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```
#include <stdio.h>

int main()
{
    int a, s;
    printf("Enter length of side = ");
    scanf("%d", &s); //storage length in s
    a = s * s;
    printf("\nArea of square is = %d\n", a);
    return 0;
}
```

Output:
Enter length of side = 12

Area of square is = 144

page-12

```
#include <stdio.h>

int main()
{
    printf("Welcome to Bangladesh");
}
```

Output:
Welcome to Bangladesh

page-15

```
#include <stdio.h>

int main()
{
    printf("My name is Kibria\n");
    printf("\nI live in Dhaka-Bangladesh\n");
}
```

Output:
My name is Kibria

I live in Dhaka - Bangladesh

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```
#include <stdio.h>

int main()
{
    //escape sequence
    printf("\Dhaka is the capital of Bangladesh\\n");
    printf("Golam \\Kibria\\n");
}
```

Output:
"Dhaka is the capital of Bangladesh"
Golam \Kibria

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```
#include <stdio.h>

int main()
{
    int a, b, sum;
    a = 14;
    b = 26;
    sum = a + b;
    printf("%d + %d = %d\\n", a, b, sum);
    return 0;
}
```

Output:
14 + 26 = 40

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```
#include <stdio.h>

int main()
{
    int a = 15;
    int b = 24;
    printf("%d %d\n", b - a + 7, b - (a + 7));
    printf("%d %d\n", b - a - 4, b - (a - 4));
    printf("%d %d\n", b % a / 2, b % (a / 2));
    printf("%d %d\n", b * a + 2, b * (a + 2));
    printf("%d %d\n", b / 2 * a, b / (2 * a));
    return 0;
}
```

Output:
16 2
5 13
4 3
362 408
180 0

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```
#include <stdio.h>

int main()
{
    int a = 9876;
    int b = -3;
    int c = 501;
    printf("%d\n", a);
    printf("%d\n", b);
    printf("%d\n", c);
    printf("\n\n");
    printf("%5d\n", a);
    printf("%5d\n", b);
    printf("%5d\n", c);
}
```

Output:
9876
- 3
501

9876
-3
501

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```
#include <stdio.h>

int main()
{
    float a = 419.56;
    /*যদি .5678 থাকতো এবং নিচে .2f থাকতো তখন .57 প্রিন্ট হতো*/
    float b = -8.70;
    float c = 3.25;
    printf("%6.2f\n", a);
    printf("%6.2f\n", b);
    printf("%6.2f\n", c);
    //printf("6.2f \n6.2f \n6.2f \n", a, b, c);
    return 0;
}
```

Output:
419.56
-8.70
3.25

page-36

```
#include <stdio.h>

int main()
{
    /*we can store a double value in a double variable
    and a float value in a float variable
    if we assign a double to a float some precision may be lost*/

    double d = 987.654321;
    double x = d;
    printf("%lf\n", x);
    return 0;
}
```

Output:
987.654321

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```
#include <stdio.h>

int main()
{
    double n = 19;
    int a = 5;
    double result = n / a;

    double c = 4.68;
    float d = 8.987;
    double result2 = c * d;

    double x = 19;
    double y = 5;
    double result3 = x / y;

    printf("%lf\n", result);
    printf("\n%lf\n", result2);
    printf("\n%lf\n", result3);
    return 0;
}
```

Output:
3.800000

42.059162

3.800000

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```
#include <stdio.h>

int main()
{
    int a = 7, b = 5;
    float x;
    x = (float)a / b;
    /*or, a / (float)b
    or, (float)a/ (float)b*/
    printf("%f\n", x);
}
```

Output:
1.400000

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```
#include <stdio.h>

int main()
{
    /*when we assign a double value to an int
    the factorial part is dropped*/
    double d = 987.654321;
    int n = d;
    printf("%d\n", n);
    return 0;
}
```

Output:
987

page-38

```
#include <stdio.h>

int main()
{
    /*a long string can be broke up into pieces
    when the program is compiled, c will join
    the pieces and making one string*/
    printf("My name is "
           "Golam Kibria. "
           "I live in Dhaka\n");
}
```

Output:
My name is Golam Kibria.I live in Dhaka

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```
#include <stdio.h>

int main()
{
    char name[50] = "Golam Kibria";
    printf("Hello, %s\n", name);
}
```

Output:
Hello, Golam Kibria

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```
#include <stdio.h> //needed for printf
#include <string.h> //needed for strcpy
```

```
int main()
{
    char name[50];
    strcpy(name, "Golam Kibria");
    printf("Hello, %s\n", name);
}
```

Output: Hello, Golam Kibria

page-40

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

```
int main()
{
    char name[30] = "Alice";
    char last[30] = "Bangladesh";
    strcat(name, " in ");
    strcat(name, last);
    printf("%s\n", name);
}
```

Output: Alice in Bangladesh

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

```
int main()
{
    int a = 13;
    int b = a + 12;
    printf("%d %d\n", a, b);
    int c = a + b;
    a = a + 11;
    printf("a = %d  b = %d  c = %d\n", a, b, c);
}
```

Output:
13 25
a = 24 b = 25 c = 38

page-43

```
#include <stdio.h>

int main()
{
    int num = 75;
    printf("%d\n", num);
    printf("%5d\n", num);
    printf("%-5d\n", num);
    printf("%05d\n", num);
}
```

Output:

```
75
   75 //3 space
75
00075
```

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```
#include <stdio.h>

int main()
{
    char name[50];
    printf("Hi, what's your name? ");
    gets(name);
    printf("Delighted to meet you, %s\n", name);
}
```

Output:

```
Hi, what's your name? Kibria
Delighted to meet you, Kibria
```


page-55

```
#include <stdio.h>

int main()
{
    int a, b, c;
    double avg;
    printf("Enter 3 integer = ");
    scanf("%d %d %d", &a, &b, &c);
    avg = (a + b + c) / 3.0;
    //or, avg = (double)(a+b+c)/3;
    printf("The average is = %.2lf\n", avg);
}
```

Output:
Enter 3 integer = 23 7 10
The average is = 13.33

page-56

```
#include <stdio.h>

int main()
{
    int num;
    scanf("%d", &num);
    printf("\nSquare of %d is %d\n", num, num * num);
}
```

Output:
4

Square of 4 is 16

```
/*Calculate interest and service charge for bank customer.*/  
#include <stdio.h>
```

```
int main()  
{  
    char name[50], aNum[50];  
    double avg;  
    int tran;  
  
    printf("Name? ");  
    gets(name);  
    printf("Accounr number? ");  
    gets(aNum);  
    printf("Average banance? ");  
    scanf("%lf", &avg);  
    printf("Num of transaction? ");  
    scanf("%d", &tran);  
  
    double interest = avg * 0.06;  
    double sCharge = tran / 2.0; //or, (double)tran  
  
    printf("Name: %s\n", name);  
    printf("Average balance: $%.2lf\n", avg);  
    printf("Interest: $%.2lf\n", interest);  
    printf("Service charge: $%.2lf\n", sCharge);  
}
```

Output:
Name ? Golam Kibria
Accounr number ? 354545634256
Average banance ? 2500
Num of transaction ? 13
Name : Golam Kibria
Average balance : \$2500.00
Interest : \$150.00
Service charge : \$6.50

```
#include <stdio.h>

int main()
{
    //r=reserve || s=stands || g = grounds
    double rPrice, sPrice, gPrice;
    int rSold, sSold, gSold;

    printf("Reserve price and tickets sold? ");
    scanf("%lf %d", &rPrice, &rSold);
    printf("Stands price and tickets sold? ");
    scanf("%lf %d", &sPrice, &sSold);
    printf("Grounds price and tickets sold? ");
    scanf("%lf %d", &gPrice, &gSold);

    double rSeals, sSales, gSales;
    rSeals = rPrice * rSold;
    sSales = sPrice * sSold;
    gSales = gPrice * gSold;
    int tticketsold = rSold + sSold + gSold;
    double tmoneycollected = rSeals + sSales + gSales;

    printf("Reserve sales: $%.2lf\n", rSeals);
    printf("Stands sales: $%.2lf\n", sSales);
    printf("Grounds sales: $%.2lf\n", gSales);
    printf("%d tickets were sold\n", tticketsold);
    printf("Total money collected: $%.2lf\n", tmoneycollected);
}
```

Output:

```
Reserve priceand tickets sold ? 100 500
Stands price and tickets sold ? 75 4000
Grounds price and tickets sold ? 40 8000
Reserve sales : $50000.00
Stands sales : $300000.00
Grounds sales : $320000.00
12500 tickets were sold
Total money collected : $670000.00
```

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```
#include <stdio.h>

int main()
{
    double hours, parts, jobCharge;
    printf("Hours workd? ");
    scanf("%lf", &hours);
    printf("Cost of part? ");
    scanf("%lf", &parts);
    jobCharge = hours * 100 + parts;
    if (jobCharge < 150)
        jobCharge = 150;
    printf("Charge of the job = $%.2lf\n", jobCharge);
}
```

Output:
Hours workd ? 2.5
Cost of part ? 20
Charge of the job = \$270.00

Hours workd ? 1
Cost of part ? 25
Charge of the job = \$150.00

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```
/*This program illustrates the use of symbolic constants.*/
#include <stdio.h>
#define chargePerhour 100
#define conditionValue 150
int main()
{
    double hours, parts, jobCharge;
    printf("Hours workd? ");
    scanf("%lf", &hours);
    printf("Cost of part? ");
    scanf("%lf", &parts);
    jobCharge = hours * chargePerhour + parts;
    if (jobCharge < conditionValue)
        jobCharge = conditionValue;
    printf("Charge of the job = $%.2lf\n", jobCharge);
}
```

*/*উপরের টার মতো সেম আউটপুট*/*

page-73

```
#include <stdio.h>

int main()
{
    int m1, cm1, m2, cm2, mSum, cmSum;
    printf("Enter value for m and cm = ");
    scanf("%d %d", &m1, &cm1);
    printf("Enter value for m and cm = ");
    scanf("%d %d", &m2, &cm2);
    mSum = m1 + m2;
    cmSum = cm1 + cm2;
    if (cmSum >= 100)
    {
        cmSum = cmSum - 100;
        mSum = mSum + 1;
    }
    printf("\nSum is %dm %dcm\n", mSum, cmSum);
}
```

Output:
Enter value for m and cm = 5 75
Enter value for m and cm = 3 45

Sum is 9m 20cm

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```
#include <stdio.h>

int main()
{
    int m1, cm1, m2, cm2, mSum, cmSum;
    printf("Enter value for m and cm = ");
    scanf("%d %d", &m1, &cm1);
    printf("Enter value for m and cm = ");
    scanf("%d %d", &m2, &cm2);
    mSum = m1 + m2;
    cmSum = cm1 + cm2;
    if (cmSum >= 100)
    {
        mSum = mSum + cmSum / 100;
        cmSum = cmSum % 100;
    }
    printf("\nSum is %dm %dcm\n", mSum, cmSum);
}
```

Output:
Enter value for m and cm = 3 150
Enter value for m and cm = 2 200

Sum is 8m 50cm

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```
#include <stdio.h>

int main()
{
    int mark1, mark2, mark3;
    double avg;
    printf("Enter 3 marks = ");
    scanf("%d %d %d", &mark1, &mark2, &mark3);
    avg = (mark1 + mark2 + mark3) / 3.0;
    printf("Average is = %.2lf ", avg);
    if (avg >= 50)
        printf("Pass\n");
    else
        printf("Fail\n");
}
```

Output:
Enter 3 marks = 60 40 56
Average is = 52.00 Pass

page-79

```
#include <stdio.h>

int main()
{
    double hours, rateperhour, regularPay, overtimePay, grossPay;
    printf("Hours worked? ");
    scanf("%lf", &hours);
    printf("Rate of pay? ");
    scanf("%lf", &rateperhour);
    if (hours <= 40)
    {
        regularPay = hours * rateperhour;
        overtimePay = 0;
    }
    else
    {
        regularPay = 40 * rateperhour;
        overtimePay = (hours - 40) * rateperhour * 1.5;
    }
    grossPay = regularPay + overtimePay;
    printf("\nRegular pay: $%.2lf\n", regularPay);
    printf("Overtime pay: $%.2lf\n", overtimePay);
    printf("Gross pay: $%.2lf\n", grossPay);
}
```

Output:
Hours worked ? 50
Rate of pay ? 12

Regular pay : \$480.00
Overtime pay :
\$180.00
Gross pay : \$660.00

page-82

```
#include <stdio.h>
#define maxregularhour 40
#define overtimefactor 1.5
int main()
{
    double hours, rateperhour, regularPay, overtimePay, grossPay;
    printf("Hours worked? ");
    scanf("%lf", &hours);
    printf("Rate of pay? ");
    scanf("%lf", &rateperhour);
    if (hours <= maxregularhour)
    {
        regularPay = hours * rateperhour;
        overtimePay = 0;
    }
    else
    {
        regularPay = maxregularhour * rateperhour;
        overtimePay = (hours - maxregularhour) * rateperhour *
overtimefactor;
    }
    grossPay = regularPay + overtimePay;
    printf("\nRegular pay: $%.2lf\n", regularPay);
    printf("Overtime pay: $%.2lf\n", overtimePay);
    printf("Gross pay: $%.2lf\n", grossPay);
}
```

Output:
Hours worked ? 50
Rate of pay ? 12

Regular pay : \$480.00
Overtime pay :
\$180.00
Gross pay : \$660.00

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```
#include <stdio.h>
int main()
{
    int score;
    printf("Enter a score = ");
    scanf("%d", &score);
    printf("\nGrade ");
    if (score < 50) printf("F\n");
    else if (score < 75) printf("B\n");
    else printf("A\n");
    /*else {
        if (score < 75) printf("B\n");
        else printf("A\n");
    }*/
}
```

Output:
Enter a score = 70

Grade B

page-86

```
#include <stdio.h>

int main()
{
    int a, b, c;
    printf("Enter 3 sides of a triangle = ");
    scanf("%d %d %d", &a, &b, &c);

    if (a <= 0 || b <= 0 || c <= 0)
        printf("\nNot a triangle\n");
    else if (a + b <= c || b + c <= a || c + a <= b)
        printf("\nNot a triangle\n");
    else if (a == b && b == c)
        printf("\nEqualateral\n");
    else if (a == b || b == c || c == a)
        printf("\nIsosceles\n");
    else if (a * a + b * b == c * c)
        printf("\nRight angle\n");
    else
        printf("\nScalene\n");
}
```

Output:
Enter 3 sides of a
triangle = 7 4 7

Isosceles

page95

```
#include <stdio.h>

int main()
{
    int num, sum = 0;
    printf("Enter a number (0 to end): ");
    scanf("%d", &num);
    while (num != 0)
    {
        sum = sum + num;
        printf("Enter a number (0 to end): ");
        scanf("%d", &num);
    }
    printf("\nThe sum is = %d\n", sum);
}
```

Output:
Enter a number(0 to end) : 24
Enter a number(0 to end) : 13
Enter a number(0 to end) : 55
Enter a number(0 to end) : 32
Enter a number(0 to end) : 19
Enter a number(0 to end) : 0

The sum is = 143

page-98

```
#include <stdio.h>

int main()
{
    int num, sum = 0, c = 0;
    printf("Enter a number (0 to end): ");
    scanf("%d", &num);
    while (num != 0)
    {
        c = c + 1;
        sum = sum + num;
        printf("Enter a number (0 to end): ");
        scanf("%d", &num);
    }
    printf("\n%d numbers were entered\n", c);
    printf("The sum is = %d\n", sum);
}
```

Output:

```
Enter a number(0 to end) : 24
Enter a number(0 to end) : 13
Enter a number(0 to end) : 55
Enter a number(0 to end) : 32
Enter a number(0 to end) : 19
Enter a number(0 to end) : 0
```

```
5 numbers were entered
The sum is = 143
```

page-99

```
#include <stdio.h>

int main()
{
    int num, sum = 0, c = 0;
    double avg;
    printf("Enter a number (0 to end): ");
    scanf("%d", &num);
    /*If user entered 0 then, there is a problem
    thst's why we use this system.*/
    if (num == 0) printf("No numbers entered\n");
    else
    {
        while (num != 0)
        {
            c = c + 1;
            sum = sum + num;
            printf("Enter a number (0 to end): ");
            scanf("%d", &num);
        }
        printf("\n%d numbers were entered\n", c);
        printf("The sum is = %d\n", sum);
        printf("The average is = %.2lf\n", (double)sum / c);
    }
}
```

Output:

```
Enter a number(0 to end) : 24
Enter a number(0 to end) : 13
Enter a number(0 to end) : 55
Enter a number(0 to end) : 32
Enter a number(0 to end) : 19
Enter a number(0 to end) : 0
```

```
5 numbers were entered
The sum is = 143
The average is = 28.60
```

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

```
int main()
{
    int m, n, rem;
    printf("Enter two numbers = ");
    scanf("%d %d", &m, &n);
    while (n != 0)
    {
        rem = m % n;
        m = n;
        n = rem;
    }
    printf("\nTheir HCF is = %d\n", m);
    /*m is always greater than n. If n is greater than m then
    the compiler automatically store the big value into m.*/
}
```

Output:
Enter two numbers = 42 24

Their HCF is = 6

page-100

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

```
int main()
{
    int n = 7, m = 3;
    printf("Suffix: %d\n", m = n++);
    printf("Prefix: %d\n", n = ++m);
    printf("\n");
    printf("Suffix: %d\n", m = n--);
    printf("Prefix: %d\n", n = --m);
    /*++n increment n before using its value,
    whereas n++ increment n after using its value.*/
}
```

Output:
Suffix: 7
Prefix : 8

Suffix : 8
Prefix : 7

page-103

```
#include <stdio.h>

int main()
{
    int num, bigNum;
    printf("Enter a number(0 to end): ");
    scanf("%d", &num);
    if (num == 0) return;
    /*In c, the keyword return can be used in main to
    halt the program by returning to the operating system.*/
    bigNum = num;
    while (num != 0)
    {
        if (num > bigNum) bigNum = num;
        printf("Enter a number(0 to end): ");
        scanf("%d", &num);
    }
    printf("\nThe large is = %d\n", bigNum);
}
```

Output:
Enter a number(0 to end) : 36
Enter a number(0 to end) : 17
Enter a number(0 to end) : 43
Enter a number(0 to end) : 52
Enter a number(0 to end) : 50
Enter a number(0 to end) : 0

The large is = 52*/

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```
#include <stdio.h>

int main()
{
    int num, smallNum;
    printf("Enter a number(0 to end): ");
    scanf("%d", &num);
    if (num == 0) return;
    smallNum = num;
    while (num != 0)
    {
        if (num < smallNum) smallNum = num;
        printf("Enter a number(0 to end): ");
        scanf("%d", &num);
    }
    printf("\nThe smallest is = %d\n", smallNum);
}
```

Output:
Enter a number(0 to end) : 36
Enter a number(0 to end) : -17
Enter a number(0 to end) : 43
Enter a number(0 to end) : -52
Enter a number(0 to end) : 50
Enter a number(0 to end) : 0

The smallest is = -52

page-123

```
#include <stdio.h>

int main()
{
    for (int i = 1; i <= 5; i++)
    {
        printf("%d. Golam Kibria\n", i);
    }
}
```

output:
1. Golam Kibria
2. Golam Kibria
3. Golam Kibria
4. Golam Kibria
5. Golam Kibria

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```
#include <stdio.h>

int main()
{
    int n;
    printf("How many line you want to print? ");
    scanf("%d", &n);
    printf("\n");
    for (int i = 1; i <= n; i++)
    {
        printf("%2d. Golam Kibria\n", i);
    }
}
```

Output:
How many line ? 12

1. Golam Kibria
2. Golam Kibria
3. Golam Kibria
4. Golam Kibria
5. Golam Kibria
6. Golam Kibria
7. Golam Kibria
8. Golam Kibria
9. Golam Kibria
10. Golam Kibria
11. Golam Kibria
12. Golam Kibria

page-126

```
#include <stdio.h>

int main()
{
    for (int i = 1; i <= 10; i++)
    {
        printf("2 X %2d = %2d\n", i, 2 * i);
    }
}
```

Output:

```
2 X 1 = 2
2 X 2 = 4
2 X 3 = 6
2 X 4 = 8
2 X 5 = 10
2 X 6 = 12
2 X 7 = 14
2 X 8 = 16
2 X 9 = 18
2 X 10 = 20
```

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```
#include <stdio.h>

int main()
{
    int n;
    printf("Which table? ");
    scanf("%d", &n);

    for (int i = 1; i <= 10; i++)
    {
        printf("%d X %2d = %2d\n", n, i, n * i);
    }
}
```

output:

Which table ? 5

```
5 X 1 = 5
5 X 2 = 10
5 X 3 = 15
5 X 4 = 20
5 X 5 = 25
5 X 6 = 30
5 X 7 = 35
5 X 8 = 40
5 X 9 = 45
5 X 10 = 50
```

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

```
int main()
{
    int n;
    printf("Which table? ");
    scanf("%d", &n);
    int f, t;
    printf("From? ");
    scanf("%d", &f);
    printf("To? ");
    scanf("%d", &t);
    if (f > t) {
        printf("Invalid data!\n");
        /*cuz from value is bigger
        than to to value*/
    }
    else
    {
        for (int i = f; i <= t; i++)
        {
            printf("%2d X %2d = %2d\n", n, i, n * i);
        }
    }
}
```

Output:
Which table ? 6
From ? 10
To ? 16
6 X 10 = 60
6 X 11 = 66
6 X 12 = 72
6 X 13 = 78
6 X 14 = 84
6 X 15 = 90
6 X 16 = 96

page-130

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

```
int main()
{
    double c, f;
    printf("Celcius Farenheit\n\n");
    for (c = 0; c <= 100; c = c + 10)
    {
        f = (c * 1.8) + 32;
        printf("%5.01f%10.01f\n", c, f);
    }
}
```

Output:

Celcius	Farenheit
0	32
10	50
20	68
30	86
40	104
50	122
60	140
70	158
80	176
90	194
100	212

Page-132

```
#include <stdio.h>

int main()
{
    int start, end;
    printf("Enter the end? ");
    scanf("%d", &end);

    for (start = 1, end = end - 1; start <= end; start++, end--)
    {
        printf("%d %d\n", start, end);
    }
}
```

Output:
Enter the end ?
10
1 9
2 8
3 7
4 6

page-134

```
#include <stdio.h>

int main()
{
    int a, b, rem;

    do {
        printf("Enter the value of a and b : ");
        scanf("%d %d", &a, &b);
    } while (a <= 0 || b <= 0);
    /*both a and b must be positive*/
    printf("\nThe HCF of %d and %d is = ", a, b);
    do {
        rem = a % b;
        a = b;
        b = rem;
    } while (b != 0);

    printf("%d\n", a);
}
```

Output:
Enter the value of a and b : 40 9
Enter the value of a and b : 30 0
Enter the value of a and b : 200 16

The HCF of 200 and 16 is = 8

```
#include <stdio.h>

int main()
{
    int year = 0;
    double initialdeposit, interestrate, target, deposit, interest;

    printf("Intial deposit? ");
    scanf("%lf", &initialdeposit);
    printf("Rate of interest? ");
    scanf("%lf", &interestrate);
    printf("Target deposit? ");
    scanf("%lf", &target);

    printf("\nYear Deposit Interest\n\n");
    deposit = initialdeposit;

    do {
        year++;
        interest = deposit * interestrate / 100;
        deposit = deposit + interest;
        printf("%3d %8.2lf %8.2lf\n", year, deposit, interest);
    } while (deposit <= target);
    printf("\nDeposit exceed $%7.2lf at the end of year %d\n",
target, year);
}
```

Output:

Intial deposit ? 1000
Rate of interest ? 10
Target deposit ? 2000

Year	Deposit	Interest
------	---------	----------

1	1100.00	100.00
2	1210.00	110.00
3	1331.00	121.00
4	1464.10	133.10
5	1610.51	146.41
6	1771.56	161.05
7	1948.72	177.16
8	2143.59	194.87

Deposit exceed \$2000.00 at the end of year 8

page-145

```
#include <stdio.h>

int main()
{
    char ch = getchar();
    //int ch = getchar();
    printf("Value of EOF is %d \n", EOF);

    /*if we call getchar when there
    is no more data it simply returns -1*/
}
```

Output:
Hello
Value of EOF is -1

page-46

```
#include <stdio.h>

int main()
{
    printf("Type some data and press Enter \n");
    char ch = getchar();

    /*if we use only getch() then its only take h
    so, we use getchar() cuz it take the full character like hello*/

    printf("\nThe first character is : %c\n", ch);
    printf("It's code is : %d\n", ch);
    printf("Value of EOF is : %d\n", EOF);
    /*we can also use : int ch = getchar();*/
}
```

Output:
Type some dataand press Enter
Hello

The first character is : H
It's code is : 72
Value of EOF is : -1

page-143

```
#include <stdio.h>

int main()
{
    char ch = 'K'; //must be single quote
    printf("The character is : %c\n", ch);
    printf("The code is : %d\n", ch);
}
```

Output:
The character is : K
The code is : 75

page-144

```
#include <stdio.h>

int main()
{
    char ch = 'K' + 32; //must be single quote
    printf("The character is : %c\n", ch);
    printf("The code is : %d\n", ch);
}
```

Output:
The character is : k
The code is : 107

page-144

```
#include <stdio.h>

int main()
{
    char ch;
    printf("Enter any uppercase letter : ");
    ch = getchar();

    /*or, ch = getchar()+32 if we use this then  
ch+32(next line) is no needed*/

    printf("The lower case letter is : %c\n", ch+32);
    printf("The code is = %d\n", ch + 32);
}
```

Output:
Enter any uppercase letter :
A
The lower case letter is : a
The code is = 97

page-144

```
#include <stdio.h>

int main()
{
    char ch;
    printf("Enter any lowercase letter : ");
    ch = getchar();

    /*or, ch = getchar()-32 if we use this then  
ch-32(next line) is no needed*/

    printf("The uppercase letter is : %c\n", ch-32);
    printf("The code is = %d\n", ch - 32);
}
```

Output:
Enter any lowercase letter :
a
The uppercase letter is : A
The code is = 65

page-148

```
#include <stdio.h>

int main()
{
    printf("Type some data and press Enter \n");
    int i;
    for (i = 1; i <= 3; i++){
        char ch = getchar();
        printf("Character %d is %c\n", i, ch);
    }
}
```

Output:
Type some data and press Enter
Hi, Kibria
Character 1 is H
Character 2 is i
Character 3 is,

page-149

```
#include <stdio.h>

int main()
{
    printf("Press some data and press Enter\n");
    char ch = getchar();

    /*as long as ch is a blank it will take input again and again.
    But when getchar find a non-blank character
    then it directly go to the printf statement*/

    while (ch == ' ')
    {
        ch = getchar();
    }
    printf("The first non-blank is %c\n", ch);
}
```

Output:
Press some dataand press Enter
---Kibria // its indicate space(-)
The first non - blank is K*

page-150

```
#include <stdio.h>

int main()
{
    printf("Type some data and press Enter\n");
    char ch = getchar();

    /*As long as getchar() does not find a non-blank craracter
    the while loop is running. But when it's find a blank
    charcater then it print all the character before the black.If user
    enter 'space' as the first character then its print nothing*/

    while (ch != ' ')
    {
        printf("%c\n", ch);
        ch = getchar();
    }
}
```

Output:
Type some dataand
press Enter
Golam kibria
G
o
l
a
m

page-152

```
#include <stdio.h>

int main()
{
    printf("Type some data and press Enter\n");
    char ch = getchar();
    int count = 0;
    /*It's count number of space*/

    while (ch == ' ')
    {
        count++;
        ch = getchar();
    }
    printf("The number of leading brackets %d\n", count);
    printf("The forst non-blank is %c\n", ch);
}
```

Output:
Type some dataand press Enter
----kibria *//- means space(e.g.)*
The number of leading brackets 4
The forst non - blank is k

```
#include <stdio.h>

int main()
{
    printf("Type some data and press Enter\n");
    char ch = getchar();
    int count = 0;
    /*repeat as long as \n. When a user press enter
    the new line character(\n) returned by getchar*/

    while (ch != '\n')
    {
        ch = getchar();
        count++;
    }
    printf("The number of character : %d\n", count);
}
```

Output:
Type some data and press Enter
Hi kibria.How are you.
The number of character : 23

page-154

```
#include <stdio.h>

int main()
{
    char ch;
    int numberofcharacter = 0;
    int numberofblanks = 0;
    printf("Type some data and press Enter\n");
    ch = getchar();
    while (ch != '\n')
    {
        numberofcharacter++;
        ch = getchar();
        /*If character is blank then
        numberofblank is increment*/
        if (ch == ' '){
            numberofblanks++;
        }
    }
    printf("Number of character is = %d\n", numberofcharacter);
    printf("Number of blanks = %d\n", numberofblanks);
}
```

Output:

Type some dataand press Enter
golam kibria ezaz
Number of character is = 17
Number of blanks = 2

page-155

```
#include <stdio.h>

int main()
{
    char ch;
    int bigchar = '\0';
    /*The value of null character('\0') is 0(zero)*/
    printf("Type some data and press Enter\n");
    ch = getchar();
    while (ch != '\n')
    {
        if (ch > bigchar){
            bigchar = ch;
        }
        ch = getchar();
    }
    printf("The largest character is = %c\n", bigchar);
}
```

Output:

Type some dataand press Enter
Where The Mind Is Without Fear
The largest character is = u

```
#include <stdio.h>

int main()
{
    char ch;
    int num = 0;
    ch = getchar();
    printf("Type some data including number\n");
    /*As Long as the character is
    not a digit keep reading*/
    while (ch < '0' || ch > '9')
    {
        ch = getchar();
    }
    /*This loop is executed when
    character is a digit*/
    while (ch >= '0' && ch <= '9')
    {
        num = num * 10 + ch - '0';
        ch = getchar();
    }
    printf("Number is = %d\n", num);
}
/*integer value of digit = code for digit character - code for character '0'*/
```

Output:
Type some data including number
Golam kibria 3435 diu
Number is = 3435

page-167

```
#include <stdio.h>

int main()
{
    void skiplines(int n);
    printf("My name is \n");
    skiplines(2);
    printf("Golam kibria\n");
}

void skiplines(int n)
{
    int i;
    for (i = 1; i <= n; i++) {
        printf("\n");
    }
}
```

Output:
My name is

Golam kibria

page-171

```
#include <stdio.h>

int main()
{
    int max(int a, int b);
    int n1, n2;
    printf("Enter two whole number: ");
    scanf("%d %d", &n1, &n2);
    printf("The largest number is: %d\n", max(n1, n2));
}

int max(int a, int b)
{
    if (a > b)
        return a;
    else
        return b;
}
```

Output:
Enter two whole number : 4 6
The largest number is : 6

page-171

```
#include <stdio.h>

int main()
{
    int max(int a, int b);
    int n1, n2;
    printf("Enter two whole number: ");
    scanf("%d %d", &n1, &n2);
    while (n1 != 0 || n2 != 0) {
        printf("The largest number is : %d\n", max(n1, n2));
        printf("Enter two whole number: ");
        scanf("%d %d", &n1, &n2);
    }
}

int max(int a, int b)
{
    if (a > b)
        return a;
    else
        return b;
}
```

Output:

```
Enter two whole number : 4 6
The largest number is : 6
Enter two whole number : 18 88
The largest number is : 88
Enter two whole number : 33 56
The largest number is : 56
Enter two whole number : 0 9
The largest number is : 9
Enter two whole number : 0 0
```

page-173

```
#include <stdio.h>

int main()
{
    int min(int a, int b);
    int n1, n2;
    printf("Enter two whole number: ");
    scanf("%d %d", &n1, &n2);
    while (n1 != 0 || n2 != 0) {
        printf("The smallest number is: %d\n", min(n1, n2));
        printf("Enter two whole number: ");
        scanf("%d %d", &n1, &n2);
    }
}

int min(int a, int b)
{
    if (a < b)
        return a;
    else
        return b;
}
```

Output:

```
Enter two whole number : 4 7
The smallest number is : 4
Enter two whole number : 44 55
The smallest number is : 44
Enter two whole number : 0 0
```

page-173

```
#include <stdio.h>

int main()
{
    int max(int a, int b);
    char ch1, ch2;
    printf("Enter two character: ");
    scanf("%c %c", &ch1, &ch2);
    printf("The largest number is: %d\n", max(ch1, ch2));
}

int max(int a, int b)
{
    if (a > b)
        return a;
    else
        return b;
}
```

Output:
Enter two character : A C
The largest number is :
67

page-173

```
#include <stdio.h>

int main()
{
    int n;
    printf("Enter a day from 1 to 7: ");
    scanf("%d", &n);

    if (n == 1) printf("Saturday\n");
    else if (n == 2) printf("Sunday\n");
    else if (n == 3) printf("Monday\n");
    else if (n == 4) printf("Tuesday\n");
    else if (n == 5) printf("Wednesday\n");
    else if (n == 6) printf("Thursday\n");
    else if (n == 7) printf("Friday\n");
    else printf("Invalid day\n");
}
```

Output:
Enter a day from 1 to 7 : 3
Monday

page-174

```
#include <stdio.h>

int main()
{
    void printday(int n);
    int n;
    printf("Enter a day from 1 to 7: ");
    scanf("%d", &n);
    printday(n);
}

void printday(int n)
{
    if (n == 1) printf("Saturday\n");
    else if (n == 2) printf("Sunday\n");
    else if (n == 3) printf("Monday\n");
    else if (n == 4) printf("Tuesday\n");
    else if (n == 5) printf("Wednesday\n");
    else if (n == 6) printf("Thirsday\n");
    else if (n == 7) printf("Friday\n");
    else printf("Invalid day\n");
}
```

Output:
Enter a day from 1 to 7 : 4
Tuesday

page-176

```
#include <stdio.h>

int main()
{
    int hcf(int m, int n);
    int a, b;
    printf("Enter two positive number = ");
    scanf("%d %d", &a, &b);
    while (a > 0 || b > 0) {
        printf("The HCF is = %d\n", hcf(a, b));
        printf("Enter two positive number = ");
        scanf("%d %d", &a, &b);
    }
}

int hcf(int m, int n)
{
    int rem;
    while (n != 0) {
        rem = m % n;
        m = n;
        n = rem;
    }
    return m;
}
```

Output:
Enter two positive number = 24 42
The HCF is = 6
Enter two positive number = 32 512
The HCF is = 32
Enter two positive number = 100 31
The HCF is = 1
Enter two positive number = 0 0

page-177

```
#include <stdio.h>

int main()
{
    int hcf(int m, int n);
    int a, b;
    printf("Enter two positive number = ");
    scanf("%d %d", &a, &b);
    while (a > 0 || b > 0) {
        printf("The HCF is = %d\n", hcf(a, b));
        printf("The LCM is = %d\n", (a * b) / hcf(a, b));
        printf("Enter two positive number = ");
        scanf("%d %d", &a, &b);
    }
}

int hcf(int m, int n)
{
    int rem;
    while (n != 0) {
        rem = m % n;
        m = n;
        n = rem;
    }
    return m;
}
```

Output:
Enter two positive number = 8 6
The HCF is = 2
The LCM is = 24
Enter two positive number = 42 24
The HCF is = 6
The LCM is = 168
Enter two positive number = 0 0

page-178

```
#include <stdio.h>

int main()
{
    int n, fact = 1;
    printf("Enter a positive number = ");
    scanf("%d", &n);
    int i;
    for (i = 2; i <= n; i++) {
        fact = fact * i;
    }
    printf("%d! = %d\n", n, fact);
}
```

Output:
Enter a positive number = 4
4! = 24
Enter a positive number = 0
0! = 1

page-178

```
#include <stdio.h>

int main()
{
    int factorial(int x);
    int n;
    printf("Enter a positive number = ");
    scanf("%d", &n);
    while (n > 0) {
        printf("The factorial of %d is %d\n", n, factorial(n));
        printf("Enter a positive number = ");
        scanf("%d", &n);
    }
}

int factorial(int x)
{
    int fact = 1;
    int i;
    for (i = 2; i <= x; i++) {
        fact = fact * i;
    }
    return fact;
}
```

Output:
Enter a positive number = 4
The factorial of 4 is 24
Enter a positive number = 5
The factorial of 5 is 120
Enter a positive number = 8
The factorial of 8 is 40320
Enter a positive number = 0

page-181

```
#include <stdio.h>

int main()
{
    int factorial(int x);
    int n;
    printf("z      z!\n"); //5 space
    printf("-----\n\n");
    for (n = 0; n <= 7; n++) {
        printf("%1d %5d\n", n, factorial(n));
    }
}

int factorial(int x)
{
    int fact = 1;
    int i;
    for (i = 2; i <= x; i++) {
        fact = fact * i;
    }
    return fact;
}
```

Output:

z	z!

0	1
1	1
2	2
3	6
4	24
5	120
6	720
7	5040

```
#include <stdio.h>

int main()
{
    int factorial(int n);
    int combination(int n, int r);
    int n, r, ncr;
    printf("Enter value for n and r: ");
    scanf("%d %d", &n, &r);
    while (n != 0) {
        ncr = combination(n, r);
        if (ncr == 1) {
            printf("There is 1 combination of %d object "
                  "taken %d at a time\n", n, r);
        }
        else {
            printf("There are %d combination of %d object "
                  "taken %d at a time\n", ncr, n, r);
        }
        printf("Enter value for n and r: ");
        scanf("%d %d", &n, &r);
    }
}

int factorial(int n)
{
    int fact = 1, i;
    for (i = 2; i <= n; i++) {
        fact = fact * i;
    }
    return fact;
}

/*we can also use a and b. a for n and b for r*/
int combination(int n, int r)
{
    int factorial(int n);
    return factorial(n) / (factorial(n - r) * factorial(r));
}
```

Output:
Enter value for n and r : 7 3
There are 35 combination of 7 object taken 3 at a time
Enter value for n and r : 6 6
There is 1 combination of 6 object taken 6 at a time
Enter value for n and r : 0 0

page-184

```
#include <stdio.h>
#define chargeperhour 100
#define minjobcost 150
int main()
{
    double total(double hours, double parts);
    double hours, parts;
    printf("Hours worked? ");
    scanf("%lf", &hours);
    printf("Cost of parts? ");
    scanf("%lf", &parts);

    printf("Charge for the job: $%3.2lf\n", total(hours, parts));
}
double total(double hours, double parts)
{
    double jobcharge;
    jobcharge = hours * chargeperhour + parts;
    if (jobcharge < minjobcost)
        return minjobcost;
    return jobcharge;
}
```

Output:
Hours worked ? 2.5
Cost of parts ? 20
Charge for the job : \$270.00

page-185

```
#include <stdio.h>
#define maxregularhour 40
#define overtimefactor 1.5
int main()
{
    double totalpay(double hours, double rate);
    double hours, rate;
    printf("Hours worked? ");
    scanf("%lf", &hours);
    printf("Rate of pay? ");
    scanf("%lf", &rate);

    printf("Total pay: $%3.2lf\n", totalpay(hours, rate));
}
double totalpay(double hours, double rate)
{
    double regularpay, overtimepay;
    if (hours <= maxregularhour)
        return hours * rate;
    return maxregularhour * rate +
        (hours - maxregularhour) * rate * overtimefactor;
}
```

Output:
Hours worked ? 50
Rate of pay ? 12
Total pay : \$660.00

page-186

```
#include <stdio.h>

int main()
{
    int n;
    printf("Enter a number: ");
    scanf("%d", &n);
    int i;
    int sum = 1;
    for (i = 2; i <= n / 2; i++) {
        if (n % i == 0) {
            sum = sum + i;
        }
    }
    printf("%d\n", sum);
}
```

Output:
Enter a number: 15
9

page-186

```
#include <stdio.h>

int main()
{
    int sumofed(int n);
    int n;
    printf("Enter a number: ");
    scanf("%d", &n);

    printf("Sum of exact divisor is : %d\n", sumofed(n));
}

int sumofed(int n)
{
    int i;
    int sum = 1;
    for (i = 2; i <= n / 2; i++) {
        if (n % i == 0) {
            sum = sum + i;
        }
    }
    return sum;
}
```

Output:
Enter a number : 50
Sum of exact divisor is : 43


```
#include <stdio.h>

int main()
{
    int sumofed(int n);
    int n;
    printf("Enter a number: ");
    scanf("%d", &n);
    while (n != 0) {
        int x = sumofed(n);
        if (x > n) printf("Abundant\n");
        else if (x < n) printf("Deficient\n");
        else printf("Perfect\n");
        printf("Enter a number: ");
        scanf("%d", &n);
    }
}

int sumofed(int n)
{
    int i;
    int sum = 1;
    for (i = 2; i <= n / 2; i++) {
        if (n % i == 0) {
            sum = sum + i;
        }
    }
    return sum;
}
```

Output:
Enter a number : 15
Deficient
Enter a number : 12
Abundant
Enter a number : 0

page-187

```
#include <stdio.h>

int main()
{
    int i, n = 10000;
    int sum = 0;
    printf("Perfect number between 1 to 10000\n");
    for (i = 1; i <= n; i++)
    {
        int p = 1;
        while (p <= (i / 2)) {
            if (i % p == 0) {
                sum = sum + p;
            }
            p++;
        }
        if (sum == i) {
            printf("%d\n", i);
        }
        sum = 0;
    }
}
```

Output:
Perfect number between 1 to 10000
6
28
496
8128

page-188

```
#include <stdio.h>

int main()
{
    int uppercase(char ch);
    char ch;
    printf("Enter a character : ");
    scanf("%c", &ch);
    printf("The return value is : %d\n", uppercase(ch));
}

int uppercase(char ch)
{
    if (ch >= 'Z' && ch <= 'Z')
        return 1;
    return 0;
    /*we can also write this 3 line into 1 line like this
    return ch>='A' && ch<='Z'. This will be return 1 if the
    statement is true, and return 0 when it is false*/
}
```

Output:
Enter a character : A
The return value is : 1

*/*The Lowercase is also same as uppercase just change this statement like this
if(ch>='a' && ch<='z')*/
/*If we want to find the digit it is also same as uppercase, just change this
statement like this if(ch>='0' && ch<='9')*/*

```
#include <stdio.h>

int main()
{
    int position(char ch);
    char ch;
    printf("Type some letter and non-letter and press Enter\n");
    ch = getchar();
    while (ch != '\n') {
        printf("%c %3d\n", ch, position(ch));
        ch = getchar();
    }
}

int uppercase(char ch){
    return ch >= 'A' && ch <= 'Z';
}

int lowercase(char ch){
    return ch >= 'a' && ch <= 'z';
}

int position(char ch){
    int uppercase(char ch);
    int lowercase(char ch);
    if (uppercase(ch)) return ch - 'A' + 1;
    if (lowercase(ch)) return ch - 'a' + 1;
    return 0;
}
```

Output:

```
Type some letter and non - letter and press Enter
Fa$&n
F    6
a    1
$    0
&    0
n   14
```

```
ch = getchar();
while (ch != '\n') {
    printf("%c %3d\n", ch, position(ch));
    ch = getchar();
}

we can write this four line into two line like this:
while ((ch = getchar()) != '\n') {
    printf("%c %3d\n", ch, position(ch));
}
```

```
#include <stdio.h>

int main()
{
    int getInt();
    printf("Type some digit and non-digit number and press Enter\n");
    printf("Number is = %d\n", getInt());
}

int getInt()
{
    char ch;
    ch = getchar();
    /*As long as the character is not a digit keep reading*/
    while (ch < '0' || ch > '9') {
        ch = getchar();
    }
    int num = 0;
    /*At this point character find first digit*/
    while (ch >= '0' && ch <= '9') {
        num = num * 10 + ch - '0';
        ch = getchar();
    }
    return num;
}
```

Output:
Type some digit and non-digit and press Enter
Kibrai3435kdh
Number is = 3435

we can write this two line like this:
while (ch < '0' || ch > '9') or, while (!digit(ch))
• *As long as the character is not a digit keep reading.*
while (ch >= '0' && ch <= '9') or, while (digit(ch))
• *At this point character find first digit.*

getInt reads data character by character and returns the next integer found. The function does not take any argument but the bracket must be written after the name.

```
#include <stdio.h>
//#include <ctype.h>
int main()
{
    int m1, cm1, m2, cm2, msum, csum;
    int getInt();
    printf("Enter first length: ");
    m1 = getInt();
    cm1 = getInt();
    printf("Enter second length: ");
    m2 = getInt();
    cm2 = getInt();

    msum = m1 + m2;
    csum = cm1 + cm2;
    if (csum >= 100) {
        msum = msum + 1;
        csum = csum - 100;
    }
    printf("\nSum is %dm %dc\n", msum, csum);
}

int getInt()
{
    char ch;
    ch = getchar();
    /*As long as the character is not a digit keep reading*/
    while (ch < '0' || ch > '9') {
        ch = getchar();
    }
    int num = 0;
    /*At this point character find first digit*/
    while (ch >= '0' && ch <= '9') {
        num = num * 10 + ch - '0';
        ch = getchar();
    }
    return num;
}
```

Output:
Enter first length : 3m 75cm
Enter second length : 5m 50cm

Sum is 9m 25cm

```
#include <stdio.h>
#define maxnumber 100
int main()
{
    int n;
    printf("Enter up to 100 numbers (end with 0)\n");
    scanf("%d", &n);
    int x = 0;
    double sum = 0;
    int num[maxnumber];
    while (n != 0) {
        sum = sum + n;
        num[x++] = n;
        scanf("%d", &n);
    }
    if (x == 0) printf("No numbers entered\n");
    else {
        printf("\nNumbers entered: %d\n", x);
        printf("Sum of numbers: %1.01f\n", sum);
        double average = sum / x;
        printf("The average is: %3.21f\n", average);
        printf("Numbers are different from average\n");
        for (int i = 0; i < x; i++) {
            printf("%4d %7.21f\n", num[i], num[i] - average);
        }
    }
}
```

Output:
Enter up to 100 numbers(end with 0)
2 7 5 3 0

Numbers entered : 4
Sum of numbers : 17
The average is : 4.25
Numbers are different from average

2	- 2.25
7	2.75
5	0.75
3	- 1.25

```
#include <stdio.h>

int main()
{
    int position(char ch);
    char ch;
    int n;
    int lettercount[27];

    for (n = 1; n <= 26; n++) {
        lettercount[n] = 0;
    }
    ch = getchar();
    while (ch != '\n') {
        n = position(ch);
        if (n > 0) {
            ++lettercount[n];
        }
        ch = getchar();
    }

    printf("Letter Frequency\n");
    for (n = 1; n <= 26; n++) {
        printf("%5c %5d\n", 'a' + n - 1, lettercount[n]);
    }
}

int position(char ch)
{
    if (isupper(ch)) return ch - 'A' + 1;
    if (islower(ch)) return ch - 'a' + 1;
    return 0;
}
```

Golam kibia

Letter Frequency

a	2
b	1
c	0
d	0
e	0
f	0
g	1
h	0
i	2
j	0
k	1
l	1
m	1
n	0
o	1
p	0
q	0
r	1
s	0
t	0
u	0
v	0
w	0
x	0
y	0
z	0

```
#include <stdio.h>

int main()
{
    int score[10];
    int n;
    printf("How many numbers: ");
    scanf("%d", &n);
    printf("Enters numbers: \n");
    for (int i = 0; i < n; i++) {
        scanf("%d", &score[i]);
    }
    int sum = 0;
    for (int j = 0; j < n; j++) {
        sum = sum + score[j];
    }
    printf("Sum is : %d\n", sum);
}
```

Output:
How many numbers : 5
Enters numbers :
3 8 1 5 7
Sum is : 24

/*The same program using function*/

```
#include <stdio.h>

int main()
{
    int calculatesum(int score[], int n);
    int score[10];
    int n;
    //printf("How many numbers: ");
    scanf("%d", &n);
    printf("Enters numbers: \n");
    for (int i = 0; i < n; i++) {
        scanf("%d", &score[i]);
    }

    printf("Sum is : %d\n", calculatesum(score, 5));
}

int calculatesum(int score[], int n)
{
    int sum = 0;
    for (int j = 0; j < n; j++) {
        sum = sum + score[j];
    }
    return sum;
}
```

Output: Same as above.

page-215

```
#include <stdio.h>

int main()
{
    char word[10];
    int n = 0;
    char ch = getchar();
    //read data untill it find alphabet.
    while (!isalpha(ch)) {
        ch = getchar();
    }
    //when find alphabet it execute this loop.
    while (isalpha(ch)) {
        word[n++] = ch;
        ch = getchar();
    }
    word[n] = '\0';
    printf("%s\n", word);
}
```

Output:
12\$kibria dhaka35
kibria

page-216

```
#include <stdio.h>

int main()
{
    char ch[] = "How we live and how we die";
    int i = 0;
    int space = 0;
    while (ch[i] != 0) {
        if (ch[i] == ' ') {
            space++;
        }
        i++;
    }
    printf("Number of space: %d\n", space);
}
```

Output:
Number of space : 6

If we want to take it from the user we just write the program like this:

```
char ch[40];  
gets(ch);  
Then the whole program is same as above
```

page-218

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

int main()
{
    char ch[30];
    printf("Type some data : ");
    gets(ch);
    int length;
    length = strlen(ch)-1;
    int m = 0;

    while (m < length) {
        char c = ch[m];
        ch[m] = ch[length];
        ch[length] = c;
        m++; length--;
    }
    printf("%s\n", ch);
}
```

Output:
Type some data : golam kibria
airbik malog
**/*if we type comma in input it will also printed in output.*/
we can also write the while loop like this
for(m = 0, length; m<length; m++, length--)***

page-222

```
#include <stdio.h>
#include <string.h>
int main()
{
    char a[100], b[100];

    printf("Enter a string\n");
    gets(a);

    strcpy(b, a);
    strrev(b);

    if (strcmp(a, b) == 0)
        printf("The string is a palindrome.\n");
    else
        printf("The string isn't a palindrome.\n");

    return 0;
}
```

Output:
Enter a string
civic
The string is a palindrome.

/*Page-222 : Same program using function*/

```
#include <stdio.h>
#include <string.h>
int main()
{
    int palindrome(char ch[]);
    char ch[30];
    printf("Type some data : ");
    gets(ch);
    /*Two double quotes denote the empty string*/
    while (strcmp(ch, "") != 0) {
        if (palindrome(ch))
            printf("Palindrome\n");
        else
            printf("Not palindrome\n");
        printf("Type some data : ");
        gets(ch);
    }
}

int palindrome(char ch[])
{
    int m = 0;
    int length;
    length = strlen(ch) - 1;
    while (m < length)
        if (ch[m++] != ch[length--])
            return 0;
    return 1;
}
```

Output:
Type some data : kibria
Not palindrome
Type some data : civic
Palindrome
Type some data :
//press enter to end the output.

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

int main()
{
    void onlylowerletter(char phase[], char ch[]);
    int palindrome(char ch[]);
    char ch[30], phase[30];
    printf("Type some data : ");
    gets(phase);
    /*Two double quotes denote the empty string*/
    while (strcmp(phase, "") != 0) {
        onlylowerletter(phase, ch);
        printf("Converted to: %s\n", ch);
        if (palindrome(ch))
            printf("Palindrome\n");
        else
            printf("Not palindrome\n");
        printf("Type some data : ");
        gets(phase);
    }
}

void onlylowerletter(char phase[], char ch[])
{
    int j = 0, n = 0;
    char q;
    while ((q = phase[j++]) != '\0')
        if (isalpha(q)) ch[n++] = tolower(q);
    ch[n] = '\0';
}

int palindrome(char ch[])
{
    int m = 0;
    int length;
    length = strlen(ch) - 1;
    while (m < length)
        if (ch[m++] != ch[length--])
            return 0;
    return 1;
}
```

Output:
Type some data : Madam i'm adam
Converted to : madamimadam
Palindrome
Type some data : Golam, kibria
Converted to : golamkibria
Not palindrome
Type some data :

page-227

```
#include <stdio.h>

int main()
{
    int n;
    printf("Enter a day number = ");
    scanf("%d", &n);
    char day[10][10] = { "", "saturday", "sunday", "monday", "tuesday",
                        "wednesday", "thursday", "friday" };
    if (n < 1 || n > 7)
        printf("Invalid Day\n");
    else
        printf("%s\n", day[n]);
}
```

Output:
Enter a day number = 5
wednesday

page-233

```
#include <stdio.h>

int main()
{
    int num[100];
    int n, i;
    printf("How many numbers : ");
    scanf("%d", &n);
    for (i = 0; i < n; i++) {
        scanf("%d", &num[i]);
    }
    int max = num[0];
    int position;
    for (i = 1; i < n; i++) {
        if (max < num[i]) {
            max = num[i];
            position = i;
        }
    }
    printf("Maximum number is : %d\n", max);
}
```

Output:
How many numbers : 5
12 13 43 55 17
Maximum number is : 55

Same program using function.(page-233)

```
#include <stdio.h>

int main()
{
    int maxnumber(int num[], int n);
    int num[100];
    int n, i;
    printf("How many numbers : ");
    scanf("%d", &n);
    for (i = 0; i < n; i++){
        scanf("%d", &num[i]);
    }

    printf("Maximum number is : %d\n", maxnumber(num, n));
}

int maxnumber(int num[], int n)
{
    int i;
    int max = num[0];
    for (i = 1; i < n; i++) {
        if (max < num[i]) {
            max = num[i];
        }
    }
    return max;
}
```

Output:
How many numbers : 5
12 13 43 55 17
Maximum number is : 55

```
#include <stdio.h>

int main()
{
    int minnumber(int num[], int n);
    int num[100];
    int n, i;
    printf("How many numbers : ");
    scanf("%d", &n);
    for (i = 0; i < n; i++) {
        scanf("%d", &num[i]);
    }

    printf("Maximum number is : %d\n", minnumber(num, n));
}

int minnumber(int num[], int n)
{
    int i;
    int min = num[0];
    for (i = 1; i < n; i++) {
        if (min > num[i]) {
            min = num[i];
        }
    }
    return min;
}
```

Output:
How many numbers : 5
12 13 22 11 45
Maximum number is : 11

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

```
int main()
{
    int num[7] = { 35, 17, 48, 25, 61, 12, 42 };
    printf("%d\n", num[4]);
}
```

Output:
61

/*Same program*/

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

```
int main()
{
    int num[10];
    int n;
    printf("How many numbers : ");
    scanf("%d", &n);
    int i;
    printf("Enter %d numbers : ", n);
    for (i = 0; i < n; i++)
    {
        scanf("%d", &num[i]);
    }
    int x;
    printf("Enter the index number you like to print : ");
    scanf("%d", &x);
    if (x > n) {
        printf("Please enter correct index. This is too big\n");
    }
    else {
        printf("The %dth number is : %d\n", x, num[x]);
    }
}
```

Output:
How many numbers : 5
Enter 5 numbers : 12 23 33 45 67
Enter the index number you like to print : 2
The 2th number is : 33


```
#include <stdio.h>

int main()
{
    int i, j, temp, n, number[30];
    printf("Enter the value of n \n");
    scanf("%d", &n);

    printf("Enter %d numbers\n", n);
    for (i = 0; i < n; ++i) {
        scanf("%d", &number[i]);
    }

    for (i = 0; i < n; i++)
    {
        for (j = i + 1; j < n; j++)
        {
            if (number[i] > number[j])
            {
                temp = number[i];
                number[i] = number[j];
                number[j] = temp;
            }
        }
    }

    printf("Ascending order : \n");
    for (i = 0; i < n; i++)
        printf("%d ", number[i]);
    printf("\nDescending order : \n");
    for (i = n-1; i >= 0; i--)
        printf("%d ", number[i]);
}
```

Output:
Enter the value of n
7
Enter 7 numbers
57 48 49 65 15 33 52
Ascending order :
15 33 48 49 52 57 65
Descending order :
65 57 52 49 48 33 15

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

int main()
{
    char str[25][25];
    int n;
    printf("How many string : ");
    scanf("%d", &n);
    printf("Enter string one by one : \n");
    for (int i = 0; i <= n; i++)
    {
        gets(str[i]);
    }

    char temp[25];
    for (int i = 0; i <= n; i++)
    {
        for (int j = i + 1; j <= n; j++)
        {
            if (strcmp(str[i], str[j]) > 0)
            {
                strcpy(temp, str[i]);
                strcpy(str[i], str[j]);
                strcpy(str[j], temp);
            }
        }
    }
    printf("\nThe sorted string is : ");
    for (int i = 0; i <= n; i++)
    {
        /*printf("%s\n", str[i]);*/
        puts(str[i]);
    }
}
```

Output:
How many string : 5
Enter string one by one :
kibria
saim
tausif
abid
naeem

The sorted string is :
abid
kibria
naeem
saim
tausif

/*Reverse a string*/

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

int main()
{
    char str[100], temp;
    int i, j;

    printf("Enter the string :");
    gets(str);

    i = 0;
    j = strlen(str);

    while (i < j)
    {
        temp = str[i];
        str[i] = str[j-1];
        str[j-1] = temp;
        i++; j--;
    }

    printf("\nReverse string is :%s", str);
}
```

Output:
Enter the string : kibria
Reverse string is : airbik

/*Reverse a string by alphabetical order*/

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

int main()
{
    char string[100];
    printf("Enter the string : ");
    //scanf("% s", string);
    gets(string);
    char temp;
    int i, j;
    int n = strlen(string);
    for (i = 0; i < n - 1; i++) {
        for (j = i + 1; j < n; j++) {
            if (string[i] > string[j]) {
                temp = string[i];
                string[i] = string[j];
                string[j] = temp;
            }
        }
    }

    /*printf("The sorted string is : % s", string);*/
    puts(string);
}
```

Enter the string : kibria
abiikr

```
#include <stdio.h>

int main()
{
    void sort(int num[], int n);
    int num[10];
    int n;
    printf("Type 10 numbers which is end by 0\n");
    scanf("%d", &n);
    int i = 0;
    while (n != 0)
    {
        num[i++] = n;
        scanf("%d", &n);
    }

    sort(num, i);
    printf("\nThe sorted number are\n");
    for (int h = 0; h < i; h++)
    {
        printf("%d ", num[h]);
    }
    printf("\n");
}

void sort(int num[], int n)
{
    for (int h = 1; h < n; h++)
    {
        int key = num[h];
        int a = h - 1;
        while (a >= 0 && num[a] > key)
        {
            num[a + 1] = num[a];
            a--;
        }
        num[a + 1] = key;
    }
}
```

Output:
Type 10 numbers which is end by 0
57 48 79 65 15 33 52 0

The sorted number are
15 33 48 52 57 65 79

/*sort parallel array*/

```
#include <stdio.h>

int main()
{
    void parallelsort(int initial, int final, int max, char name[][15], int id[]);
    char name[5][15] = { "Kibria", "Saim", "Tausif", "Abid", "Naeem" };
    int id[5] = { 3456, 6543, 7865, 1278, 9834 };

    parallelsort(0, 4, 15, name, id);
    printf("\nThe sorted name and id's are \n");
    for (int h = 0; h < 5; h++)
    {
        printf("%s\t\t%d\n", name[h], id[h]);
    }
}

void parallelsort(int initial, int final, int max, char name[][15], int id[])
{
    char key[15];
    for (int h = initial; h <= final; h++)
    {
        strcpy(key, name[h]);
        int m = id[h];
        int k = h - 1;

        while (k >= initial && strcmp(key, name[k]) < 0)
        {
            strcpy(name[k + 1], name[k]);
            id[k + 1] = id[k];
            --k;
        }
        strcpy(name[k + 1], key);
        id[k + 1] = m;
    }
}
```

Output:
The sorted nameand id's are
Abid 1278
Kibria 3456
Naeem 9834
Saim 6543
Tausif 7865

when we take it from the user just change this

```
for (int i = 0; i < 5; i++) {
    scanf("%s", &name[i]);
}
int id[5];
for (int i = 0; i < 5; i++) {
    scanf("%d", &id[i]);
}
```

/*Binary search*/

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

```
int main()
{
    int first, last, middle, n, search, array[100];
    printf("How many numbers? ");
    scanf("%d", &n);
    printf("Enter %d integers:\n", n);
    for (int i = 0; i < n; i++)
        scanf("%d", &array[i]);
    printf("Enter the value to find : ");
    scanf("%d", &search);

    first = 0;
    last = n - 1;
    middle = (first + last) / 2;

    while (first <= last) {
        if (array[middle] == search) {
            printf("%d is present at index %d.\n", search, middle);
            break;
        }
        else if (array[middle] < search)
            first = middle + 1;
        else
            last = middle - 1;

        middle = (first + last) / 2;
    }
    if (first > last)
        printf("Not found! %d is not present in the list.\n", search);
}
```

Output:
How many numbers ? 5
Enter 5 integers :
12 23 34 45 56
Enter the value to find : 56
56 is present at index 4.

```

/*Binary Search*/
/*Same program using function*/

#include <stdio.h>

int main()
{
    int binarysearch(int array[], int search, int first, int last);
    int first, last, middle, n, search, array[100];
    printf("How many numbers? ");
    scanf("%d", &n);
    printf("Enter %d integers:\n", n);
    for (int i = 0; i < n; i++)
        scanf("%d", &array[i]);
    printf("Enter the value to find : ");
    scanf("%d", &search);

    first = 0;
    last = n - 1;
    middle = (first + last) / 2;
    if (first > last)
        printf("Not found! %d is not present in the list.\n", search);

    int ans = binarysearch(array, search, 0, n - 1);
    if (ans == -1) printf("%d not found\n", search);
    else printf("%d found is positon %d\n", search, ans);
}

int binarysearch(int array[], int search, int first, int last)
{
    int middle = (first + last) / 2;
    while (first <= last) {
        if (array[middle] == search) return middle;
        else if (array[middle] < search) first = middle + 1;
        else last = middle - 1;

        middle = (first + last) / 2;
    }
}

```

Output:

```

How many numbers ? 5
Enter 5 integers :
12 23 34 67 78
Enter the value to find : 34
34 found is positon 2

```

/*Frequency of a character*/

```
#include <stdio.h>
int main()
{
    char str[1000], ch;
    int count = 0;

    printf("Enter a string: ");
    /*fgets(str, sizeof(str), stdin);*/
    gets(str);

    printf("Enter a character to find its frequency: ");
    scanf("%c", &ch);

    for (int i = 0; str[i] != '\0'; ++i) {
        if (ch == str[i])
            ++count;
    }

    printf("Frequency of %c = %d", ch, count);
    return 0;
}
```

Output:

```
Enter a string : kitao golam kibria ki obsta tomar
Enter a character to find its frequency : i
Frequency of i = 4
```


/*Merge Sorted List*/

```
#include <stdio.h>

int main()
{
    int A[] = { 21, 28, 35, 40, 61, 75 };
    int B[] = { 16, 25, 47, 54 };
    int C[20];
    int i = 0; int j = 0; int k = -1;
    int m = 6; int n = 4;
    while (i < m || j < n) {
        if (i == m)
            C[++k] = B[j++];
        else if (j == n)
            C[++k] = A[i++];
        else if (A[i] < B[j])
            C[++k] = A[i++];
        else
            C[++k] = B[j++];
    }
    int x = m + n;
    for (int h = 0; h < x; h++)
        printf("%d ", C[h]);
}
```

Output:
16 21 25 28 35 40 47 54 61 75

আরো অনেক ইজি ভাবে এই সমস্যাটার সমাধান করে দেয়া আছে ।

সমস্যা ৪৭ – অ্যারের জোট এই সমাধানটা দেখো । (৫২ টি প্রোগ্রামিং সমস্যা)

/*Merge Sorted List(From the user)*/

```
#include <stdio.h>

int main()
{
    int A[10];
    int B[8];
    int C[20];
    int p, q;
    printf("How many value for A? ");
    scanf("%d", &p);
    printf("Enter %d value for A : \n", p);
    for (int z = 0; z < p; z++) {
        scanf("%d", &A[z]);
    }
    printf("How many value for B? ");
    scanf("%d", &q);
    printf("Enter %d value for B : \n", q);
    for (int y = 0; y < q; y++) {
        scanf("%d", &B[y]);
    }

    int i = 0; int j = 0; int k = -1;
    int m = p; int n = q;
    while (i < m || j < n) {
        if (i == m)
            C[++k] = B[j++];
        else if (j == n)
            C[++k] = A[i++];
        else if (A[i] < B[j])
            C[++k] = A[i++];
        else
            C[++k] = B[j++];
    }
    int x = m + n;
    for (int h = 0; h < x; h++)
        printf("%d ", C[h]);
}
```

Output:
How many value for A ? 6
Enter 6 value for A :
21 28 35 40 61 75
How many value for B ? 4
Enter 4 value for B :
15 25 47 54
15 21 25 28 35 40 47 54 61 75

/*Merge Sorted List(Using Function)*/

```
#include <stdio.h>

int main()
{
    int merge(int A[], int m, int B[], int n, int C[]);
    int A[] = { 21, 28, 35, 40, 61, 75 };
    int B[] = { 16, 25, 47, 54 };
    int C[20];
    int n = merge(A, 6, B, 4, C);
    for (int h = 0; h < n; h++)
        printf("%d ", C[h]);
}

int merge(int A[], int m, int B[], int n, int C[])
{
    int i = 0; int j = 0; int k = -1;

    while (i < m || j < n) {
        if (i == m)
            C[++k] = B[j++];
        else if (j == n)
            C[++k] = A[i++];
        else if (A[i] < B[j])
            C[++k] = A[i++];
        else
            C[++k] = B[j++];
    }
    return m + n;
}
```

Output: 16 21 25 28 35 40 47 54 61 75
--

/*Printing date using structure*/

```
#include <stdio.h>
struct date {
    int day;
    int month;
    int year;
};
int main()
{
    struct date date_of_birth;

    date_of_birth.day = 15;
    date_of_birth.month = 11;
    date_of_birth.year = 2000;

    printf("%d/%d/%d\n", date_of_birth.day, date_of_birth.month, date_of_birth.year);
}
```

Output:
15/11/2000

/*Printing date using structure from the user*/

```
#include <stdio.h>
struct date {
    int day;
    int month;
    int year;
};
int main()
{
    void printday(struct date d);
    struct date date_of_birth;

    date_of_birth.day;
    date_of_birth.month;
    date_of_birth.year;

    scanf("%d %d %d", &date_of_birth.day, &date_of_birth.month, &date_of_birth.year);
    printday(date_of_birth);
}
void printday(struct date d)
{
    printf("%d/%d/%d\n", d.day, d.month, d.year);
}
```

Output:
15 11 2000
15/11/2000

/*printing date using structure by typedef*/

```
#include <stdio.h>
typedef struct {
    int day;
    int month;
    int year;
}Date;
int main()
{
    Date date_of_birth;

    date_of_birth.day = 15;
    date_of_birth.month = 11;
    date_of_birth.year = 2000;

    printf("%d/%d/%d\n", date_of_birth.day, date_of_birth.month, date_of_birth.year);
}
```

Output:
15 / 11 / 2000

/*Printing date using structure. Month is character array*/

```
#include <stdio.h>
typedef struct {
    int day;
    char month[4]; /*Goes 0 to 3. 0,1,2 index is for Nov and 3 index for \0*/
    int year;
}Date;
int main()
{
    Date dob;          /*Here dob means date of birth*/
    dob.day = 15;
    strcpy(dob.month, "Nov");
    dob.year = 2000;

    printf("%s %d, %d\n", dob.month, dob.day, dob.year);
}
```

Output:
Nov 15, 2000

/*Array of structure*/

```
#include <stdio.h>
struct person {
    char name[30];
    int age;
    float salary;
    char gender[2];
};
int main()
{
    struct person man[2];
    int i;
    for (i = 0; i < 2; i++)
    {
        printf("Enter information for person %d : \n", i + 1);
        printf("Name? ");
        scanf("%s", &man[i].name);
        printf("Age? ");
        scanf("%d", &man[i].age);
        printf("Salary? ");
        scanf("%f", &man[i].salary);
        printf("Gender? ");
        scanf("%s", &man[i].gender);
    }
    for (i = 0; i < 2; i++)
    {
        printf("\nInformaton for person %d : \n", i + 1);
        printf("Name   : %s\n", man[i].name);
        printf("Age    : %d\n", man[i].age);
        printf("Salary : %.2f\n", man[i].salary);
        printf("Gender : %s\n", man[i].gender);
    }
}
```

Output:
Enter information for person 1 :
Name? kibria
Age? 20
Salary? 123.4
Gender? M
Enter information for person 2 :
Name? nina
Age? 20
Salary? 345.67
Gender? F

Informaton for person 1 :
Name : kibria
Age : 20
Salary : 123.40
Gender : M

Informaton for person 2 :
Name : nina
Age : 20
Salary : 345.67
Gender : F

```
#include <stdio.h>
struct person {
    char gender;
};
int main()
{
    struct person man;
    printf("Gender? ");
    scanf("%c", &man.gender);
    printf("%c", man.gender);
}
```

Output:
Gender ? M
M

```
#include <stdio.h>
typedef struct {
    char gender;
}person;
int main()
{
    person man;
    printf("Gender? ");
    scanf("%c", &man.gender);
    printf("%c", man.gender);
}
```

Output:
Gender ? M
M

/*Search an array of structure*/

```
#include <stdio.h>
struct employee {
    int num;
    char name[30];
    int salary;
};
int main()
{
    struct employee a[50];
    int i; int n; int m;
    printf("How many employee? ");
    scanf("%d", &n);
    printf("Enter employee information.\n"
           "Number  Name  Salary\n");
    for (i = 0; i < n; i++){
        scanf("%d %s %d", &a[i].num, &a[i].name, &a[i].salary);
    }

    printf("Which employee you want to search? ");
    scanf("%d", &m);

    for (i = 0; i < n; i++){
        if (m == a[i].num)
            break;
    }
    if (i < n) printf("Employee found at index %d\n", i);
    else printf("Not found\n");
}
```

Output:

```
How many employee ? 4
Enter employee information.
Number  Name  Salary
10      saim   2500
20      gkez   2400
30      tausf  2600
40      motta  3000
Which employee you want to search ? 30
Employee found at index 2
```

/*Sort an array of structure*/

```
#include<stdio.h>

struct cricket {
    char pname[20];
    char tname[20];
    float avg;
};

int main()
{
    struct cricket player[10], temp;
    int i, j, n;
    printf("Enter the value of n? ");
    scanf("%d", &n);
    printf("Enter %d value.\n", n);

    for (i = 0; i < n; i++) {
        printf("\nEnter Player Name : ");
        scanf("%s", player[i].pname);
        printf("Enter Team Name : ");
        scanf("%s", player[i].tname);
        printf("Enter Average : ");
        scanf("%f", &player[i].avg);
    }

    for (i = 1; i < n; i++)
        for (j = 0; j < n - i; j++) {
            if (strcmp(player[j].tname, player[j + 1].tname) > 0) {
                temp = player[j];
                player[j] = player[j + 1];
                player[j + 1] = temp;
            }
        }

    for (i = 0; i < n; i++) {
        printf("\n%s\t%s\t%.2f", player[i].pname, player[i].tname, player[i].avg);
    }
}
```

Output:

Enter the value of n ? 3
Enter 3 value.

Enter Player Name : saim
Enter Team Name : bd
Enter Average : 45

Enter Player Name : tausif
Enter Team Name : sa
Enter Average : 56

Enter Player Name : kibria
Enter Team Name : pk
Enter Average : 50

saim	bd	45.00
kibria	pk	50.00
tausif	sa	56.00

/*Read, Search and Sort a Structure*/

```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
typedef struct {
    char name[31];
    int age;
    char gender;
}student;
int main()
{
    void getString(FILE * in, char str[]);
    int getData(FILE * in, student list[]);
    int search(char key[], student list[], int n);
    void sort(student list[], int n);

    student pupil[100];
    char name[31];

    FILE* in = fopen("inputfile.txt", "r");
    if (in == NULL) {
        printf("Error opening inputfile.\n");
        exit(1);
    }
    int numofstudents = getData(in, pupil);
    if (numofstudents == 0) {
        printf("No data supplied for students.\n");
    }
    printf("\n");
    for (int h = 0; h < numofstudents; h++)
        printf("Name: %-15s Age: %2d\tGender: %1c\t\n", pupil[h].name,
pupil[h].age, pupil[h].gender);
    printf("\n");

    getString(in, name);
    while (strcmp(name, "END") != 0) {
        int ans = search(name, pupil, numofstudents);
        if (ans == -1) printf("%s not found\n", name);
        else printf("%s found at location %d\n", name, ans);
        getString(in, name);
    }

    sort(pupil, numofstudents);
    printf("\n");
    for (int h = 0; h < numofstudents; h++)
        printf("Name: %-15s Age: %2d\tGender: %1c\t\n", pupil[h].name,
pupil[h].age, pupil[h].gender);
}
```

/*End main*/

```

int getData(FILE* in, student list[])
{
    char temp[31];
    void getString(FILE * in, char str[]);
    char readChar(FILE * in);
    int n = 0;
    getString(in, temp);
    while (n < 100 && strcmp(temp, "END") != 0) {
        strcpy(list[n].name, temp);
        fscanf(in, "%d", &list[n].age);
        list[n].gender = readChar(in);
        n++;
        getString(in, temp);
    }
    return n;
}
/*End getData*/

int search(char key[], student list[], int n)
{
    for (int h = 0; h < n; h++)
        if (strcmp(key, list[h].name) == 0) return h;
    return -1;
    /*Search for key in list[0] to list[n-1].
    If found return the location; if not found return -1.*/
}
/*End search*/

void sort(student list[], int n)
{
    student temp;
    int k;
    for (int h = 1; h < n; h++) {
        temp = list[h];
        k = h - 1;
        while (k >= 0 && strcmp(temp.name, list[k].name) < 0) {
            list[k + 1] = list[k];
            k = k - 1;
        }
        list[k + 1] = temp;
    }
}
/*End sort*/

void getString(FILE* in, char str[])
{
    /*The string is read from the file in.
    The first non-whitespace character is the delimiter.
    Store in str, the next string within delimiter.*/

    char ch, delimiter;
    int n = 0;
    str[0] = '\0';
    /*Read over whitespace*/
    while (isspace(ch = getc(in))); /*Empty while body*/
    if (ch == EOF) return;

    delimiter = ch;
    while (((ch = getc(in)) != delimiter) && (ch != EOF))
        str[n++] = ch;
    str[n] = '\0';
}
/*End getString*/

```

```

char readChar(FILE* in)
{
    char ch;
    while (isspace(ch = getc(in))); /*Empty while body*/
    return ch;
}

```

/*End readChar*/

inputfile.txt - Notepad

File Edit Format View Help

```

"Golam kibria" 20 M
"Saim Islam" 21 M
"Tausif Ahmed" 20 M
"Nina Akter" 22 F
"Mottaki Billah" 21 M
"Meye Akter" 24 F
"Keya Akter" 27 F
"Montasir" 15 M
"END"
"Golam kibria"
"Nina Akter"
"Montasir"
"END"

```

C:\Users\DCL\Downloads\nobel\sokal.exe

```

Name: Golam kibria      Age: 20      Gender: M
Name: Saim Islam       Age: 21      Gender: M
Name: Tausif Ahmed     Age: 20      Gender: M
Name: Nina Akter       Age: 22      Gender: F
Name: Mottaki Billah   Age: 21      Gender: M
Name: Meye Akter       Age: 24      Gender: F
Name: Keya Akter       Age: 27      Gender: F
Name: Montasir         Age: 15      Gender: M

Golam kibria found at location 0
Nina Akter found at location 3
Montasir found at location 7

Name: Golam kibria      Age: 20      Gender: M
Name: Keya Akter       Age: 27      Gender: F
Name: Meye Akter       Age: 24      Gender: F
Name: Montasir         Age: 15      Gender: M
Name: Mottaki Billah   Age: 21      Gender: M
Name: Nina Akter       Age: 22      Gender: F
Name: Saim Islam       Age: 21      Gender: M
Name: Tausif Ahmed     Age: 20      Gender: M

```

/*Nested Structure*/

```
#include<stdio.h>
struct address
{
    char city[20];
    int pin;
    char phone[14];
};
struct employee
{
    char name[20];
    struct address add;
};
int main()
{
    struct employee emp;
    printf("Enter employee information?\n");
    scanf("%s %s %d %s", emp.name, emp.add.city, &emp.add.pin, emp.add.phone);
    printf("Printing the employee information....\n");
    printf("name: %s\nCity: %s\nPincode: %d\nPhone: %s", emp.name,
emp.add.city, emp.add.pin, emp.add.phone);
}
```

Output:
Enter employee information ?
kibria
dhaka
1212
01790037447
Printing the employee information....
name: kibria
City : dhaka
Pincode : 1212
Phone : 01790037447

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/*Structure to represent a Fraction*/

```
#include <stdio.h>
typedef struct {
    int num;
    int den; /*den means denominator*/
}Fraction;
int main()
{
    Fraction f;
    f.num = 5;
    f.den = 9;
    printf("%d/%d", f.num, f.den);
}
```

Output: 5 / 9

```
#include <stdio.h>
typedef struct {
    int num;
    int den; /*den means denominator*/
}Fraction;
int main()
{
    Fraction f;
    f.num;
    f.den;
    scanf("%d %d", &f.num, &f.den);
    printf("%d/%d", f.num, f.den);
}
Output:
5 9
5 / 9
```

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/*Manipulate Fraction by structure*/

```
#include <stdio.h>
typedef struct {
    int num1;
    int den1;
    int num2;
    int den2;
}Fraction;
int main()
{
    Fraction a, b;
    a.num1 = 3; a.den1 = 7;
    b.num2 = 5; b.den2 = 8;
    int x = ((a.num1 * b.den2) + (b.num2 * a.den1));
    int y = (a.den1 * b.den2);
    printf("%d/%d+%d/%d = %d/%d", a.num1, a.den1, b.num2, b.den2, x, y);
}
```

Output:
Output: 3 / 7 + 5 / 8 = 59 / 56

/*Pass Structures to Function*/

```
#include <stdio.h>
struct student {
    char firstname[64];
    char lastname[64];
    char id[64];
    int score;
};
int main(void)
{
    void displayDetail(struct student std);
    struct student stdArr[3];
    int i, n;
    printf("How many students? "); scanf("%d", &n);
    for (i = 0; i < n; i++) {
        printf("Enter detail of %d student.\n", (i + 1));

        printf("Enter First Name: ");
        scanf("%s", stdArr[i].firstname);

        printf("Enter Last Name: ");
        scanf("%s", stdArr[i].lastname);

        printf("Enter ID: ");
        scanf("%s", stdArr[i].id);

        printf("Enter Score: ");
        scanf("%d", &stdArr[i].score);
    }

    for (i = 0; i < n; i++) {
        printf("\nStudent %d Detail:\n", (i + 1));
        displayDetail(stdArr[i]);
    }
}

void displayDetail(struct student std)
{
    printf("Firstname: %s\n", std.firstname);
    printf("Lastname: %s\n", std.lastname);
    printf("ID: %s\n", std.id);
    printf("Score: %d\n", std.score);
}
```

Output:

```
How many students ? 1
Enter detail of 1 student.
Enter First Name : Golam
Enter Last Name : kibria
Enter ID : 2281
Enter Score : 10
```

```
Student 1 Detail:
Firstname: Golam
Lastname : kibria
ID : 2281
Score : 10
```