1. Write a program to display size of all types variable using the sizeof().

Source Code:-

```c
#include <stdio.h>
#include <conio.h>
main()
{
    printf("\n Character = %d bytes", sizeof(char));
    printf(" \n Integor = %d bytes", sizeof(int));
    printf(" \n Short Integor = %d bytes", sizeof(short));
    printf(" \n long Integor = %d bytes", sizeof(long));
    printf(" \n unsigned character = %d bytes", sizeof(unsigned char));
    printf(" \n unsigned integor = %d bytes", sizeof(unsigned int));
    printf(" \n unsigned short = %d bytes", sizeof(unsigned short));
    printf(" \n unsigned long = %d bytes", sizeof(unsigned long));
    printf(" \n Float = %d bytes", sizeof(Float));
    printf(" \n double = %d bytes", sizeof(double));

    getch();
    return 0;
}
```

Sample output:-

Character = 1 bytes
Integor = 2 bytes
Short Integor= 2 bytes
long Integor = 4 bytes
unsigned character = 1 bytes
unsigned integor = 2 bytes
unsigned short = 2 bytes
unsigned long = 4 bytes
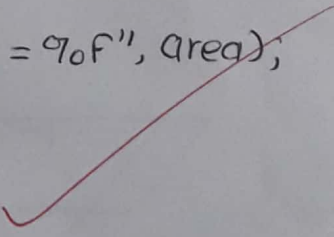
Float = 4 bytes
double = 8 bytes

2. Write algorithm pseudo code, draw Flowchart and write program in C that compute and display the area of circle with given radius. Define PI as constant.

Algorithm:-
Step 1 - Start
Step 2 - Define PI as constant
Step 3 - Input the value of radius
Step 4 - Calculate the area of circle
$$Area = PI \times (radius)^2$$
Step 5 - Display the value of area
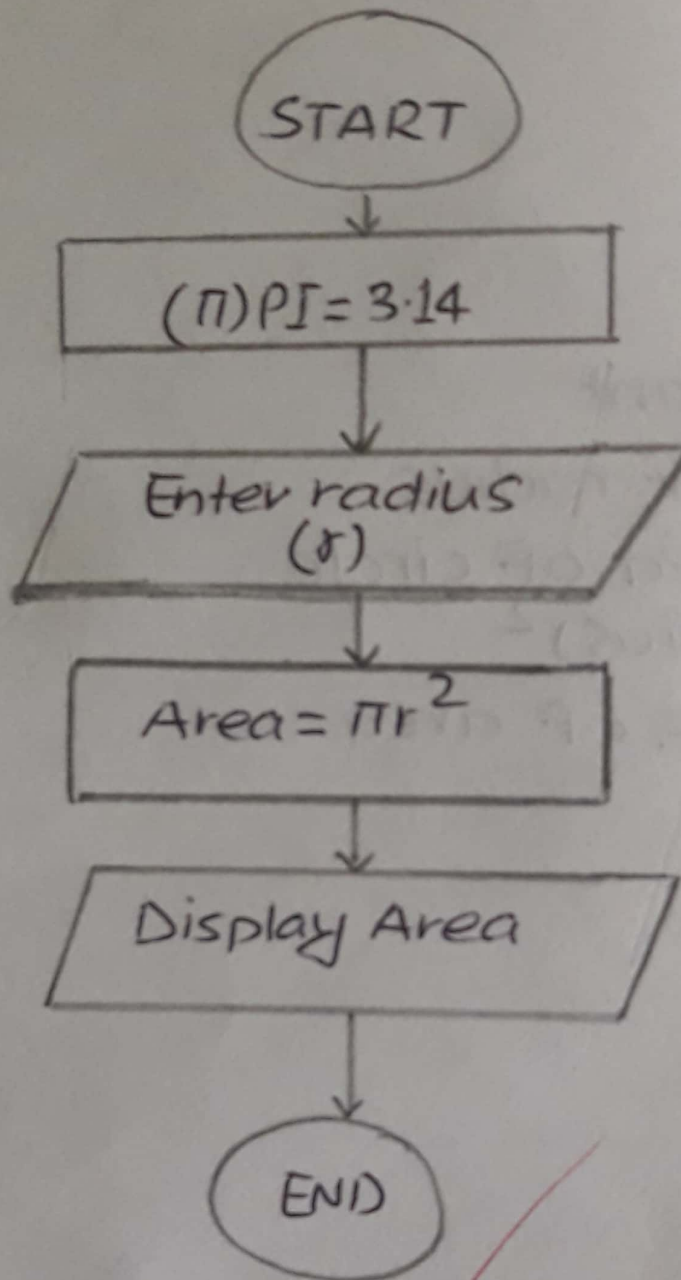Step 6 - End

Source Code:-
```c
#include <stdio.h>
#include <conio.h>
#define PI 3.14
main()
{
  float rad, area;
  printf("Enter the radius:");
  scanf("%f", &rad);
    area= PI* rad * rad;
  printf("\n The area of circle = %f", area);
  getch();
  return 0;
}
```

Sample output:-
Enter the radius: 9
The area of circle = 254.340000

Flowchart:-

```
        ( START )
            |
            v
    ┌───────────────────┐
    │   (π) PI = 3·14    │
    └───────────────────┘
            |
            v
    ╱───────────────────╲
    │   Enter radius     │
    │       (r)          │
    ╲───────────────────╱
            |
            v
    ┌───────────────────┐
    │   Area = πr²       │
    └───────────────────┘
            |
            v
    ╱───────────────────╲
    │   Display Area     │
    ╲───────────────────╱
            |
            v
        ( END )
```

3. Draw Flowchart and design a program that the given length in feet is converted into inch scale.
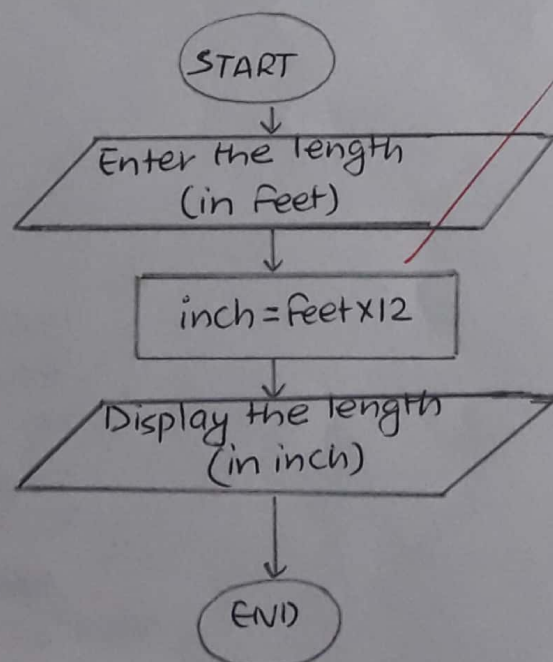
Source Code:-

```
#include <stdio.h>
#include <conio.h>
main()
{
    int inch, feet;
    printf("Enter the length (in feet):");
    scanf("%d", &feet);
     inch = feet * 12;
    printf("\nLength (in inch) = %d", inch);
    getch();
    return 0;
}
```

Sample output:-

Enter the length (in feet): 12
Length (in inch) = 144

Flowchart:-

4. Write a program that accepts the marks of a student in different 5 subjects as input and calculates the total marks and percentage and show the result. Also draw the flow-chart.
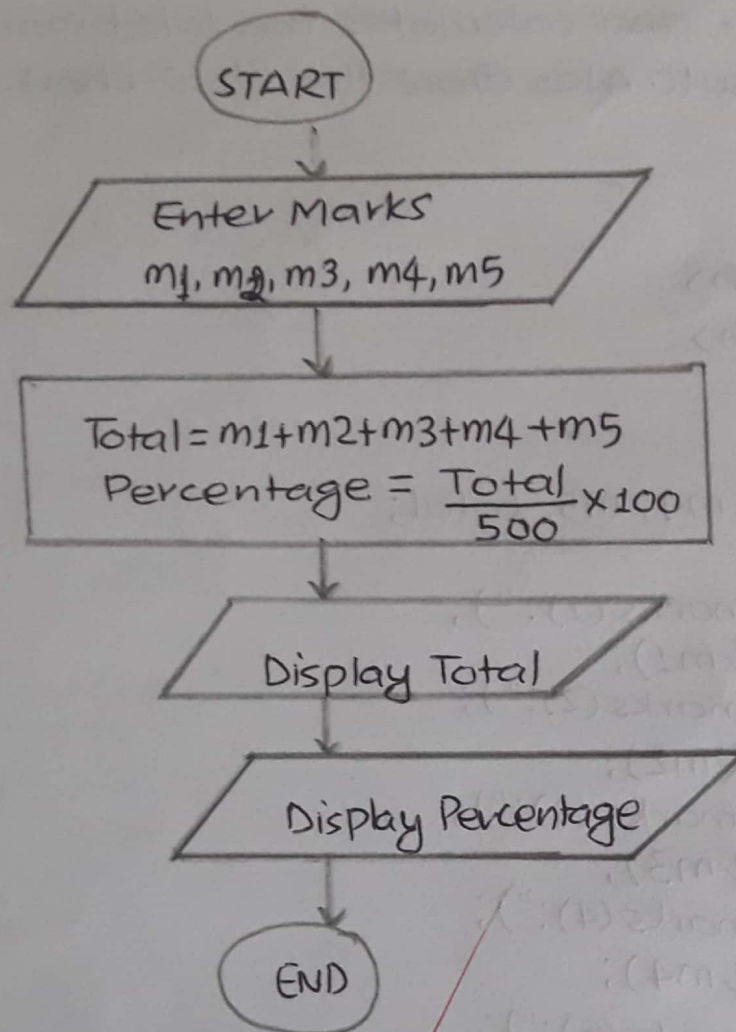
Source Code :-

```c
# include <stdio.h>
# include <conio.h>
main ()
{
    int m1, m2, m3, m4, m5, total;
    float per;
    printf ("Enter marks (1):");
    scanf (" %d", &m1);
    printf (" Enter marks (2):");
    scanf (" %d", &m2);
    printf (" Enter marks (3):");
    scanf (" %d", &m3);
    printf (" Enter marks (4):");
    scanf (" %d", &m4);
    printf (" Enter marks (5):");
    scanf (" %d", &m5);
    total = m1+m2+m3+m4+m5;
    per = total / 5.0;
    printf (" Total Marks = %d", total);
    printf (" \n Percentage = %f", per);

    getch ();
    return 0;
}
```

Sample Output :-

Enter marks (1) : 80
Enter marks (2) : 79
Enter marks (3) : 95
Enter marks (4) : 92
Enter marks (5) : 98

Total Marks = 444
Percentage = 88.800000

Flow Chart:-

START

Enter Marks
m1, m2, m3, m4, m5

$$Total = m1 + m2 + m3 + m4 + m5$$
$$Percentage = \frac{Total}{500} \times 100$$

Display Total

Display Percentage

END

5. Given the basic salary of an employee. The transport allowance is 5% of basic salary. dearness allowance is 10% of basic salary. Provident Fund is deducted 10% of basic salary. Compute the gross monthly salary payable to the employee if 1% tax is deducted from his total income.

Source Code:-
```c
#include <stdio.h>
#include <conio.h>
main()
{
    float bs, ta, da, pf, gs, tax;
    printf("ENTER THE BASIC SALARY:");
    scanf("%f", &bs);
    ta = (5.0/100) * bs;
    da = (10.0/100) * bs;
    pf = (10.0/100) * bs;
    gs = bs + ta + da - pf;
    tax = (1.0/100) * gs;
    gs = gs - tax;
    printf(" TOTAL PAYABLE SALARY : %f", gs);
    getch();
    return 0;
}
```

Sample output:-
ENTER THE BASIC SALARY :1200
TOTAL PAYABLE SALARY : 1247.400024

6. Write algorithm pseudo code as well as draw flow chart to compute the root of quardatic equation $ax^2+bx+c=0$ for given input a, b and c.
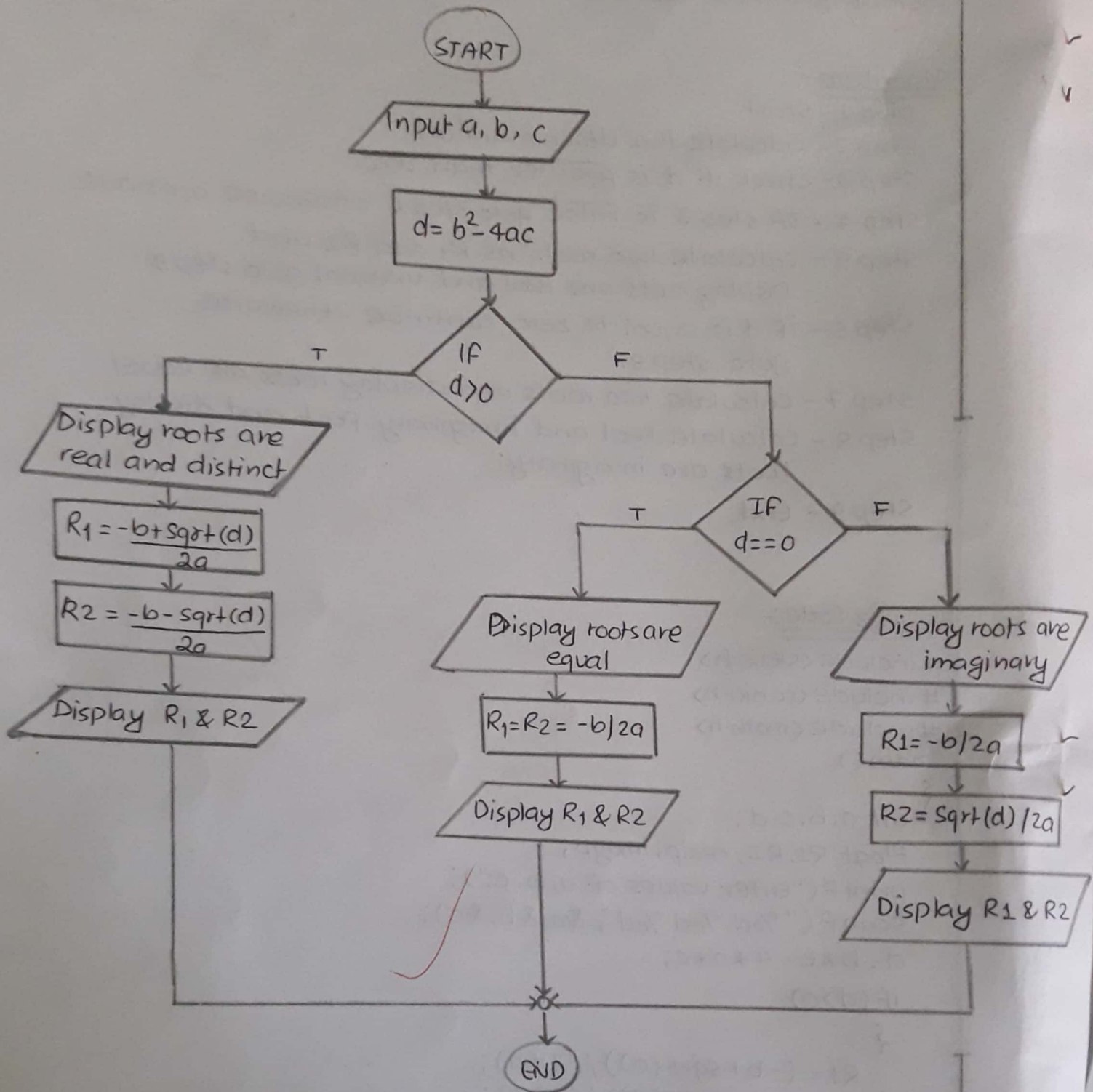
Algorithm:-

Step 1 - Start

Step 2 - Calculate the descrimant (d).

Step 3 - Check if d is greater than zero.

Step 4 - If step 3 is false goto step 6 otherwise continue

Step 5 - Calculate two roots as R_1 and R_2 and Display roots are real and unequal goto step 9

Step 6 - if d is equal to zero continue otherwise goto step 8.

Step 7 - Calculate two roots and display roots are equal

Step 8 - Calculate real and imaginary part and display roots are imaginary.

Step 9 - End

Source Code :-

```
#include <stdio.h>
#include <conio.h>
#include <math.h>
main()
{
    int a,b,c,d;
    float R1,R2,realp,imagp;
    printf(" Enter values of a, b, c:");
    scanf("%d %d %d", &a, &b, &c);
    d= b*b-4*a*c;
    if(d>0)
    {
        R1= (-b+sqrt(d))/(2*a);
        R2= (-b-sqrt(d))/(2*a);
        printf("Roots are real and distinct \n");
        printf("Root 1= %f, Root 2= %f", R1,R2);
    }
    else if(d==0)
    {
        R1=R2= -b/(2*a);
        printf("\n Roots are equal.");
        printf(" \n Root 1= %f, Root2= %f", R1,R2);
    }
    else{
        realp= -b/2*a;
        imag = sqrt((d))/(2*a);
```

Flowchart:-

START

Input a, b, c

$$d = b^2 - 4ac$$

If d>0

T →

Display roots are real and distinct

$$R_1 = \frac{-b + sqrt(d)}{2a}$$

$$R_2 = \frac{-b - sqrt(d)}{2a}$$

Display R₁ & R2

F →

If d==0

T →

Display roots are equal

$$R_1 = R_2 = -b/2a$$

Display R₁ & R2

F →

Display roots are imaginary

$$R_1 = -b/2a$$

$$R_2 = sqrt(d)/2a$$

Display R1 & R2

END

7.
```
        printf ("\n Roots are imaginary.");
        printf ("\n Root1= %of, Root 2= %of", realp, imagp);
    }

    getch ();
    return 0;
}
```

Sample output:-

```
Enter values of a, b, c: 1, 3, 2
 Roots are real and distinct
   Root 1 = 2           Root2 = 1
```

8. Write algorithm, Flowchart to find that a given number is divisible by 5 and 3 but not by 10.

Algorithm:-
   Step 1 - Start
   Step 2 - Input the number (n)
   Step 3 - Check if n is divisible by 5.
   Step 4 - If step 3 is false goto step 8 otherwise
             Check if n is divisible by 3.
   Step 5 - If step 4 is false goto step 8 otherwise
             check if n is not divisible by 10.
   Step 6 - If step 5 is false goto step 8 otherwise
             goto step 7.
   Step 7 - Display " number is exactly divisible by 3 and 5 but not by 10." goto step 8.
   Step 8 - End

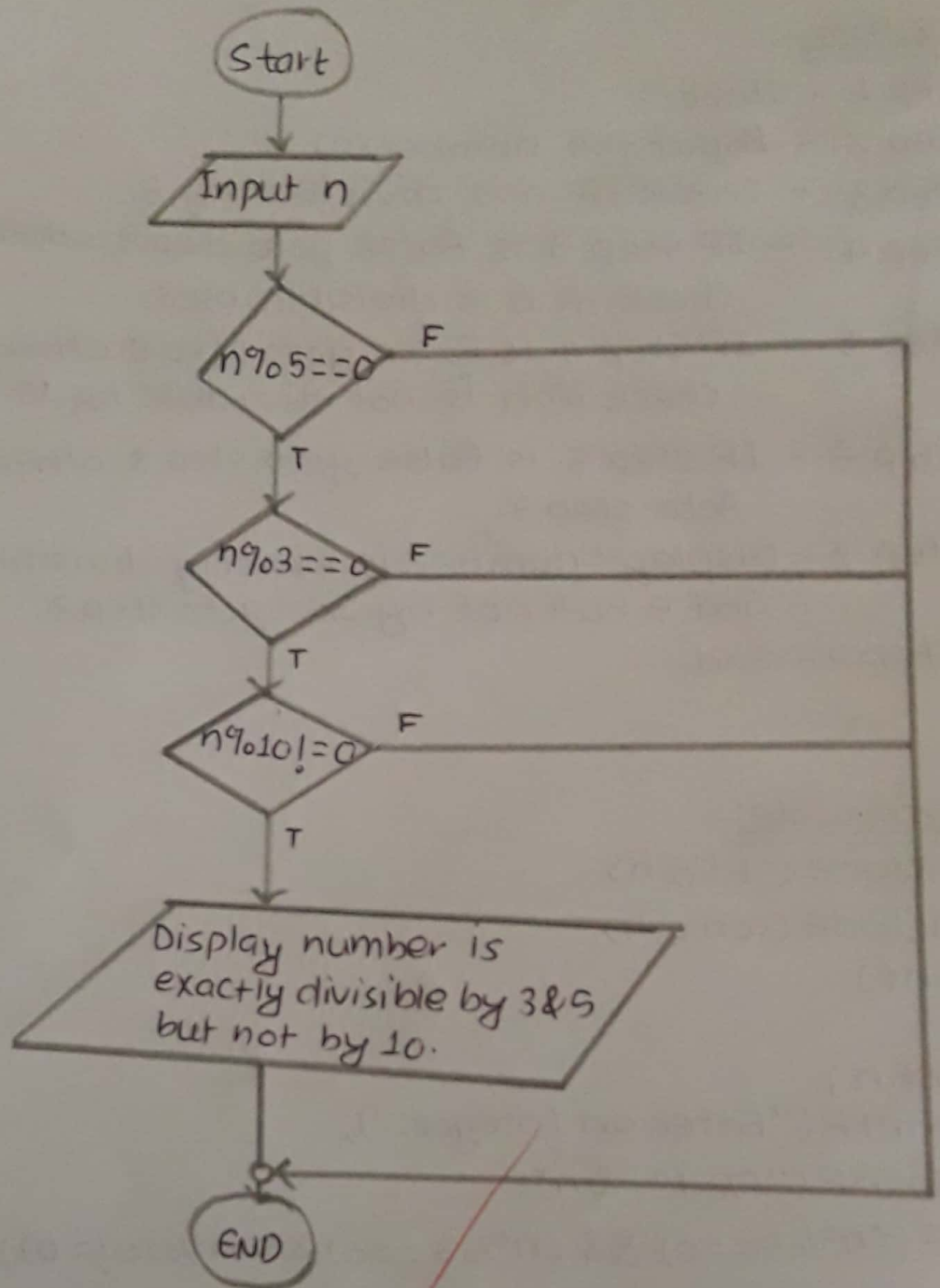Source Code:-

```c
#include <stdio.h>
#include <conio.h>
main()
{
    int n;
    printf("Enter an Integor:");
    scanf("%d", &n);
    if((n%5==0) && (n%3==0) && n%10!=0))
    printf("\n %d is exactly divisible by 3 and 5 but not by 10", n);
    getch();
    return 0;
}
```

Sample output:
Enter an Integor: 15
15 is exactly divisible by 3 and 5 but not by 10.

Flowchart:-

```
                    ( Start )
                       |
                       v
                 / Input n /
                       |
                       v
                  < n%5==0 >----F----+
                       |             |
                       T             |
                       v             |
                  < n%3==0 >----F----+
                       |             |
                       T             |
                       v             |
                 < n%10!=0 >---F-----+
                       |             |
                       T             |
                       v             |
          / Display number is      /|
          / exactly divisible by 3&5|
          / but not by 10.         / |
                       |             |
                       v             |
                       +<------------+
                   ( END )
```

9. Write a C program that reads only two integers and an operator symbol (+, -, *, /, %) and calculate the value after applying the given operator.
i) use of if-else
ii) use of switch statement.

Source Code:-

i) use of if-else

```c
#include <stdio.h>
#include <conio.h>
main()
{
    int a, b;
    char op;
    int r;
    float d;
    printf(" Enter two integers:");
    scanf("%d %d", &a, &b);
    printf(" Enter an operator:");
    scanf(" %c", & op);
    if (op == '+')
    {
        r = a+b;
        printf(" %d + %d = %d", a, b, r);
    }
    else if (op == '-');
    {
        r = a-b;
        printf("%d - %d = %d", a, b, r);
    }
    else if (op == '*')
    {
        r = a*b;
        printf("%d * %d = %d", a, b, r);
    else if (op == '/')
    {
        d = (float)a/b;
        printf("%d / %d = %d", a, b, d);
    }
    else if (op == '%')
    {
        r = a % b
        printf("%d %% %d = %d", a, b, r);
    }
    else
        printf(" Invalid operator);
    getch();
    return 0;
}
```

Enter two integers: 7 9
Enter an operator : *
7 * 9 = 63

ii) Switch Statement :-

```c
# include <stdio.h>
# include <conio.h>
main()
{
    int a, b, r;
    char op;
    float d;
    printf("Enter two integers:");
    scanf("%d %d", &a, &b);
    printf("Enter an operator:");
    scanf(" %c", &op);
    switch(op)
    {
        case '+':
            r = a + b;
            printf("%d + %d = %d", a, b, r);
            break;
        case '-':
            r = a - b;
            printf("%d - %d = %d", a, b, r);
            break;
        case '*':
            r = a * b;
            printf("%d * %d = %d", a, b, r);
            break;
        case '/':
            d = (float) a / b;
            printf("%d / %d = %d", a, b, d);
            break;
        case '%':
            r = a % b;
            printf("%d %% %d = %d", a, b, r);
            break;
        default:
            printf("Invalid operator");
    }
    getch();
    return 0;
}
```

Sample output :-
Enter two integers: 19, 38
Enter an operator: %
19 % 38 = 0

10. Draw a flowChart and write a program to compute the sum of even numbers and odd numbers separately from 1 to 100 using loop.

Source Code:-

```c
#include <stdio.h>
#include <conio.h>
main()
{
    int n, sum_even, sum_odd;
    n=1;
    sum_even = sum_odd = 0;
    while (n <= 100)
    {
        if (n%2 == 0)
        {
            sum_even += n;
            n=n+1;
        }
        else
        {
            sum_odd += n;
            n=n+1;
        }
    }
    printf("Sum of even numbers= %d", sum_even);
    printf("Sum of odd numbers= %d", sum_odd);
    getch();
    return 0;
}
```

Sample output:-

Sum of even numbers=
Sum of odd numbers=

FlowChart:-

START

$n = 1$
Sum_even = 0
Sum_odd = 0

$n \leq 100$ —F→

T

$n \%2 == 0$

T← ——— →F

Sum_even+=n

$n = n+1$

Sum_odd +=n

$n = n+1$

Display Sum-even

Display Sum_odd

END
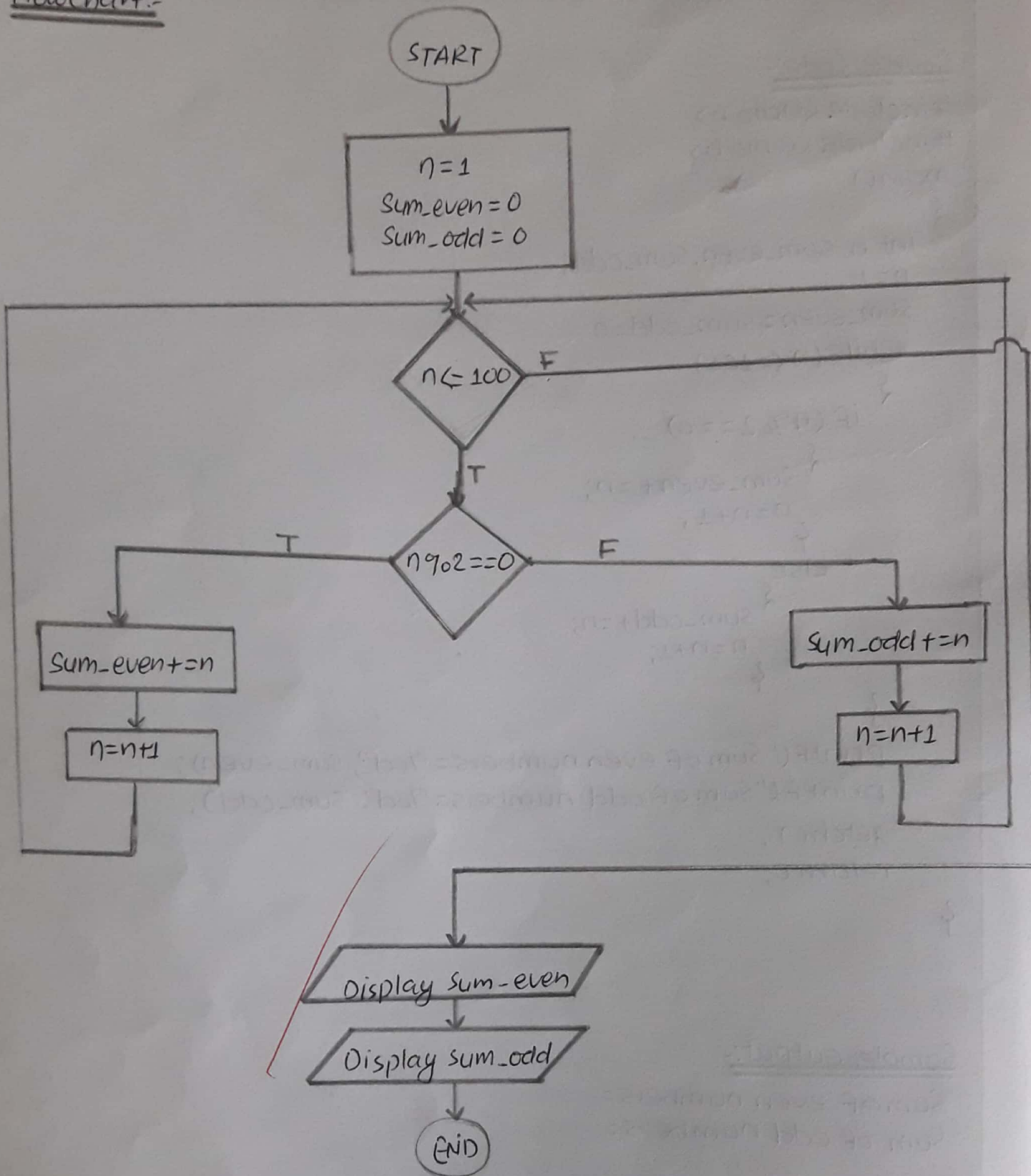
10 Write a program to decide that whether a given integer is prime or not.

Source Code:-
```
#include <stdio.h>
#include <conio.h>
main()
{
    int i, n, f=0;
    printf(" Enter a number:");
    scanf("%d", &n);
    i=2;
    while (i<n)
    {
        if(n%i==0)
            f++;
        i++;
    }
    if (f!=0)
        printf("%d is prime", n);
    else
        printf("%d is not prime", n)
    getch();
    return 0;
}
```

Sample Output:-

Enter a number: 7
7 is prime.

12. Write a program to compute the factorial of an integer using while, do while as well as for loop.

Source Code:-

i) while

```c
#include <stdio.h>
#include <conio.h>
main()
{
    int i, n, fact=1;
    printf("Enter a number:");
    scanf("%d", &n);
    i=1;
    while(1)
    {
        fact= fact*i;
        i++;
        if(i>n)
        break;
    }
    printf("Factorial=%d", fact);
    getch();
    return 0;
}
```

Sample Output:-

Enter a number: 9
Factorial = 362880

ii) do while

```c
#include <stdio.h>
#include <conio.h>
main()
{
    int i, n, fact=1;
    printf("Enter a number:");
    scanf("%d", &n);
    i=1;
    do
    {
        fact = fact*i;
        i++;
        if(i>n)
        break;
    }while(1)
    printf("Factorial=%d", fact);
    getch();
    return 0;
}
```

Sample output:-
Enter a number: 13
Factorial = 6227020800

iii) For

```c
#include <stdio.h>
#include <conio.h>
main()
{
    int i, n, Fact=1;
    printf(" Enter a number:");
    scanf(" %d", &n);
    for (i=1; i>n; i++)
        {
            Fact = Fact*i;
            break;
        }
    printf("Factorial = %d", Fact);
    getch();
    return 0;
}
```

Sample Output:-

Enter a number: 7
Factorial = 5040

12. Write a program to compute the multiplication table from 1 to 100.

Source Code:-
```c
#include <stdio.h>
#include <conio.h>
main()
{
    int i, j;
    for (i=1; i<=10; i++)
    {
        for (j=1; j<=10; j++)
        {
            printf("%d \t", i*j);
        }
        printf("\n");
    }
    getch();
    return 0;
}
```

Sample output:-

1	2	3	4	5	6	7	8	9	10
2	4	6	8	10	12	14	16	18	20
3	6	9	12	15	18	21	24	27	30
4	8	12	16	20	24	28	32	36	40
5	10	15	20	25	30	35	40	45	50
6	12	18	24	30	36	42	48	54	60
7	14	21	28	35	42	49	56	63	70
8	16	24	32	40	48	56	64	72	80
9	18	27	36	45	54	63	72	81	90
10	20	30	40	50	60	70	80	90	100

13. Draw a flowchart and also write a program to compute the sum of n numbers as input by the user.

Source code:-

```c
#include <stdio.h>
#include <conio.h>
main()
{
    int N, n, sum=0, count=1;
    printf("Enter Total Number(count):");
    scanf("%d", &N);
    while(count <= N)
    {
        printf("Enter numbers (value):");
        scanf("%d", &n);
        sum = sum+n;
        count = count+1;
    }
    printf("Sum of %d Numbers by you = %d", N, sum);
    getch();
    return 0;
}
```

Sample output:-

Enter Total Numbers(count): 7
Enter numbers (value): 19
Enter numbers (value): 23
Enter numbers (value): 54
Enter numbers (value): 9
Enter numbers (value): 64
Enter numbers (value): 17
Enter numbers (value): 39

Sum of 7 Numbers by you = 225

Flowchart

```
        ( START )
            |
            v
     +-------------+
     | Count = 1   |
     +-------------+
            |
            v
     +-------------+
     | Sum = 0     |
     +-------------+
            |
            v
      / Input N    /
     / (count)    /
            |
            v
        / Count <= N \  ------------------+
        \            /                    |
            |                             |
            v                             |
       / Input n     /                    |
      / (values)    /                     |
            |                             |
            v                             |
     +-------------+                      |
     | Sum += n    |                      |
     +-------------+                      |
            |                             v
            v                    / Display sum /
     +-------------+                      |
     | Count += 1  |                      v
     +-------------+                   ( END )
            |
   (loop back to Count <= N)
```
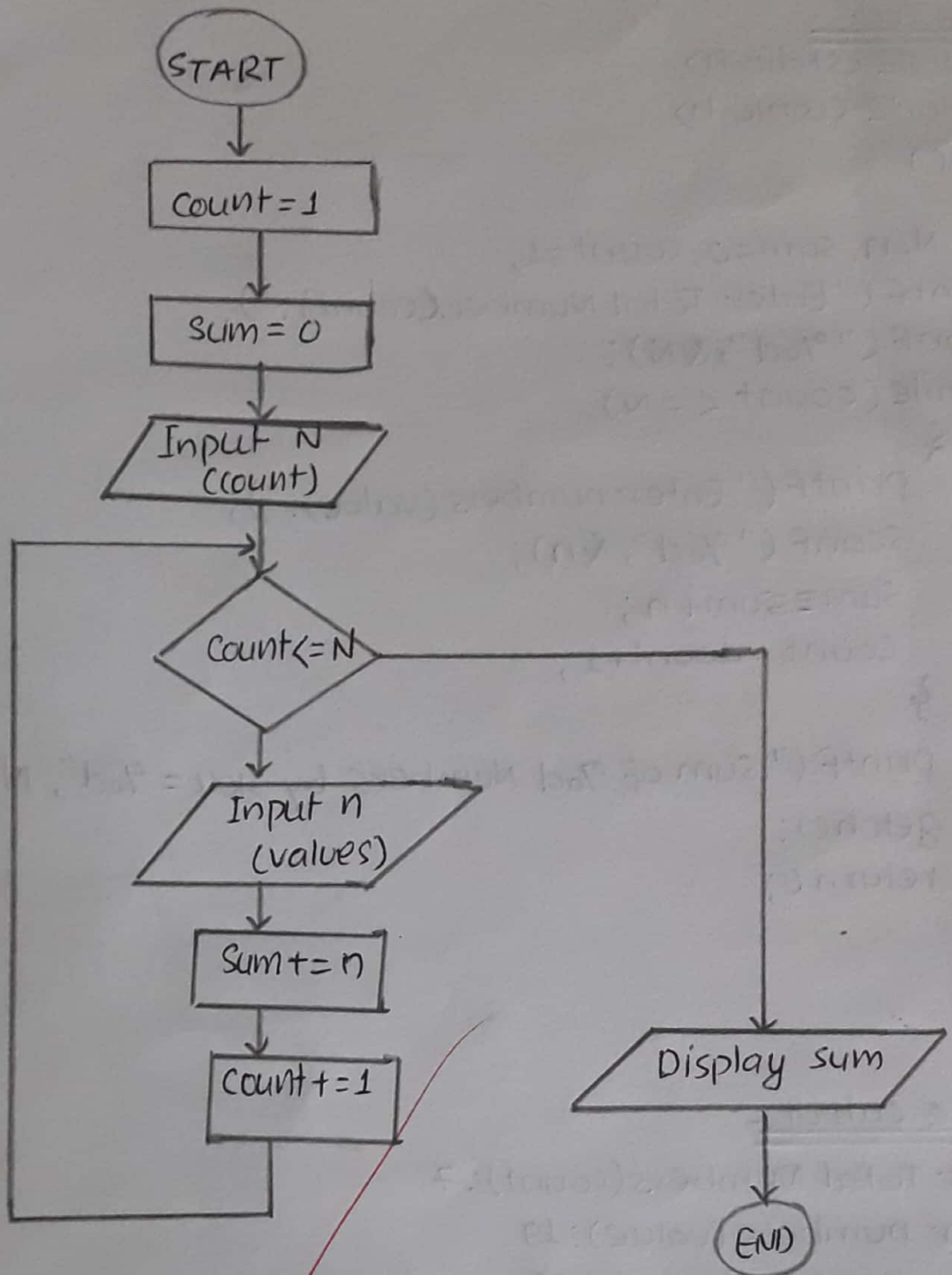
14. Write a program that accepts an integer and displays the equivalent binary number using loop.

Source Code:-

```c
#include <stdio.h>
#include <conio.h>
main ()
{
    int n, base=1, r, y;
    long int sum = 0;
    printf("Enter an Integer :");
    scanf("%d", &n);
    y=n;
    while(1)
    {
        r = n%2;
        sum = sum+r * base;
        base = base * 10;
        n = n/2;
        if (n==0)
        break;
    }
    printf("The binary equivalent of %d is %d", y, sum);
    getch();
    return 0;
}
```

Sample Output:-

Enter an Integer : 19
The binary equivalent of 19 is 10011.

15. Write a program using loop to print the following floyd's triangle as given below when input is n.

```
1
2  3
4  5  6
7  8  9  10
11 12 13 14   up to n rows.
```

Source Code:-

```c
#include <stdio.h>
#include <conio.h>
main()
{
    int i,j, n=1;
    for(i=1; i<=5; i++)
    {
        for (j=1; j<= i; j++)
        {
            printf("%d", n);
            n++;
        }
        printf("\n");
    }
    getch();
    return 0;
}
```

Sample Output:-

```
1
2  3
4  5  6
7  8  9  10
10 12  13  14  15
```