EXERCISE NO.3.1: Given the values 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.

SOLUTION:

```
#include<stdio.h>

void main()
{
int x,y,z,temp;
printf("Enter the value of x,y,z\n");
scanf("%d %d %d",&x,&y,&z);
temp=x;
x=y;
y=z;
z=temp;
printf("%d %d %d",x,y,z);
}
```

EXERCISE NO.3.2: write a program that reads a floating-point number and then displays right-most digit of the integral part of the number.

SOLUTION:

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

EXERCISE NO.3.3. Modify the above program to display to right-most digits of the integral part of the number.

SOLUTION:

```
#include<stdio.h>
void main()
{
 int a,e;
 printf("Enter the value of a\n");
 scanf("%d",&a);
 e=a%100;
```


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```
if(a>100)
printf("%d\n%d\n",a,e);
}
```

3.4: Write a program that will obtain the length and width of a rectangle from the user and compute its area and perimeter.

SOLUTION:

```
#include<stdio.h>
void main()
{

 int length,width;
 float area,perimeter;
 printf("Enter the value of length,width\n");
 scanf("%d %d",&length,&width);
 area=(length*width);
 perimeter=2*(length+width);
 printf("%f %f",area,perimeter);
 }
```

EXERCISE NO.3.5: Given an integer number, write a program that displays the number as follows:

First line: all digits
Second line: all except first digit
Third line: all except first two digits
……
Last line: The last digit
For example the number 5678 will be displayed as:
5 6 7 8
6 7 8
8

SOLUTION:

```
#include<stdio.h>
void main()
{
 int a,b,c,e,x;
 float p;
 printf("Enter the value of p\n");
 scanf("%f",&p);
 a=int(p);
 printf("%d\n",a);
```

```
e=a%10000;
b=e%1000;
c=b%100;
 x=c%10;
if(a>10000)
printf("%d\n%d\n%d\n%d\n%d\n ",a,e,b,c,x);
else if(a>1000)
printf("%d\n%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);
}
```

EXERCISE NO.3.6: The straight-line method of computing the yearly depreciation of the value of an item is given by Depreciation=

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

SOLUTION:

```
#include<stdio.h>
void main()
{
  int years;
  float s, d,p;
  printf("Enter the value of years,d,p\n");
  scanf("%d %f %f",&years,&d,&p);
  s=p-(years*d);
  printf("%f",s);
  }
```

EXERCISE NO.3.7: Write the program that will read a real number from the keyboard and print the following output in one line:

Smallest integer not less then the number ***The given number*** ***Largest integer not greater than the number***

SOLUTION:

```
#include<stdio.h>
void main()
```

```
{
 float m;
 int n,p;
 printf("Enter the value of m\n");
 scanf("%f",&m);
 n=(m/1)+1;
 p=m;
 printf("%d %f %d",n,m,p);
 }
```

EXERCISE NO.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(meter per second),a is the acceleration (meter per second^2). Write a program to evaluate the distance travelled at intrevales of time, give the value of u and a. the program should provide the flexibility to the user to select his own time intervals and repeat the calculation for different value of u and a.

SOLUTION:

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

EXERCISE NO.3.9: In inventory management ,the Economic Order Quantity for a single item is given by

EOQ=sqrt { (2*demand rate*setup rate) / (holding cost per item per unit time) }

And the Time Between Orders

TBO =sqrt { (2* setup cost) / (demand rate * holding cost per item per unit time) }

SOLUTION 1:

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```
#include<stdio.h>
#include<math.h>
void main()
{ float EOQ,d,s,h,x;
printf("Enter the value of d,s,h\n");
scanf("%f %f %f",&d,&s,&h);
x=(2*d*s)/h;
EOQ=sqrt(x);
printf("%f",EOQ);
}
```

SOLUTION 2:

```
#include<stdio.h>
#include<math.h>
void main()
{
        float x,s,d,h,TOB;
        printf("Enter the value of s,d,h\n");
        scanf("%f%f%f",&s,&d,&h);
        x=(2*s)/(d*h);
        TOB=sqrt(x);
        printf("%f",TOB);
 }
```

EXERCISE NO.3.10: For a certain electrical circuit with an inductance L and resistance R,the damped natural frequency is given by

Frequency =sqrt { (1/L*C) - (R*R/4*C*C) }
It is desired to study the variation of this frequency with C(capacitance).Write a program to calculate the frequency for different values of C starting from 0.01 to 0.1 in steps of 0.01.

SOLUTION:

```
#include<stdio.h>
#include<math.h>
void main()
{
float L,R,C,x,a,b,F;
printf("Enter the value of L,R,C\n");
scanf("%f %f %f",&L,&R,&C);
a={ (1/L*C) – (R*R/4*C*C) };
F=sqrt(a);
Printf(“%f”,F);
}
```

EXERCISE NO.3.11: Write program to read a four digit integer and print the sum of its digit. Hints: Use / and % operators.

SOLUTION:

```
 #include<stdio.h>
void main()
{
int num,a,b,c,d,x,y,result;
printf("Enter a number");
scanf("%d",&num);
a=num%10;
x=num/10;
b=x%10;
y=x/10;
c=y%10;
d=y/10;
result=a+b+c+d;
printf("%d",result);
}
```

EXERCISE NO. 3.12: Write a program to print the size of various data types in C.

SOLUTION:

```
#include<stdio.h>
void main()
{
int m;
m=sizeof(10);
printf("Size=%d",m);
}
```

EXERCISE NO.3.13: Given three values, write a program to read three values from keyboard and print out the largest of them without using if statement.

SOLUTION:

```
#include<stdio.h>
void main()
{
 int x,y,z,a,b;
 printf("Enter the value of x,y,z\n");
 scanf("%d%d%d",&x,&y,&z);
```


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```
printf("largest\n");
a=(x>y)?x:y
b=(a>z)?a:z
printf("%d",b);
}
```

EXERCISE NO.3.14: Write a program to read two integer values m and n and to decide and print whether m is multiple of n.

SOLUTION:

```
#include<stdio.h>
void main()
{
int m,n;
printf("Enter m & n,m>=n:");
scanf("%d %d",&m,&n);
if(m%n==0)
  printf("m is a multiple of n");
else
  printf("m is not a multiple of n");
}
```

EXERCISE N0.3.15: Write a program to read three values using scanf statement and print the following results:

(a)Sum of the values
(b) Average of the three values
(c) Largest of the three
(d) Smallest of the three.

SOLUTION:

```
#include<stdio.h>
void main()

{
  int a,b,c,x,y;
  float sum, average;
  printf("Enter the value of a,b,c\n");
  scanf("%d%d%d",&a,&b,&c);
  sum=(a+b+c);
  printf("sum=%f\n",sum);
  {
  average=sum/3;
  printf("average=%f\n",average);
          }
            {
```

```
  printf("Largest\n");
x=(a>b)?a:b;
y=(x>c)?x:c;
printf("%d\n",y);
 }
                    {
                    printf("Smallest\n");
                    x=(a<b)?a:b;
                    y=(x<c)?x:c;
                    printf("%d\n",y);
                     }

}
```

EXERCISE NO.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 customer codes and calls made and print the bill for each customer.

SOLUTION:

```
#include<stdio.h>
void main()
{
int code,call;
float bill;
printf("Enter customer code and number of calls made:");
scanf("%d %d",&code,&call);
bill=250+(call*1.25);
printf("Bill=%f",bill);
}
```

EXERCISE NO.3.17: Write a program to print a table of sin and cos functions for the interval 0 180 degrees in increments of 15 as shown below.

---

x(degees)	*sin(x)*	*cos(x)*
O	…….	…….
15	…….	…….
…..	…….	…….

SOLUTION:

```
#include<stdio.h>
```

```
#include<math.h>
#define p1 3.1416
#define MAX 180

void main()
{

        int i;
        float x,y,z;
        i=0;
        printf("x(degree)    sin(x)    cos(x)\n");
        while(i<=MAX)
        {
        x=(p1/MAX)*i;
        y=sin(x);
        z=cos(x);
        printf("%d\n %f\n %f\n",i,y,z);
        i=i+15;
        }
 }
```

EXERCISE NO.3.18: Write a program to compute the values of square-roots and squares of the number 0 to 100 in steps 10 print the output in a tabular form as shown below.

---

number	***Square-root***	***square***
0	***0***	***0***
100	***10***	***10000***

SOLUTION:

```
#include<stdio.h>
#include<math.h>
void main()
{
/*.....square root and square of numbers 0 to 100.....*/
int i,y;
float x;
printf("Number\tSquare root\tSquare\n\n");
for(i=0;i<=100;i++)
{
x=sqrt(i);
y=i*i;
printf("%d\t%f\t%d\n",i,x,y);
```


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```
}
}
```

EXERCISE NO.3.19: Write a program that determines whether a given integer is odd or even and displays the number and description on the same line.

SOLUTION:

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

EXERCISE NO.3.20: Write a program to illustrate the use of cast operator in a real life situation.

SOLUTION:

```
include<stdio.h>
void main()
{
float sum;
int n;
sum=0;
for(n=1;n<=10;++n)
{
sum=sum+1/(float)n;
printf("%2d %6.4f\n",n,sum);
}
}
```

Assignments:

1. Write down all the built-in operators' name.
2. What is **"?"** operator give an example.
3. What is the difference between **"="** and **"=="** operator.
4. What is **sizeof** operator give an example?
5. What is increment and decrement operator? Write down the rules for increment and decrement operators.