Project File

M.SC.

1st Semester

Mathematics

LAB EXERCISE #1

Objective(s):

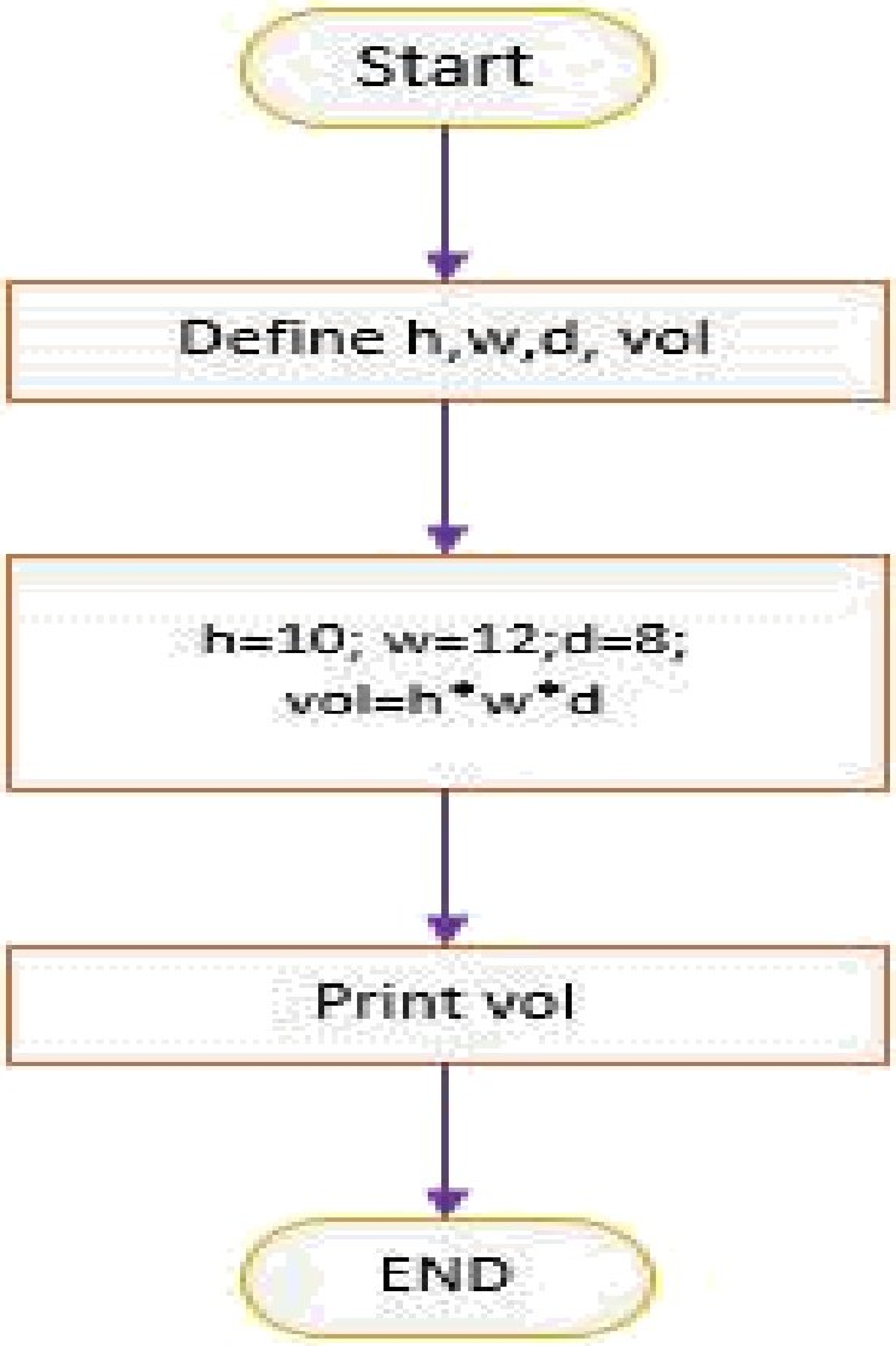
To be familiar with syntax and structure of C- programming.
To learn problem solving techniques using C

Program: Write a Program to calculate and display the volume of a CUBE having its height (h=10cm), width (w=12cm) and depth (8cm).

Algorithm:

```
1. Start
2. Define variables: h(int), w(int), d(int), vol(int)
3. Assign value to variables: h = 10, w=12, d=8
4. Calculate the volume as: vol = h*w*d
5. Display the volume (vol)
6. Stop
```

Flowchart:



Code: *(Use comments wherever applicable)*

```
//Following code is written and compiled in GCC

#include<stdio.h>
void main()
{
//start the program
int h,w,d,vol; //variables declaration
h=10;w=12;d=8; //assign value to variables
vol=h*w*d;     //calculation using mathematical formula
printf("The Volume of the cube is: %d",vol); //display the
volume
getch();
//end the main program
}
```

Output :

```
The Volume of the cube is: 960
```

LAB EXERCISE #2

Objective(s):

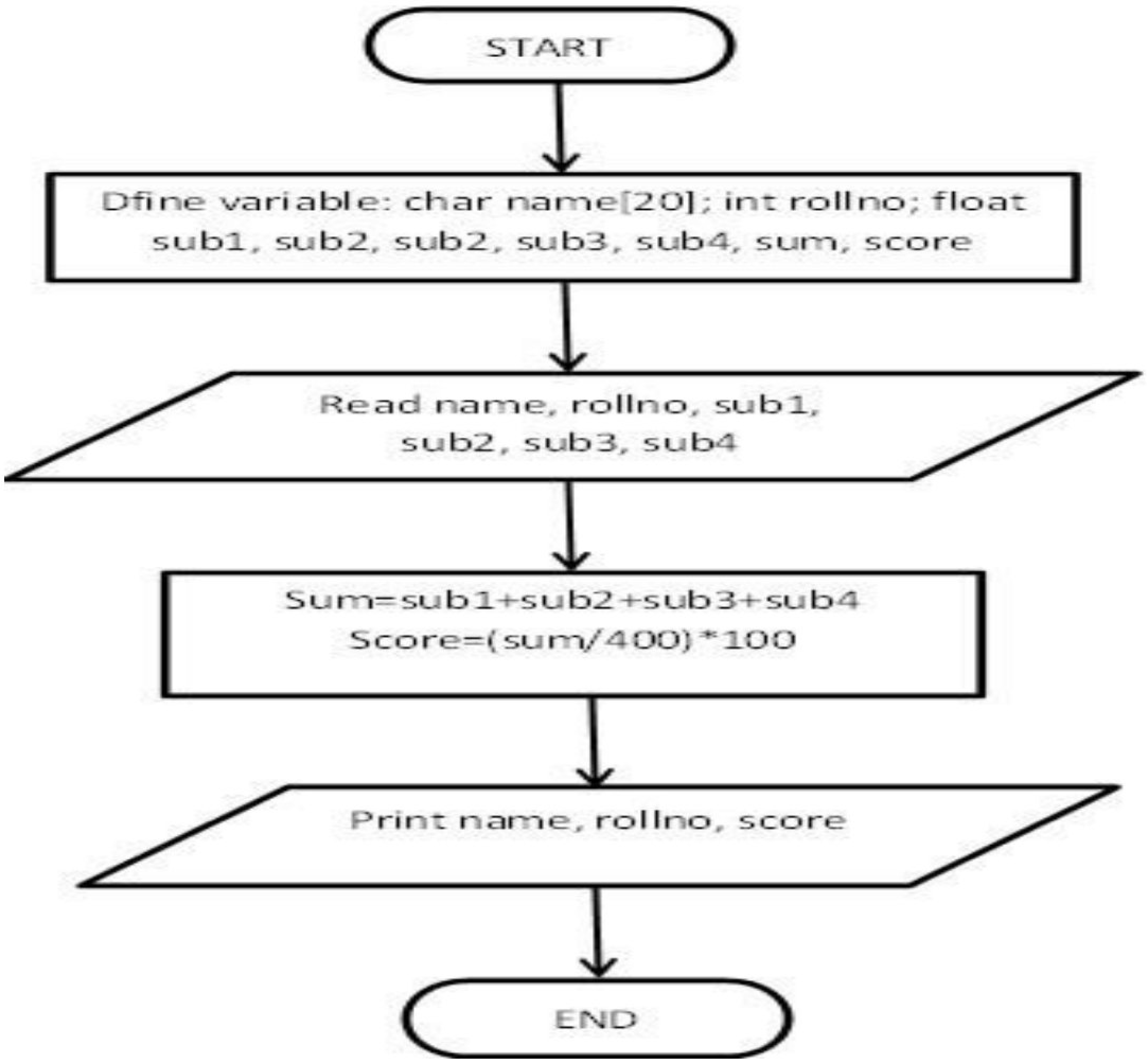
To be familiar with different data types, Operators and Expressions in C.

Program: Write a program to take input of name, rollno and marks obtained by a student in 4 subjects of 100 marks each and display the name, rollno with percentage score secured.

Algorithm:

```
1.  Start
2.  Define variables: name, rollno, sub1, sub2, sub3, sub4, sum, score
3.  Take input from keyboard for all the input variables
4.  Calculate the sum of marks of 4 subjects and also calculate the percentage score
    as:
    sum = sub1 + sub2 + sub3 + sub4;
     score = (sum/400) * 100
5.  Display the name, roll number and percentage score.
6.  Stop
```

Flowchart:


START
Dfine variable: char name[20]; int rollno; float sub1, sub2, sub2, sub3, sub4, sum, score
Read name, rollno, sub1, sub2, sub3, sub4
Sum=sub1+sub2+sub3+sub4
Score=(sum/400)*100
Print name, rollno, score
END

Code: *(Use comments wherever applicable)*

```
//Following code is written and compiled in TURBO C++

#include<stdio.h>
#include<conio.h>
void main()
{
char name[20];
int rollno;
float sub1, sub2, sub3, sub4, , sum, score;
printf("Enter name of student: ");
scanf("%s”,&name[]);
printf ("\n Enter Roll Number: ");
scanf("%d", &rollno);
printf ("\n Enter Marks in 4 Subjects:\n");
scanf("%f%f%f%f", &sub1, &sub2, &sub3, &sub4);
sum=sub1+sub2+sub3+sub4;
score = (sum/500)*100;
printf("\n Name of student: %s", name[]);
printf("\n Roll Number: %d", rollno);
printf ("\nPercentage score secured: %2.2f%c", score,'%');
getch();
}
```

Output:

```
Enter name of student: Ajit Singh
Roll Number: 25
Enter Marks in 4 Subjects:
50
75
85
62
Name of student: Ajit Singh
Roll Number: 25
Percentage score secured: 68.00%
```

LAB EXERCISE #3

Objective(s):

To understand the programming knowledge using Decision Statements (if, if-else, if-else-if ladder, switch and GOTO)

Program: Write a program to print whether a given number is even or odd.

Code: *(Use comments wherever applicable)*

```
//Following code is written and compiled in TURBO C++

#include<stdio.h>
#include<conio.h>
void main()
{
int num;
printf("Enter the number: ");
scanf("%d”,&num);
if(num%2==0)
     printf("\n %d is even”, num);
else
     printf("\n %d is odd”, num);
getch();
}
```

Output:

```
Enter the number: 6
6 is even
```

LAB EXERCISE #4

Objective(s):

To understand the programming using Loop & nested loop Statements (for, while, do-while)

Program: Write a program to print positive integers from 1 to 10.

Code:

```
//Following code is written and compiled in TURBO C++
//Using FOR LOOP

#include<stdio.h>
#include<conio.h>
void main()
{
int i;
for(i=1; i<=10;i++)
     printf("%d \n", i);
getch();
}


//Using WHILE LOOP

#include<stdio.h>
#include<conio.h>
void main()
{
int i=1;
while(i<=10)
     {
     printf("%d \n", i);
     }
     i++;
getch();
}
```

```
//Using DO-WHILE LOOP

#include<stdio.h>
#include<conio.h>
void main()
{
int i=1;
do
     {
     printf("%d \n", i);
     i++;
     }
while(i<=10);
getch();
}
```

Output:

```
1
2
3
4
5
6
7
8
9
10
```

LAB EXERCISE #5

Objective(s):

To understand programming using different dimensions of Array.

Program: Write a program to insert 5 elements into an array and print the elements of the array.

Code: *(Use comments wherever applicable)*

```
#include<stdio.h>
#include<conio.h>
void main()
{
int i, arr[5];
printf(“Enter the elements into the array:”);
for(i=0; i<=4;i++)
     scanf(“%d”,&arr[i]);
printf(“The elements of the array are:”);
for(i=0; i<=4;i++)
     printf(“%d \t”, arr[i]);
getch();
}
```

LAB EXERCISE #6

Objective(s):

To understand function programming, its types and function-call.

Program: Write a program to calculate factorial of a number using recursion.

Code:

```
#include<stdio.h>
long factorial(int);  //Function declaration
int main()
{
  int num;
  long fact;
  printf("Enter a number to find factorial: \n");
  scanf("%d", &num);
  if(num<0)
    printf("Factorial of negative no. is not defined. \n");
  else
    {
       fact = factorial(num);
       printf("%d!=%d \n", num, fact);
    }
return 0;
}
//Function definition
long factorial(int num)
{
       if(num==0)
              return 1;
       else
              return(num*factorial(num-1));
}
```

LAB EXERCISE #7

Objective(s):

To understand programming with Pointer, String and Function call by reference.

Program: Write a program to find biggest among three numbers using pointer.

Code:

```
#include<stdio.h>
#include<conio.h>
int main()
{
int a,b,c;
int*ptra=&a,*ptrb=&b,*ptrc=&c;
printf("enter three values");
scanf("%d%d%d",ptra,ptrb,ptrc);
printf("a=%d\n b=%d\n c=%d\n",*ptra,*ptrb,*ptrc);
if((*ptra>*ptrb && *ptra>*ptrc))
     printf("biggest number=%d",*ptra);
else if((*ptrb>*ptra && *ptrb>*ptrc))
     printf("biggest number =%d",*ptrb);
else
     printf("biggest number=%d",*ptrc);
getch();
return 0;
}
```

LAB EXERCISE #8

Objective(s):

To understand programming with Structure.

Program 1: Write a C program to create, declare and initialize structure.

Code:

```
#include <stdio.h>
/*structure declaration*/
struct employee{
     char name[30];
     int empId;
     float salary;
};

int main()
{
     /*declare and initialization of structure variable*/
     struct employee emp={"Anil",201,80000.00};

     printf("\n Name: %s"     ,emp.name);
     printf("\n Id: %d"       ,emp.empId);
     printf("\n Salary: %f\n",emp.salary);
     return 0;
}
```

Program 2: Write a program to store information of 5 students in structure and display it.

Code:

```
#include<stdio.h>
struct student
{
     char name[30];
     int roll;
     float marks;
} s[5];
int main( )
{
     int i;
     printf("Information of students:");
     for (i=0; i<5; ++i)
     {
         s[i].roll =i+1;
         printf("\n Roll number %d, \n", s[i].roll);
         printf("Enter name:");
         scanf("%s", s[i].name);
         printf("Enter marks:");
         scanf("%f", &s[i].marks);
     }
printf("\n Displaying Information:\n");
for(i=0;i<10;++i)
{
     printf("\n Roll number:%d \n", i+1);
     printf("Name:");
     puts(s[i].name);
     printf("\n Marks:%.1f", s[i].marks);
}
return 0;
}
```

Program 3: Write a program to declare, initialize an UNION.

Code:

```
#include <stdio.h>
// union declaration
union pack{
char a;
int  b;
double c;
};
int main()
{
     pack p; //union object/variable declaration
     printf("\nOccupied size by union pack:
%d",sizeof(pack));
     // assign value to each member one by one other it
will replace last value
     p.a='A';
     printf("\nValue of a:%c",p.a);
     p.b=10;
     printf("\nValue of b:%d",p.b);
     p.c=12345.6790;
     printf("\nValue of c:%f",p.c);
     // see, what will happen? if u will assign values
together
     p.a='A';
     p.b=10;
     p.c=12345.6790;
     // here the last value of p.c will be accessed by all
members
     printf("\nValue of a:%c, b:%d, c:%f",p.a,p.b,p.c);
     return 0;
}
```

1. .

LAB EXERCISE #9

Objective(s):

To understand data files and file handling in C.

Program 1: Write a program to create a file called emp.rec and store information about a person, in terms of his name, age and salary.

Code:

```
#include <stdio.h>
void main()
{
   FILE *fptr;
   char name[20];
   int  age;
   float salary;
    /*  open for writing */
   fptr = fopen("emp.rec", "w");
    if (fptr == NULL)
   {
       printf("File does not exists \n");
       return;
   }
   printf("Enter the name \n");
   scanf("%s", name);
   fprintf(fptr, "Name    = %s\n", name);
   printf("Enter the age\n");
   scanf("%d", &age);
   fprintf(fptr, "Age     = %d\n", age);
   printf("Enter the salary\n");
   scanf("%f", &salary);
   fprintf(fptr, "Salary  = %.2f\n", salary);
   fclose(fptr);
}
```

Program 2: Write a program to illustrate how a file stored on the disk is read.

Code:

```
#include <stdio.h>
#include <stdlib.h>
void main()
{
    FILE *fptr;
    char filename[15];
    char ch;
    printf("Enter the filename to be opened \n");
    scanf("%s", filename);
    /*  open the file for reading */
    fptr = fopen(filename, "r");
    if (fptr == NULL)
    {
        printf("Cannot open file \n");
        exit(0);
    }
    ch = fgetc(fptr);
    while (ch != EOF)
    {
        printf ("%c", ch);
        ch = fgetc(fptr);
    }
    fclose(fptr);
}
```