",x); }
else if (v<0){
printf (" there are two unreal roots for equation x1=%d \n x2=%d;x1;
} else {
printf (" there are two real roots for this equation x1=%d \n
                                                    x2=%d", x1,x2)
}
return 0;
}
```

Output:

Enter the value of a : 1

Enter the value of b : 3

Enter the value of c : 2

The roots are real $x1 = 2, x2 = 1$

5.11 Write a program to read three integer values from the keyboard and display the output.

```
#include <stdio.h>
int main () {
int a, b, c, max, min, total, mid, sum;
printf ("enter value of three side \n");
Scanf ("%d %d %d", &a, &b, &c);
total = a+b+c;

max = a;
if (b > max)
max = b;
if (c > max)
max = c;
min = a;
if (b < min)
min = b;
if (c < min)
min = c;
```

```
mid = total - (max + min);
max = max * max;
min = min * min;
mid = mid * mid;
Sum = mid + mid;
if (Sum == max)
printf ("They are Side of triangle \n");
else
printf ("They are not Side of triangle \n");
}
```

output:

Enter Length Height and Hypotense of Triangle

2 3 4

Triangle is not Right triangle.

[5.12] An electricity board charges the following rates for use of electricity.

```
#include <stdio.h>
int main() {
double n, total, extra;
char name [100];
printf ("enter your name: \n");
scanf ("%s: &name);
```

```
printf("enter your uses unit \n", name);
Scanf("%lf", &n);
if (n<=200){
total = (n*80) +100;}
if (n>200 && n<= 300){
  total =(n*90)+100;
}if (total >400) {
extra =total * 0.15;
total = total + total ;}
printf("%s is your bill is %0.2 if taka only",
                                name, total);
return 0;
}
```

5.13 Write a program to compute and display the sum of all integers that are divisible 6 but not divisible by 4 and lie between 0 to 100.

```
#include <stdio.h>
void main() {
int i, Sum = 0;
for (i=0; i<=100 ; i++){
if (i%6==0 && i%4!=0){
Sum = Sum+i;
```

```
printf("%d", i);}
}
printf("\n Sum of those numbers is %d\n", Sum);
}
```

Output:

Sum = 384
Sum of those numbers is 6 18 30 42 54 66 78 90

5.14 write an interactive program that could read a positive integer number and decide whether the number is a prime number.

```
#include <stdio.h>
void main () {
int n, i, c=0;
printf("Enter a number \n");
Scanf("%d", &n);
for (i=2; i<n; i++){
if (n%i==0) {
c++;}
}
if (c!=0){
```

```
printf("%d is a prime number \n", n);}
else {
printf("%d is not a prime number \n", n);}
return 0;
}
```

Output:

```
Enter a number
3
3 is a prime number
```

Second Part

```
#include <stdio.h>
int main (){
int i, J, prime =0;
for (i=100; i<=200; i++){
for (J=2; J<i; J++){
if (i%J ==0)
break;}
if (i==j)
prime ++;}
printf ("There are %d prime numbers," prime);}
```

5.15 Write a program to read a double type value x that represent angel in radiant and a character type variable T that represents the type of trigonometry.

```
#include <stdio.h>
#include <math.h>
int main(){
double x, temp, Sum=0;
Char s,S,T,t,C,c;
printf("enter s or S for Sin(x) \n enter to or T
      for tan(x) \n enter c or C for cos(x) \n");
Scanf("%c",&T);
printf("enter angle \n");
Scanf("%lf",&x);
temp =x;
X = (x* 3.14159)/180;
if(T=='S'||T=='S'){
X = Sin(x);
printf("Sin%0.2lf = %0.3lf \n", temp, x);
}
```

```
else if (T == 'C' || T == 'c') {
    X = cos (X);
    printf ("cos %0.2lf = %0.3 lf \n", temp, x); }
else {
    X = tan (X);
    printf ("tan %0.2 lf = %0.3 lf \n", temp, X); }
return 0;
}
```