1.Equality Check:
Write a program to check if two integers provided by the user are equal or not.

```
#include <stdio.h>

int main()
{
  int num1,num2;
  printf("enter two numberrs;\n");
  scanf("%d %d",&num1,&num2);
  if(num1==num2)
  {
     printf("the numbers are equal");
  }
  else{
     printf("the numbers are not equal");
  }
   return 0;
}
```

2.Greater Number Identification:
Write a program to determine which of two numbers is greater using relational operators.

```
#include <stdio.h>

int main()
{
  int num1,num2;
  printf("enter two numberrs;\n");
  scanf("%d %d",&num1,&num2);
  if(num1>num2)
```

```
  {
    printf("%d is greater",num1);
  }
  else{
      printf("%d is greater",num2);
  }
   return 0;
}
```

3.Check if a Number is Positive:
Use relational operators to check if a given number is positive (greater than 0).

```
#include <stdio.h>

int main()
{
  int num1,num2;
  printf("enter two numberrs;\n");
  scanf("%d %d",&num1,&num2);
  if(num1>0)
  {
    printf("%d is positive",num1);
  }
  else{
      printf("%d is negative",num1);
  }
  if(num2>0)
  {
      printf("%d is positive",num2);
  }
```

```
  else{
     printf("%d is negative",num2);
  }
   return 0;
}
```

4. Rectangle Validity Check:

Write a program to verify if the given length and breadth of a rectangle satisfy the condition of a valid rectangle (length > 0 and breadth > 0).

```
#include <stdio.h>

int main()
{
  int l,b;
  printf("enter length:\n");
  scanf("%d",&l);
  printf("enter bredth");
  scanf("%d",&b);
  if(l>0&&b>0)
  {
  printf("condition satisfied");
  }
  else{
     printf("condition not satisfied");
  }

   return 0;
}
```

5. Grade Eligibility Check:
Given a student's marks in a subject, determine if the student has passed (marks >= 40).

```
#include <stdio.h>

int main()
{
  int mark;
  printf("enter mark of the student:\n");
  scanf("%d",&mark);
  if(mark>=40)
  {
  printf("student is passed");
  }
  else{
     printf("student is not passed");
  }

   return 0;
}
```

6.Check if Number is Within Range:
Use relational operators to check if a given number lies between 10 and 50 (inclusive).

```
#include <stdio.h>

int main()
{
  int num;
  printf("enter the number:\n");
  scanf("%d",&num);
  if(num >=10 && num <= 50)
```

```
  {
  printf("number is within the reange 10 to 50");
  }
  else{
     printf("number is not within the reange 10 to 50");
  }

   return 0;
}
```

7. Verify Alphabetic Range:
Write a program to check if a given character is a lowercase English letter (between 'a' and 'z').

```
#include <stdio.h>

int main()
{
  char ch;
  printf("enter a letter :");
  scanf("%c",&ch);
  if(ch>= 'a' && ch<= 'z')
  {
  printf("lettr is lower case");
  }
  else{
     printf("letter is not lower case");
  }
   return 0;
}
```

8. Age Comparison:
Compare the ages of two people and determine who is older or if both are of the same age.

```
#include <stdio.h>


int main()
{
  int age1,age2;
  printf("enter age of first person :");
  scanf("%d",&age1);
  printf("enter age of secnd person :");
  scanf("%d",&age2);
  if(age1==age2)
  {
  printf("both are same age");
  }
  else{
     if(age1>age2)
     {
        printf("fist person is older");
     }
     else
     {
        printf("second person is older");
     }
  }
   return 0;
}
```

9. Weight Limit Check:
Write a program to determine if the weight of an object exceeds the specified maximum limit (e.g., 50 kg).

```
#include <stdio.h>

int main()
{
  int wgt;
  printf("enter the weight of object :");
  scanf("%d",&wgt);

  if(wgt>50)
  {
  printf("weight exceeds the limit");
  }
  else{

        printf("weight is in the limit");
     }

   return 0;
}
```

10. Rectangle Larger Area Check:
Compare the areas of two rectangles given their lengths and breadths and determine which rectangle has a larger area.

```
#include <stdio.h>

int main()
{
  int l1=3,b1=2,l2=4,b2=2;

  int area1=l1*b1;
  int area2=l2*b2;
```

```
  if(area1>area2)
  {
     printf("rectangle 1 has larger area of %d",area1);
  }

  else{

        printf("rectangle 2 has larger area of %d",area2);
     }

   return 0;
}
```

11. Write a program to compute the result of the bitwise AND operation between two integers provided by the user.

```
#include <stdio.h>

int main()
{
  int num1,num2;
  printf("enter two numbers");
  scanf("%d %d",&num1,&num2);
  int result = num1&num2;
     printf("bitwiseAND of the two numbers= %d",result);
   return 0;
}
```

12. Write a program to compute the result of the bitwise OR operation between two integers provided by the user.

```
#include <stdio.h>


int main()
{
  int num1,num2;
  printf("enter two numbers");
  scanf("%d %d",&num1,&num2);
  int result = num1 | num2;
     printf("bitwiseOR of the two numbers= %d",result);
   return 0;
}
```

13. Write a program to compute the result of the bitwise XOR operation between two integers provided by the user.

```
#include <stdio.h>


int main()
{
  int num1,num2;
  printf("enter two numbers");
  scanf("%d %d",&num1,&num2);
  int result = num1 ^ num2;
     printf("XOR of the two numbers= %d",result);
   return 0;
}
```

14. Write a program to find the bitwise complement of a given integer and print the result.

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

```
int main()
{
  int num1;
  printf("enter a number");
  scanf("%d",&num1);
  int result = ~ num1 ;
     printf("complemnt of the two numbers= %d",result);
   return 0;
}
```

15. Given an integer n and a position p, write a program to toggle the bit at position p using the XOR operator.

```
#include <stdio.h>

int main()
{
  int num,p;
  printf("enter an integer:");
  scanf("%d",&num);
  printf("enter the position");
  scanf("%d",&p);
  int result = 1<<p;
  num=num^result;

     printf("number after toggled = %d",num);
   return 0;
}
```

16. Write a program to set the bit at a given position p in an integer n to 1 using the OR operator.

```
#include <stdio.h>

int main()
{
  int num,p;
  printf("enter an integer:");
  scanf("%d",&num);
  printf("enter the position to set the bit to 1 :");
  scanf("%d",&p);
  int result = 1<<p;
  num=num|result;

     printf("number after bit setting = %d",num);
   return 0;
}
```

17. Write a program to clear (set to 0) the bit at a given position p in an integer n using the AND and NOT operators.

```
#include <stdio.h>

int main()
{
  int num,p;
  printf("enter an integer:");
```

```
  scanf("%d",&num);
  printf("enter the position :");
  scanf("%d",&p);
  int result = ~(1<<p);
  num=num & result;

     printf("number after bit setting = %d",num);
   return 0;
}
```

Toggle and Evaluate Bit Status:
Given an integer n and a bit position p:

- Use bit masking and bitwise XOR to toggle the bit at position p.
- After toggling, check if the updated number is positive (arithmetic and relational operators) and divisible by 2 (logical operators).

```
#include <stdio.h>

int main()
{
  int num,p;
  printf("enter an integer:");
  scanf("%d",&num);
  printf("enter the position");
  scanf("%d",&p);
  int result = 1<<p;
  num=num^result;

     if(num>0)
     {
    if(num%2==0)
    {
```

```
        printf("the nmber is positive and divisible by 2");
    }
    else
    {
        printf("number after toggled = %d is positive and not divisible by 2",num);

    }
    }
    else
    {

        printf("the number is negative");
    }

  return 0;
}
```

Write a program to check if a given integer is both a multiple of 5 (arithmetic operator) and greater than 50 (relational operator). Additionally, verify if its binary representation has its least significant bit set (bitwise AND operation).

```
#include <stdio.h>

int main() {
  int num;

  printf("Enter an integer: ");
  scanf("%d", &num);

  if (num % 5 == 0) {
```

```
    if (num > 50) {


        if (num & 1) {
            printf("The number %d is a multiple of 5, greater than 50, and has its least significant bit set.\n", num);
        } else {
            printf("The number %d is a multiple of 5 and greater than 50, but its least significant bit is not set.\n", num);
        }
    } else {
        printf("The number %d is a multiple of 5, but it is not greater than 50.\n", num);
    }
  } else {
    printf("The number %d is not a multiple of 5.\n", num);
  }


  return 0;
}
```

Determine Voting Eligibility with Criteria:
A person can vote if:

- Their age is greater than or equal to 18 (relational operator).
- They are a registered citizen, represented by a specific bit set in their ID number (bit masking and bitwise AND).
  Write a program to verify these conditions using logical operators.

```
#include <stdio.h>


int main()
{
  int age,id,verify=0;
```

```
    printf("enter the age");
    scanf("%d",&age);
    if(age>=18)
    {
        printf("enter your id");
        scanf("%d",&id);
        int mv=1<<0;
        if((mv&id)!= verify)
        {
            printf("eligible for vote");
        }
        else{
            printf("not eligible");
        }


    }
    else{
        printf("not eligible");
    }
    return 0;
}
```

Set, Clear, and Check Specific Bit:

Write a program to:

Use bit masking and bitwise OR to set a specific bit in a number.

Use bitwise AND and NOT to clear another specific bit.

Check if the resulting number is odd (arithmetic and relational operators) and lies within a range (logical operators).

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

```
int main()
{
   int n;
   printf("Enter the num:");
   scanf("%d",&n);

   int p;
   printf("Enter the position:");
   scanf("%d",&p);

   int R=n|(1<<p);
   printf("Result=%d\n",R);

   int p1;
   printf("Enter the position1:");
   scanf("%d",&p1);

   int R1=R&(~(1<<p1));
   printf("Result1=%d\n",R1);

   if(R1%2!=0 && R1>0 && R1<500){
      printf("Condition Satisfied");
   }
   else{
      printf("Not Satisfied");
   }
```

Custom Mathematical Condition with Bits:

Given two integers a and b, perform the following:

Compute their sum and product (arithmetic operators).

Verify if the sum is greater than 100 and the product is divisible by 4 (relational and logical operators).

Check if the binary representation of a has its second bit set (bitwise AND with a mask).

```
#include<stdio.h>

int main(){

   int a,b,S,P,p;

   printf("Enter the num1 \n");

   scanf("%d",&a);
```

```
    printf("Enter the num2 \n");
    scanf("%d",&b);
    printf("Enter the positon");
    scanf("%d",&p);
    printf("The sum is: %d \n",S=a+b);
    printf("The product is: %d \n",P=a*b);
    if(S>100&&P%4==0)
    {
        printf("Verified");
    }
    else{
        printf("not verified \n");
    }
    int result=a&(1<<p);
    printf("Result=%d\n",result);
    return 0;
}
```

Check for Positivity:

Write a program to check if a number entered by the user is positive using an **if** statement

```
#include <stdio.h>


int main()
```

```
{
   int num;
   printf("enter a number");
   scanf("%d",&num);
   if(num==0)
   {
      printf("the number is neither positive nor negative");
   }
 if(num>0)
   {
      printf("the numbr is positive");
   }
   if(num<0)
{
   printf("the number is negative");
   }
   return 0;
}
```

Divisibility Check:
Write a program to check if a number is divisible by 3 using an **if** statement

```
#include <stdio.h>

int main()
{
   int num;
   printf("enter a number");
   scanf("%d",&num);
   if(num %3 ==0)
   {
```

```
    printf("the number is divisible by 3");
  }else
  {
    printf("the numbr is not divisible by 3");
  }

  return 0;
}
```

Odd or Even:
Write a program to determine if a number is odd or even using an **if-else** statement.

```
#include <stdio.h>

int main()
{
  int num;
  printf("enter a number");
  scanf("%d",&num);
  if(num %2 ==0)
  {
    printf("the number is even");

  }else
  {
    printf("the number is odd");
  }
  return 0;
}
```

3. **Passing Criteria:**
   Write a program to check if a student has passed an exam based on their marks (pass marks are 40). If the marks are below 40, display "Fail."

```
#include <stdio.h>


int main()
{
   int mark;
   printf("enter a mark of the student\n");
   scanf("%d",&mark);
   if(mark >= 40)
   {
      if(mark<=100)
      {
         printf("student is passed");
      }else{
         printf("enter a valid mark");
      }



   } else
   {
      printf("student is failed");
   }
   return 0;
}
```

Triangle Type Checker:
Given the lengths of three sides, write a program to determine if the triangle is valid using nested **if-else**. If valid, check if it is an equilateral triangle.

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

```
int main()
{
   int s1,s2,s3;
   printf("enter 3 sides of the triangle:\n");
   scanf("%d %d %d",&s1,&s2,&s3);
   if(s1+s2>s3 && s2+s3>s1 && s1+s3>s2)
   {
      if(s1==s2 && s2==s3)
      {
         printf("the triangle is valid and equilateral");
      }
      else
      {
         printf("the triangle is valid and not equilateral");
      }
   }
   else{
      printf("triangle is not valid");
   }
   return 0;
}
```

Write a program to check if a student is eligible for admission based on the following criteria:

- Marks in mathematics >= 50
- Marks in physics >= 50
- Total marks (math + physics) >= 120
  Use nested **if-else** statements.

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

```
int main()
{
   int
   mark1,mark2,total;
   printf("enter the mark of maths :\n");
   scanf("%d",&mark1);
   printf("enter the mark of physics :\n");
   scanf("%d",&mark2);
   total=mark1+mark2;

   if(mark1>=50 && mark2>=50)
   {
      printf("the student is eligible for admission");
   }
   else if( total>=120)
   {
      printf("the student is eligible for admission");
   }
   else{
       printf("the student not is eligible for admission");
   }
   return 0;
}
```

Grade Calculator:
Write a program to calculate and print the grade of a student based on their percentage using an **if-else-if ladder**:

- = 90: Grade A
- = 75: Grade B
- = 50: Grade C
- < 50: Fail

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

```
int main()
{
   int   mark;
   printf("enter the mark of the student:\n");
   scanf("%d",&mark);
   if(mark>=90)
   {
      printf("student has A grade");
   }
   else if(mark>=75 && mark<90)
   {
      printf("student has B grade");
   }
   else if(mark>=50 && mark<75)
   {
      printf("student has C grade");
   }
   else
   {
      printf("student has failed");
   }
   return 0;
}
```

Number Classification:
Write a program to classify an integer as positive, negative, or zero using an **if-else-if ladder**.

```
#include <stdio.h>

int main()
```

```
{
   int num;
   printf("enter a number");
   scanf("%d",&num);
   if(num>0)
   {
      printf("the number is positive");

   }
   else if(num<0)
   {
      printf("the number is negative");
   }
   else
   {
       printf("you entered 0");
   }
   return 0;
}
```

Electricity Bill Calculation:
Write a program to calculate the electricity bill based on the number of units consumed using the following criteria:

- Units <= 100: ₹5 per unit
- Units > 100 and <= 200: ₹7 per unit
- Units > 200: ₹10 per unit
  Use an **if-else-if ladder** to implement this.

```
#include <stdio.h>

int main()
{
   int unit,amt;
```

```
   printf("enter the units consumed");
   scanf("%d",&unit);
   if(unit<=100)
   {
      amt=unit*5;
      printf("electrivity bill=%d",amt);
   }
   else if(unit>100&& unit<=200)
    {
       amt=unit*7;
       printf("electrivity bill=%d",amt);
    }
   else
   {
      amt=unit*10;
       printf("electrivity bill=%d",amt);
   }




   return 0;
}
```

Day of the Week:
Write a program to print the name of the day of the week based on a number entered by the user (1 for Monday, 2 for Tuesday, ..., 7 for Sunday) using an **if-else-if ladder**. #include <stdio.h>

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

```
int main()
{
   int num;
   printf("enter a number from 1 to 7\n");
   scanf("%d",&num);
   if(num==1)
   {
      printf("monday");
   }
   else if(num==2)
   {
      printf("tuesday");
   }
   else if(num==3){

   printf("wednesday");
}
else if(num==4){
   printf("thursday");
}
else if(num==5)
{
   printf("friday");
}
  else if(num==6)
  {
     printf("saturday");
  }
  else if(num==7)
  {
     printf("sunday");
```

```
  }
  else
  {
     printf("enter a valid number");
  }
   return 0;
}
```

Write a program that takes an integer (1-7) as input and uses a switch-case to print the corresponding day of the week (e.g., 1 for Monday, 2 for Tuesday, etc.).

```
#include <stdio.h>

int main()
{
   int num;
   printf("enter a number from 1 to 7\n");
   scanf("%d",&num);
   switch(num)
   {
      case 1 : printf("the day is monday");
      break;
      case 2 : printf("the day is tuesday");
      break;
      case 3 : printf("the day is wednesday");
      break;
      case 4 : printf("the day is thurday");
      break;
      case 5 : printf("the day is friday");
      break;
      case 6 : printf("the day is saturday");
```

```
        break;
        case 7 : printf("the day is sunday");
        break;
        default : printf("enter a valid number");
        break;
    }

    return 0;
}
```

Write a program to perform basic arithmetic operations (addition, subtraction, multiplication, division) based on the operator input (+, -, *, /) using a switch-case statement.

```
#include <stdio.h>

int main()
{
    int num,a,b,result;
    printf("enter two numbers\n");
    scanf("%d %d",&a,&b);
    printf("enter the number of operation you need to
perform\n1.addition\n2.subtraction\n3.multiplicarion\n4.division\n");
    scanf("%d",&num);
    switch(num)
    {
        case 1 : result=a+b;
        printf("addition of the two numers is %d",result);
        break;
        case 2 : result=a-b;
        printf("subtraction of the two numers is %d",result);
        break;
        case 3 : result=a*b;
        printf("multiplication of the two numers is %d",result);
```

```
        break;
        case 4 : result=a/b;
        printf("division of the two numers is %d",result);
        break;
        default : printf("enter a valid number");
        break;
    }

    return 0;
}
```

Write a program that takes a single character as input and uses a switch-case to determine if it is a vowel or a consonant.

```
#include <stdio.h>

int main()
{
    char ch;
    printf("enter a character\n");
    scanf("%c",&ch);
    switch(ch)
    {
        case 'a' :
        printf(" 'a' is a vowel");
        break;
       case 'e' :
        printf("'e' is a vowel");
        break;
        case 'i' :
        printf("i' is a vowel");
        case 'o' :
```

```
    printf("'o' is a vowel");
    break;
    case 'u' :
    printf("'u' is a vowel");
    break;
    default : printf("%c is not a vowel",ch);
    break;
  }

  return 0;
}
```

Write a program to convert a single-digit number (0-9) into its word representation (e.g., 1 to "One", 2 to "Two") using a switch-case statement.

```
#include <stdio.h>

int main()
{
   int num;
   printf("enter a number from 0 to 9\n");
   scanf("%d",&num);
   switch(num)
   {
      case 0 :
      printf(" word representation of %d is Zero",num);
      break;
      case 1 :
       printf(" word representation of %d is One",num);
      break;
      case 2 :
```

```
        printf(" word representation of %d is two",num);
       case 3 :
       printf(" word representation of %d is Three",num);
       break;
       case 4 :
        printf(" word representation of %d is Four",num);
       break;
       case 5 :
        printf(" word representation of %d is Five",num);
       break;
       case 6 :
        printf(" word representation of %d is six",num);
       break;
       case 7 :
        printf(" word representation of %d is Seven",num);
       break;
       case 8 :
        printf(" word representation of %d is Eight",num);
       break;
       case 9 :
        printf(" word representation of %d is Nine",num);
       break;
       default : printf("enter a valid number from 1 to 9");
       break;
    }


    return 0;
}
```

Write a program that takes an integer (1-12) as input and uses a switch-case to print the name of the corresponding month (e.g., 1 for January, 2 for February, etc.).

```
#include <stdio.h>

int main()
{
   int num;
   printf("enter a number from 1 to 12\n");
   scanf("%d",&num);
   switch(num)
   {
      case 1 :
      printf(" corresponding month is January");
      break;
      case 2 :
      printf(" corresponding month is February");
      break;
      case 3 :
      printf(" corresponding month is march");
      break;
      case 4 :
       printf(" corresponding month is April");
      break;
      case 5 :
      printf(" corresponding month is May");
      break;
      case 6 :
       printf(" corresponding month is June");
      break;
      case 7 :
       printf(" corresponding month is July");
      break;
```

```
        case 8 :
         printf(" corresponding month is August");
        break;
        case 9 :
        printf(" corresponding month is September");
        break;
        case 10 :
        printf(" corresponding month is October");
        break;
        case 11 :
        printf(" corresponding month is November");
        break;
        case 12 :
        printf(" corresponding month is December");
        break;
        default : printf("enter a valid number from 1 to 12");
        break;
    }


    return 0;
}
```

Write a program that takes a grade (A, B, C, D, F) as input and uses a switch-case to print the description of the grade (e.g., A: "Excellent", B: "Good", etc.).

```
#include <stdio.h>


int main()
{
    char ch;
    printf("select a grade from the following \nA\nB\nC\nD\nF\nF\n");
    scanf("%c",&ch);
```

```
    switch(ch)
    {
       case 'A' :
       printf(" your grade is excellent");
       break;
       case 'B' :
       printf("your grade is good");
       break;
       case 'C' :
       printf(" your grade is not bad");
       break;
       case 'D' :
        printf(" your grade is okay");
       break;
       case 'F' :
       printf("you are failed");
       break;
       default : printf("enter a valid grade ");
       break;
    }

    return 0;
}
```

Write a menu-driven program that offers the user options for basic mathematical operations (addition, subtraction, etc.). Based on the user's choice, perform the corresponding operation using a switch-case.

```
#include <stdio.h>

int main()
```

```
{
   int num,a,b,result;
   printf("enter two numbers\n");
   scanf("%d %d",&a,&b);
   printf("enter the number of operation you need to
perform\n1.addition\n2.subtraction\n3.multiplicarion\n4.division\n");
   scanf("%d",&num);
   switch(num)
   {
      case 1 : result=a+b;
      printf("addition of the two numers is %d",result);
      break;
      case 2 : result=a-b;
      printf("subtraction of the two numers is %d",result);
      break;
      case 3 : result=a*b;
      printf("multiplication of the two numers is %d",result);
      break;
      case 4 : result=a/b;
      printf("division of the two numers is %d",result);
      break;
      default : printf("enter a valid number");
      break;
   }

   return 0;
}
```

Write a program to simulate a traffic light system. Take input as R, Y, or G (Red, Yellow, Green) and use a switch-case to display the corresponding action (e.g., R for Stop, Y for Get Ready, G for Go).

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

```
int main()
{
   char ch;
   printf("select a signal from the following \nR\nY\nG\n");
   scanf("%c",&ch);
   switch(ch)
   {
      case 'R' :
      printf(" stop the vehicle");
      break;
      case 'Y' :
      printf("Get ready ");
      break;
      case 'G' :
      printf(" You can go");
      break;

      default : printf("enter a valid input ");
      break;
   }

   return 0;
}
```

Write a program that takes the year as input and uses a switch-case to check and print whether it is a leap year or not (use logical division by 4 and additional logic in cases).

```
#include <stdio.h>

int main() {
```

```
    int year;
    printf("Enter a year: ");
    scanf("%d", &year);

    switch (year % 4 == 0) {
     case 0:
      printf("%d is not a leap year.\n", year);
      break;
     case 1:
     switch (year % 100 == 0) {
      case 0:
      printf("%d is a leap year.\n", year);
       break;
      case 1:
      switch (year % 400 == 0) {
      case 0:
        printf("%d is not a leap year.\n", year);
       break;
        case 1:
        printf("%d is a leap year.\n", year);
        break;
         }
        break;
        }
   break;
    }
    return 0;
}
```

Write a program to calculate the area of different shapes based on user input:

1 for Circle

2 for Rectangle

3 for Triangle

Use a switch-case to perform the respective area calculations.

```
#include <stdio.h>

int main() {
   int choice;
   float area,r,l,b,base,height;
   printf("sselect the shape from the following\n1.circle\n2.rectangle\n3.triangle\n");
   scanf("%d",&choice);
   switch(choice)
   {
      case 1:
      printf("enter the radius of circlr");
      scanf("%f",&r);
      area=3.14*r*r;
      printf("area of the circle =%f",area);
      break;
      case 2:
      printf("enter the length and bredth:\n");
      scanf("%f %f",&l,&b);
      area=l*b;
      printf("area f the rectangle =%f",area);
      break;
      case 3:
      printf("enter base and height of triangle");
      scanf("%f %f",&base,&height);
      area=0.5*base*height;
      printf("area f the triangle =%f",area);
```

```
        break;
        default:
        printf("choose a valid input");
        break;

    }
    return 0;
}
```