GRAPHIC ERA

DEEMED TO BE UNIVERSITY

INTRODUCTION TO C PROGRAMMING

BATCH: (2023-2026)

B.C.A. 1ST YAER

SUBMITTED BY.

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1. WAP to find the largest number using the logical AND operator.

```
#include <stdio.h>
int main() {
   int n;
   printf("khem raj joshi\n");
   printf("Enter the number of elements: ");
   scanf("%d", &n);
   if (n <= 0) {
      printf("Invalid input. Please enter a positive number of elements.\n");
      return 1;
   }
 int largest;
   int first = 1;

   for (int i = 0; i < n; ++i) {
      int num;
      printf("Enter number %d: ", i + 1);
      scanf("%d", &num);
      if (first || (num > largest)) {
         largest = num;
         first = 0; // Set the flag to 0 after the first number is entered
      }
   }
   printf("The largest number is: %d\n", largest);

   return 0;
}
```

```
/tmp/EXhlVCQUIg.o
KHEM RAJ JOSHI
Enter the number of elements: 1
Enter number 1: 3

The largest number is: 3
```

2. WAP to validate whether the username and password entered by the user are correct or not using the predefined username and password.

```
#include <stdio.h>
#include <string.h>
int main() {
   char correctUsername[] = "KHEM RAJ JOSHI";
   char correctPassword[] = "123456789";
 char enteredUsername[50];
  char enteredPassword[50];
   printf("abhishek sharma \n");

   printf("Enter username: ");
   scanf("%s", enteredUsername);

   printf("Enter password: ");
   scanf("%s", enteredPassword);

   if (strcmp(enteredUsername, correctUsername) == 0 &&
strcmp(enteredPassword, correctPassword) == 0) {
      printf("Login successful!\n");
   } else {
      printf("Login failed. Please check your username and password.\n");
   }

   return 0;
}
```

```
/tmp/EXhlVCQUIg.o
KHEM JOSHI
Enter username: KHEM
Enter password: 12345678
Login successful!
```

3. WAP to input the positive number from the user to perform the left shift operator.

```
#include <stdio.h>

int main() {
int num, shift;
{
printf("khem raj joshi \n");
printf("Enter a positive integer: ");
scanf("%d", &num);
if (num <= 0) {
printf("Please enter a positive integer.\n");
}
} while (num <= 0);
printf("Enter the number of positions to shift left: ");
scanf("%d", &shift);
int result = num << shift;

printf("Result of left shift: %d << %d = %d\n", num, shift, result);

return 0;
}
```

```
/tmp/Zf1x3xDYPX.o
khem raj joshi
Enter a positive integer: 3
Enter the number of positions to shift left: 2
Result of left shift: 3 << 2 = 12
```

4. WAP to input the positive number from the user to perform the right shift operator.

```
#include <stdio.h>

int main() {
int num, shift;
{
printf("\n");
printf("Enter a positive integer: ");
scanf("%d", &num);
if (num <= 0) {
printf("Please enter a positive integer.\n");
}
} while (num <= 0);
printf("Enter the number of positions to shift right: ");
scanf("%d", &shift);

int result = num >> shift;

printf("Result of right shift: %d >> %d = %d\n", num, shift, result);

return 0;
}
```

5.

```
/tmp/Zf1x3xDYPX.o
Enter a positive integer: 2
Enter the number of positions to shift right: 4
Result of right shift: 2 >> 4 = 0
khem raj joshi
```

WAP to perform the pre-increment and pre-decrement operator on two integers and printf both the original value and updated value.

```
#include <stdio.h>

int main() {
int num1, num2;

printf("khem raj joshi \n");
printf("Enter the first integer: ");
scanf("%d", &num1);

printf("Enter the second integer: ");
scanf("%d", &num2);

int preIncNum1 = ++num1;
int preDecNum2 = --num2;

printf("Original value of num1: %d\n", num1);
printf("Updated value of num1 (after pre-increment): %d\n", preIncNum1);

printf("Original value of num2: %d\n", num2);
printf("Updated value of num2 (after pre-decrement): %d\n", preDecNum2);

return 0;
}
```

```
/tmp/Zf1x3xDYPX.o
khem raj joshi
Enter the first integer: 3
Enter the second integer: 4
Original value of num1: 4
Updated value of num1 (after pre-increment): 4
Original value of num2: 3
Updated value of num2 (after pre-decrement): 3
```

6. WAP to perform the post-increment and post-decrement operator on two integers and printf both the original value and updated value.

```
#include <stdio.h>

int main() {
int num1, num2;
printf("khem raj joshi \n");
printf("Enter the first integer: ");
scanf("%d", &num1);

printf("Enter the second integer: ");
scanf("%d", &num2);

int postIncNum1 = num1++;
int postDecNum2 = num2--;

printf("Original value of num1: %d\n", num1);
printf("Updated value of num1 (after post-increment): %d\n", postIncNum1);

printf("Original value of num2: %d\n", num2);
printf("Updated value of num2 (after post-decrement): %d\n", postDecNum2);

return 0;
}
```

```
/tmp/Zf1x3xDYPX.o
khem raj joshi
Enter the first integer: 2
Enter the second integer: 6
Original value of num1: 3
Updated value of num1 (after post-increment): 2
Original value of num2: 5
Updated value of num2 (after post-decrement): 6
```

7. WAP for an integer number and check whether it is divisible by 9 or 7 using the OR logical operator.

```
#include <stdio.h>

int main() {
int num;
printf("khem raj joshi \n");
printf("Enter an integer: ");
scanf("%d", &num);

if (num % 9 == 0 || num % 7 == 0) {
printf("%d is divisible by 9 or 7.\n", num);
} else {
printf("%d is not divisible by 9 or 7.\n", num);
}

return 0;
}
```

```
/tmp/Zf1x3xDYPX.o
khem raj joshi
Enter an integer: 4
4 is not divisible by 9 or 7.
```

8. WAP to identify gender in a single character and printf full gender (e.g.: if the input is 'M' or 'm' – it should printf "Male").

```
#include <stdio.h>

int main() {
char gender;

    printf("khem raj joshi \n");
printf("Enter gender (M/F): ");
scanf(" %c", &gender);

switch (gender) {
case 'M':
case 'm':
printf("Male\n");
break;
case 'F':
case 'f':
printf("Female\n");
break;
default:
printf("Invalid gender input\n");
}

return 0;
}
```

```
/tmp/Zf1x3xDYPX.o
khem raj joshi
Enter gender (M/F): M
Male
```

8. WAP for Hello World or this is my first c program.

```
#include <stdio.h>

int main() {
printf("khem raj joshi \n");
printf("Hello, World! This is my first C Program.\n");
return 0;
}
```

9. WAP to add two numbers.

```
#include <stdio.h>

int main() {
int num1, num2, sum;

printf("khem raj joshi\n");
printf("Enter the first number: ");
scanf("%d", &num1);

printf("Enter the second number: ");
scanf("%d", &num2);

sum = num1 + num2;

printf("The sum of %d and %d is: %d\n", num1, num2, sum);

return 0;
}
```

```
/tmp/st9RiaQjKh.o
khem raj joshi
Enter the first number: 2
Enter the second number: 3
The sum of 2 and 3 is: 5
```

10. WAP to find the area of a circle.

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

int main() {
double radius, area;
printf("khem raj joshi\n");
printf("Enter the radius of the circle: ");
scanf("%lf", &radius);

area = M_PI * pow(radius, 2);

printf("The area of the circle with radius %.2lf is %.2lf\n", radius, area);

return 0;
}
```

```
/tmp/st9RiaQjKh.o
khem raj joshi
Enter the radius of the circle: 7
The area of the circle with radius 7.00 is 153.94
```

11. WAP to divide two numbers.

```
#include <stdio.h>

int main() {
    double num1, num2, result;
    printf("khem raj joshi\n");
    printf("Enter the first number: ");
    scanf("%lf", &num1);

    printf("Enter the second number: ");
    scanf("%lf", &num2);

    (division by zero is undefined)
    if (num2 != 0) {
        result = num1 / num2;
        printf("The result of %.2lf divided by %.2lf
is: %.2lf\n", num1, num2, result);
    } else {
        printf("Error: Division by zero is not
allowed.\n");
    }

    return 0;
}
```

12. WAP to printf ASCII value.

```
#include <stdio.h>

int main() {
char ch;

printf("khem raj joshi\n");
printf("Enter a character: ");
scanf(" %c", &ch);
printf("The ASCII value of '%c' is %d\n", ch, ch);

return 0;
}
```

```
/tmp/st9RiaQjKh.o
khem raj joshi
Enter a character: 4
The ASCII value of '4' is 52
```

13. WAP to multiply floating point numbers.

```
#include <stdio.h>

int main() {
double num1, num2, result;
printf("khem raj joshi\n");
printf("Enter the first floating-point number: ");
scanf("%lf", &num1);

printf("Enter the second floating-point number: ");
scanf("%lf", &num2);

result = num1 * num2;

printf("The result of %.2lf multiplied by %.2lf is: %.2lf\n", num1, num2, result);

return 0;
}
```

```
/tmp/st9RiaQjKh.o
khem raj joshi
Enter the first floating-point number: 4
Enter the second floating-point number: 8
The result of 4.00 multiplied by 8.00 is: 32.00
```

14. WAP to add two numbers.

```
#include <stdio.h>

int main() {
int num1, num2, sum;

printf("khem raj joshi\n");
printf("Enter the first number: ");
scanf("%d", &num1);

printf("Enter the second number: ");
scanf("%d", &num2);

sum = num1 + num2;

printf("The sum of %d and %d is: %d\n", num1, num2, sum);

return 0;
}
```

```
/tmp/st9RiaQjKh.o
khem raj joshi
Enter the first number: 2
Enter the second number: 4
The sum of 2 and 4 is: 6
```

15. WAP to find the area of a circle.

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

int main() {
double radius, area;
printf("khem raj joshi \n");
printf("Enter the radius of the circle: ");
scanf("%lf", &radius);

area = M_PI * pow(radius, 2);

printf("The area of the circle with radius %.2lf is %.2lf\n", radius, area);

return 0;
}
```

```
/tmp/st9RiaQjKh.o
khem raj joshi
Enter the radius of the circle: 6
The area of the circle with radius 6.00 is 113.10
```

16. WAP to SWAP two variables number by using a third variable.

```
#include <stdio.h>

int main() {
int num1, num2, temp;
printf("khem raj joshi \n");
printf("Enter the first number: ");
scanf("%d", &num1);

printf("Enter the second number: ");
scanf("%d", &num2);
temp = num1;
num1 = num2;
num2 = temp;

printf("After swapping, num1 is: %d\n", num1);
printf("After swapping, num2 is: %d\n", num2);

return 0;
}
```

```
/tmp/st9RiaQjKh.o
khem raj joshi
Enter the first number: 4
Enter the second number: 5
After swapping, num1 is: 5
After swapping, num2 is: 4
```

17.WAP to SWAP three variable numbers without using third variable.

```
int main() {
    int num1, num2, num3;
    printf("KHEM RAJ JOSHI\n");
    printf("Enter the first number: ");
    scanf("%d", &num1);

    printf("Enter the second number: ");
    scanf("%d", &num2);

    printf("Enter the third number: ");
    scanf("%d", &num3);


    num1 = num1 + num2 + num3;
    num2 = num1 - (num2 + num3);
    num3 = num1 - (num2 + num3);
    num1 = num1 - (num2 + num3);

    printf("After swapping, num1 is: %d\n", num1);
    printf("After swapping, num2 is: %d\n", num2);
    printf("After swapping, num3 is: %d\n", num3);

    return 0;
}
```

```
/tmp/st9RiaQjKh.o
KHEM RAJ JOSHI
Enter the first number: 2
Enter the second number: 4
Enter the third number: 7
After swapping, num1 is: 7
After swapping, num2 is: 2
After swapping, num3 is: 4
```

18. WAP to find the area of a rectangle.

```
#include <stdio.h>

int main() {

        double length, width, area;
        printf("khem raj joshi\n");
        printf("Enter the length of the rectangle: ");
        scanf("%lf", &length);

        printf("Enter the width of the rectangle: ");
        scanf("%lf", &width);
        area = length * width;

        printf("The area of the rectangle is: %.2lf\n", area);

        return 0;
        }
```

```
/tmp/st9RiaQjKh.o
khem raj joshi
Enter the length of the rectangle: 20
Enter the width of the rectangle: 25
The area of the rectangle is: 500.00
```

20. WAP to find the area of a rectangle.

```
#include <stdio.h>

int main() {
double length, width, area;
printf("khem raj joshi \n");
printf("Enter the length of the rectangle: ");
scanf("%lf", &length);

printf("Enter the width of the rectangle: ");
scanf("%lf", &width);
area = length * width;

printf("The area of the rectangle is: %.2lf\n", area);

return 0;
}
```

```
/tmp/st9RiaQjKh.o
khem raj joshi
Enter the length of the rectangle: 15
Enter the width of the rectangle: 20
The area of the rectangle is: 300.00
```

21. WAP to find the area of the right angle triangle, isosceles triangle, and any triangle with three sides.

```
#include <stdio.h>
#include <math.h>
double areaOfRightAngledTriangle(double base, double height) {
return 0.5 * base * height;
}
double areaOfIsoscelesTriangle(double base, double equalSide) {
double height = sqrt(pow(equalSide, 2) - pow(base / 2, 2));
return 0.5 * base * height;
}
double area Of Any Triangle(double a, double b, double c) {
double s = (a + b + c) / 2; // Semi-perimeter
return sqrt(s * (s - a) * (s - b) * (s - c));
}
```

```
/tmp/st9RiaQjKh.o
KHEM RAJ  JOSHI
Select the type of triangle:
1. Right-angled Triangle
2. Isosceles Triangle
3. Any Triangle
Enter your choice (1/2/3): 1
Enter the base of the right-angled triangle: 12
Enter the height of the right-angled triangle: 20
The area of the selected triangle is: 120.00
```

22. WAP to find the area and volume of a cube.

```
#include <stdio.h>
int main() {
double side, area, volume;
printf("khem raj joshi \n");
printf("Enter the length of one side of the cube: ");
scanf("%lf", &side);
area = 6 * side * side;
volume = side * side * side;
printf("The surface area of the cube is: %.2lf\n", area);
printf("The volume of the cube is: %.2lf\n", volume);

return 0;
}
```

```
/tmp/st9RiaQjKh.o
khem raj joshi
Enter the length of one side of the cube: 12
The surface area of the cube is: 864.00
The volume of the cube is: 1728.00
```

23. WAP to find the area and volume of the cuboid.

```
#include <stdio.h>

int main() {
double length, width, height, surface area, and volume;
printf("khem raj joshi \n");
printf("Enter the length of the cuboid: ");
scanf("%lf", &length);

printf("Enter the width of the cuboid: ");
scanf("%lf", &width);

printf("Enter the height of the cuboid: ");
scanf("%lf", &height);

surfaceArea = 2 * (length * width + width * height + height * length);

volume = length * width * height;

printf("The surface area of the cuboid is: %.2lf\n", surfaceArea);
printf("The volume of the cuboid is: %.2lf\n", volume);

return 0;
}
```

```
/tmp/st9RiaQjKh.o
KHEM RAJ JOSHI
Enter the length of the cuboid: 6
Enter the width of the cuboid: 9
Enter the height of the cuboid: 8
The surface area of the cuboid is: 348.00
The volume of the cuboid is: 432.00
```

23. Write a C program to input electricity unit charges and calculate total electricity bill according

to the given condition:

For first 50 units Rs. 0.50/unit

For next 100 units Rs. 0.75/unit

For next 100 units Rs. 1.20/unit

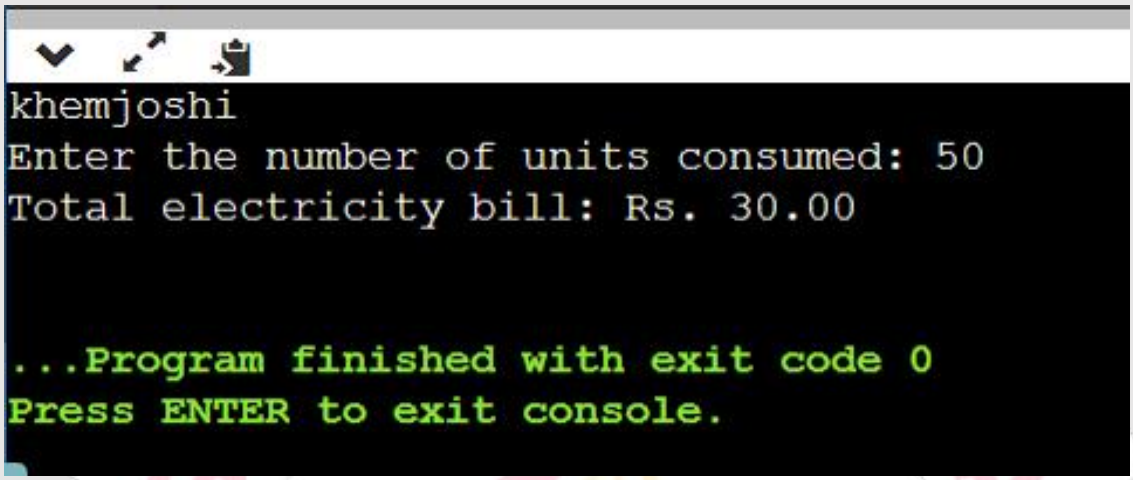
For unit above 250 Rs. 1.50/unit

An additional surcharge of 20% is added to the bill

```
#include <stdio.h>

int main() {
   float units, bill;

   printf("Enter the number of units consumed: ");
   scanf("%f", &units);

   if (units <= 50) {
      bill = units * 0.50;
   } else if (units <= 150) {
      bill = 50 * 0.50 + (units - 50) * 0.75;
   } else if (units <= 250) {
      bill = 50 * 0.50 + 100 * 0.75 + (units - 150) * 1.20;
   } else {
      bill = 50 * 0.50 + 100 * 0.75 + 100 * 1.20 + (units - 250) * 1.50;
   }

   bill += 0.2 * bill;

   printf("Total electricity bill: Rs. %.2f\n", bill);
```

```
return 0;
```

output:



22. Write a C program to input basic salary of an employee and calculate its Gross salary according

to following:

Basic Salary <= 10000 : HRA = 20%, DA = 80%

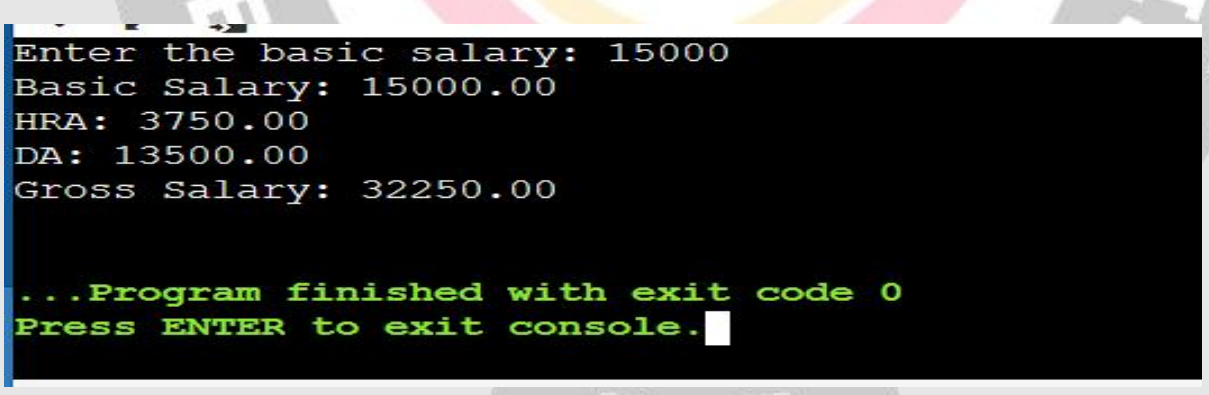
Basic Salary <= 20000 : HRA = 25%, DA = 90%

Basic Salary > 20000 : HRA = 30%, DA = 95%

```
#include<stdio.h>
int main() {
   float basic_salary, hra, da, gross_salary;

   // Input basic salary
   printf("Enter the basic salary: ");
   scanf("%f", &basic_salary);

   // Calculate HRA and DA based on conditions
   if (basic_salary <= 10000) {
      hra = 0.2 * basic_salary;
      da = 0.8 * basic_salary;
   } else if (basic_salary <= 20000) {
      hra = 0.25 * basic_salary;
      da = 0.9 * basic_salary;
   } else {
      hra = 0.3 * basic_salary;
      da = 0.95 * basic_salary;
   }

   // Calculate gross salary
```

```
    gross_salary = basic_salary + hra + da;

    // Print the results
    printf("Basic Salary: %.2f\n", basic_salary);
    printf("HRA: %.2f\n", hra);
    printf("DA: %.2f\n", da);
    printf("Gross Salary: %.2f\n", gross_salary);

    return 0;
}
```

Output :



21. Write a C program to input marks of five subjects Physics, Chemistry, Biology, Mathematics

and Computer. Calculate percentage and grade according to following:

Percentage >= 90% : Grade A

Percentage >= 80% : Grade B

Percentage >= 70% : Grade C

Percentage >= 60% : Grade D

Percentage >= 40% : Grade E

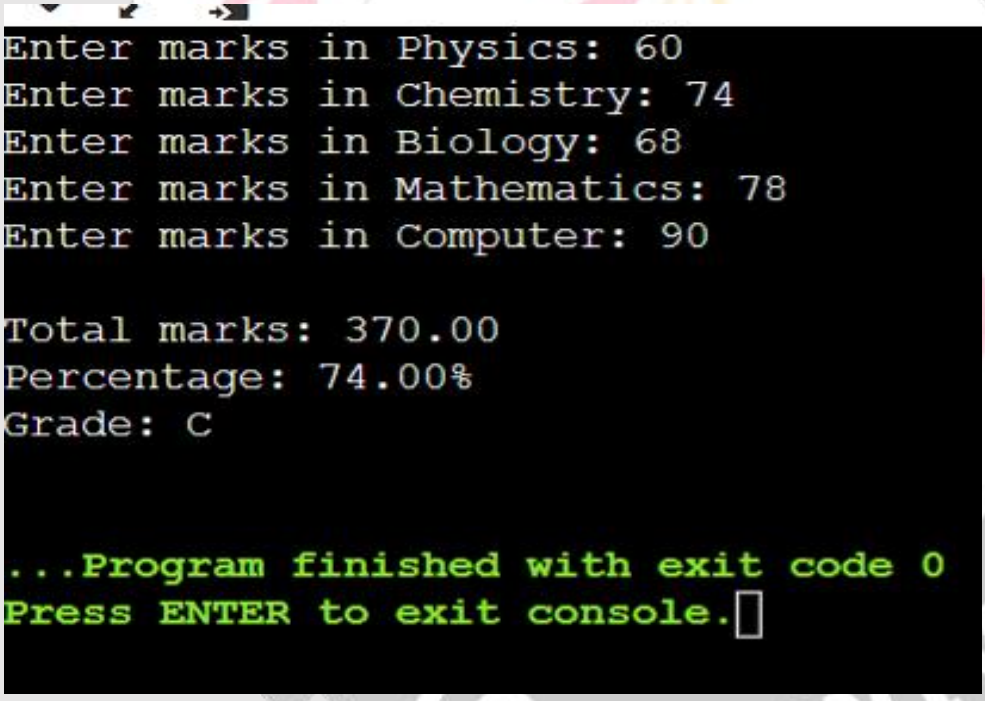
Percentage < 40% : Grade F

```
#include <stdio.h>

int main() {
   float physics, chemistry, biology, mathematics, computer;
   float total_marks, percentage;
   char grade;

   printf("Enter marks in Physics: ");
   scanf("%f", &physics);

   printf("Enter marks in Chemistry: ");
   scanf("%f", &chemistry);

   printf("Enter marks in Biology: ");
```

```
    scanf("%f", &biology);

    printf("Enter marks in Mathematics: ");
    scanf("%f", &mathematics);

    printf("Enter marks in Computer: ");
    scanf("%f", &computer);

    total_marks = physics + chemistry + biology +
mathematics + computer;

    percentage = (total_marks / 500) * 100;
    if (percentage >= 90) {
        grade = 'A';
    } else if (percentage >= 80) {
        grade = 'B';
    } else if (percentage >= 70) {
        grade = 'C';
    } else if (percentage >= 60) {
        grade = 'D';
    } else if (percentage >= 40) {
        grade = 'E';
    } else {
        grade = 'F';
    }
```

```
    printf("\nTotal marks: %.2f\n", total_marks);
    printf("Percentage: %.2f%%\n", percentage);
    printf("Grade: %c\n", grade);

    return 0;
}
```

Output :



10. Write a C program to check whether a character is uppercase or lowercase alphabet.

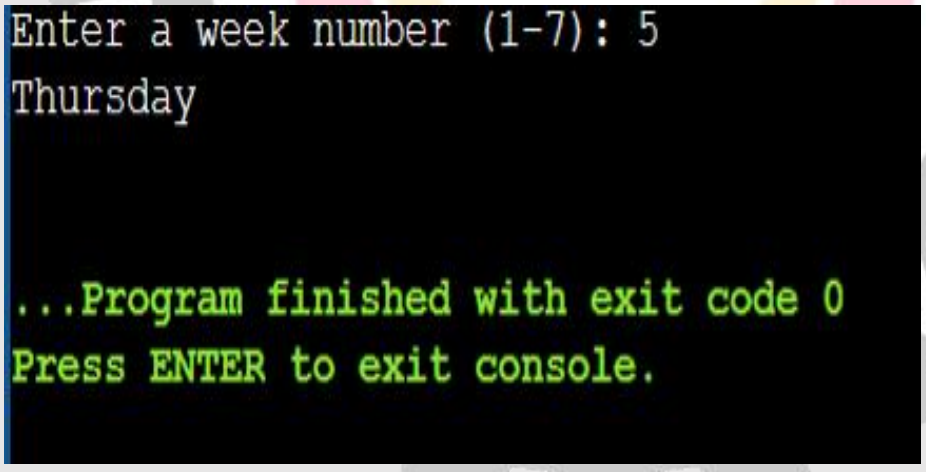
```
#include <stdio.h>
int main() {
   char c;
   printf("Enter a character: ");
   scanf("%c", &c);
  if (c >= 'A' && c <= 'Z') {
      printf("%c is an uppercase alphabet.\n", c);
   }
   else if (c >= 'a' && c <= 'z') {
      printf("%c is a lowercase alphabet.\n", c);
   }
   else {
      printf("%c is not an alphabet.\n", c);
   }

   return 0;
}
```

```
Enter a character: A
A is an uppercase alphabet.

...Program finished with exit code 0
Press ENTER to exit console.
```

11. Write a C program to input week number and print week day.

```
#include <stdio.h>

int main() {
    int weekNumber;
    printf("Enter a week number (1-7): ");
    scanf("%d", &weekNumber);

    switch(weekNumber) {
        case 1:
            printf("Sunday\n");
            break;
        case 2:
            printf("Monday\n");
            break;
        case 3:
            printf("Tuesday\n");
            break;
        case 4:
            printf("Wednesday\n");
            break;
        case 5:
            printf("Thursday\n");
            break;
```

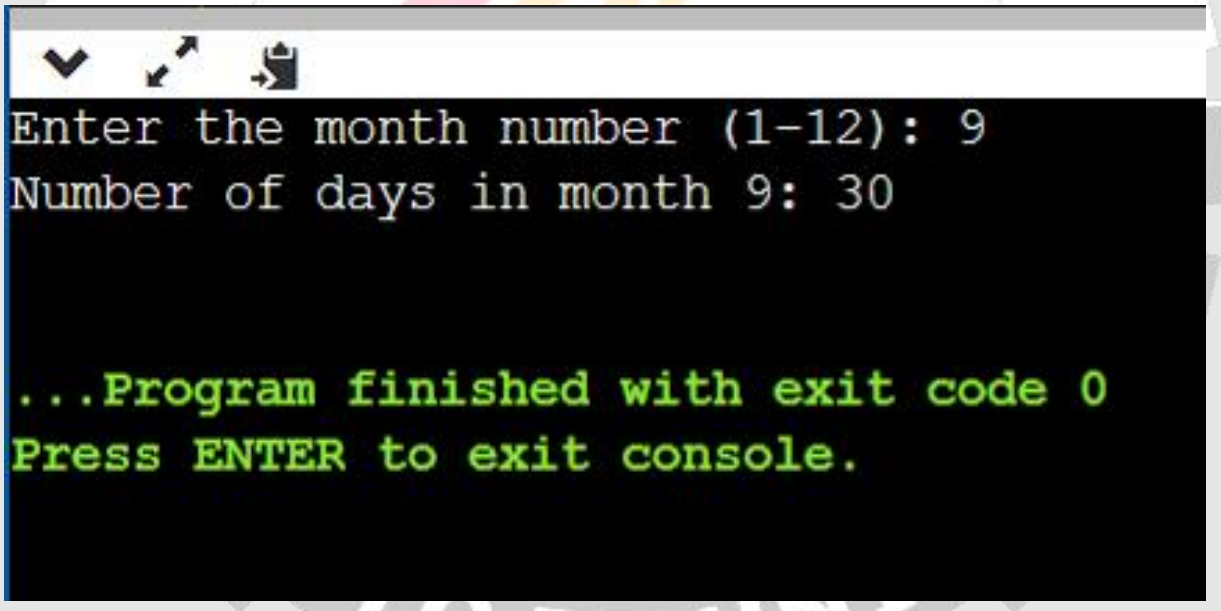
```
        case 6:
            printf("Friday\n");
            break;
        case 7:
            printf("Saturday\n");
            break;
        default:
            printf("Invalid input. Please enter a number between 1 and 7.\n");
    }

    return 0;
}
```



12. Write a C program to input month number and print number of days in that month.

```
#include <stdio.h>

int main() {
   int month;

   printf("Enter the month number (1-12): ");
   scanf("%d", &month);

   if (month < 1 || month > 12) {
      printf("Invalid month number. Please enter a number between 1 and 12.\n");
      return 1; // Return an error code
   }
   int days;
   switch(month) {
      case 2: // February
         days = 28;
         break;
      case 4: case 6: case 9: case 11: // April, June, September, November
         days = 30;
         break;
      default: // All other months
```

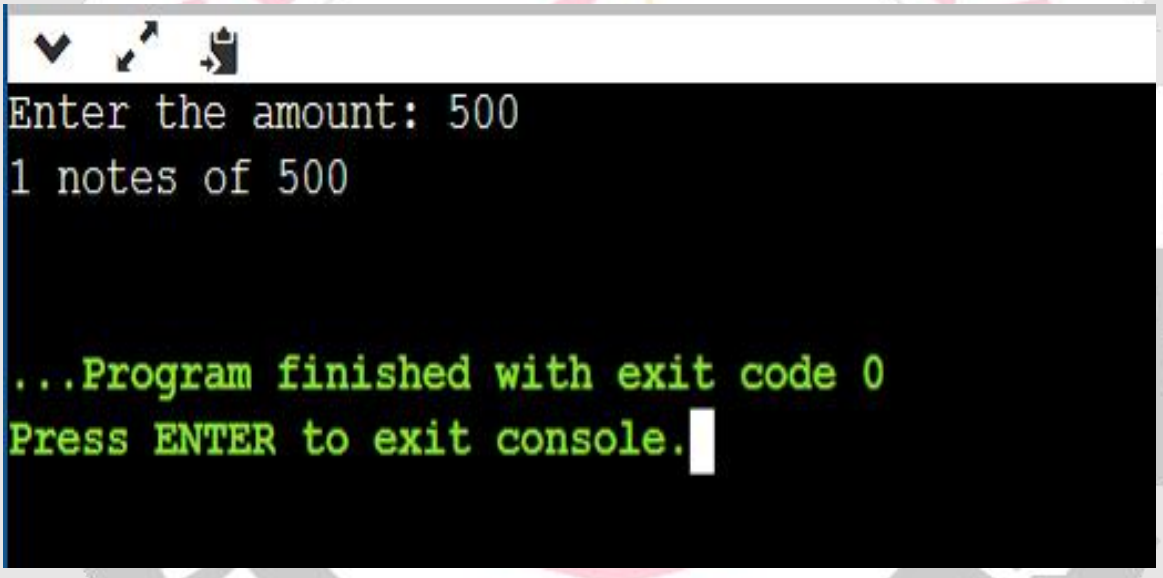
```
        days = 31;
        break;
    }


    printf("Number of days in month %d: %d\n", month,
days);

    return 0;
}
```



13. Write a C program to count total number of notes in given amount.

```
#include <stdio.h>

int main() {
    int amount;
    int notes[6] = {2000, 500, 100, 50, 20, 10}; // Denominations of notes

    // Input the amount
    printf("Enter the amount: ");
    scanf("%d", &amount);

    // Initialize a counter for each type of note
    int note_count[6] = {0};

    // Iterate through the notes and count how many of each are needed
    for (int i = 0; i < 6; i++) {
        note_count[i] = amount / notes[i];
        amount = amount % notes[i];
    }

    // Display the results
    for (int i = 0; i < 6; i++) {
```

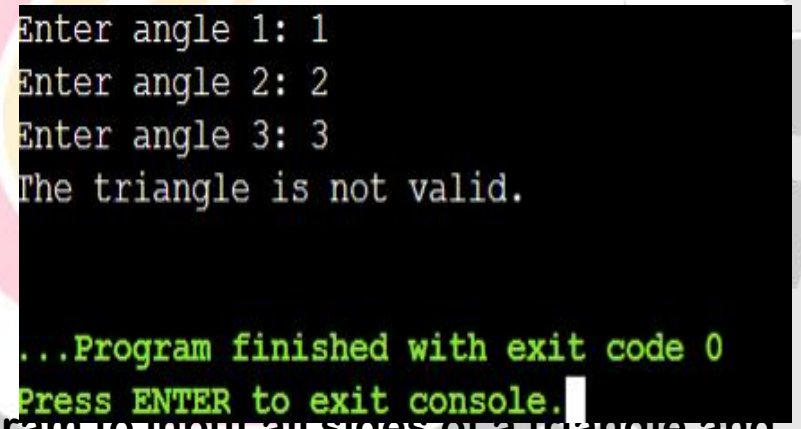
```
        if (note_count[i] > 0) {
            printf("%d notes of %d\n", note_count[i], notes[i]);
        }
    }

    return 0;
}
```



16. Write a C program to input angles of a triangle and check whether triangle is valid or not.

```
#include <stdio.h>
int main() {
    int angle1, angle2, angle3;
    printf("Enter angle 1: ");
    scanf("%d", &angle1);
```

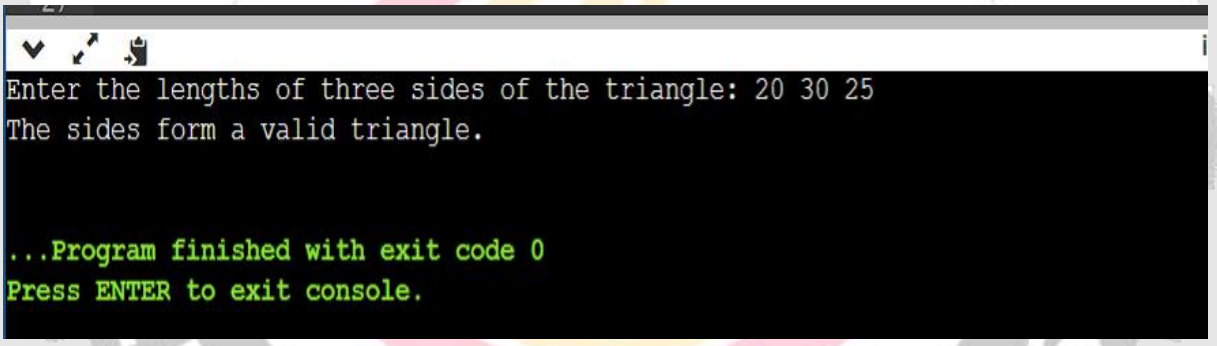
```
printf("Enter angle 2: ");
   scanf("%d", &angle2);

   printf("Enter angle 3: ");
   scanf("%d", &angle3);

if (angle1 + angle2 + angle3 == 180 && angle1 > 0 &&
angle2 > 0 && angle3 > 0) {
      printf("The triangle is valid.\n");
   } else {
      printf("The triangle is not valid.\n");
   }

   return 0;
}
```



17. Write a C program to input all sides of a triangle and check whether triangle is valid or not.

```
#include <stdio.h>
int main() {
   float side1, side2, side3;
 printf("Enter the lengths of three sides of the triangle: ");
   scanf("%f %f %f", &side1, &side2, &side3);
```

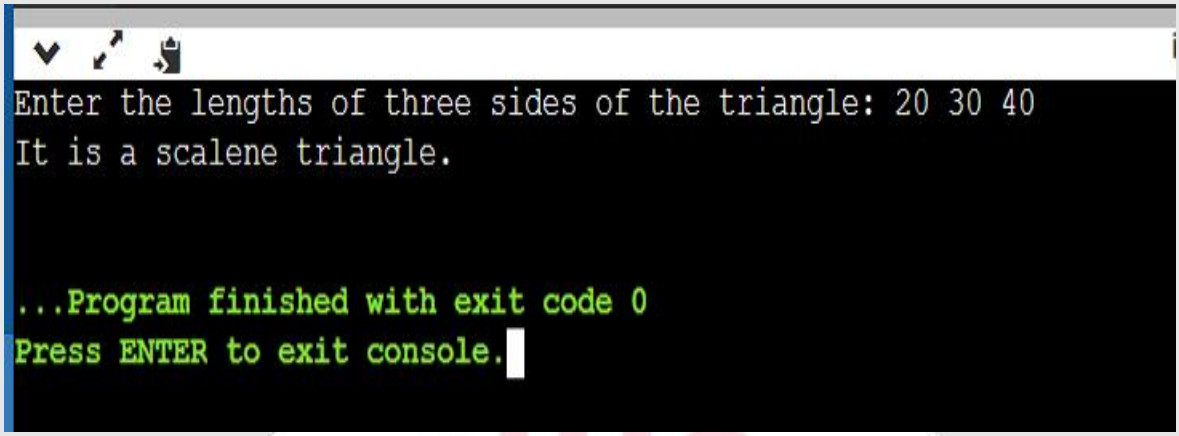
```
   if (side1 + side2 > side3 && side1 + side3 > side2 &&
side2 + side3 > side1) {
      printf("The sides form a valid triangle.\n");
   } else {
      printf("The sides do not form a valid triangle.\n");
   }

   return 0;
}
```



18. Write a C program to check whether the triangle is equilateral, isosceles or scalene triangle.

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

  float side1, side2, side3;
```

```
    printf("Enter the lengths of three sides of the triangle: ");
    scanf("%f %f %f", &side1, &side2, &side3);

    if (side1 + side2 > side3 && side1 + side3 > side2 &&
side2 + side3 > side1)

   if (side1 == side2 && side2 == side3) {

  printf("It is an equilateral triangle.\n");
   } else if (side1 == side2 || side1 == side3 || side2 == side3)
{

        printf("It is an isosceles triangle.\n");
     } else {

        printf("It is a scalene triangle.\n");
     }
    } else {
       printf("The given sides do not form a valid
triangle.\n");
    }
    return 0;
}
```

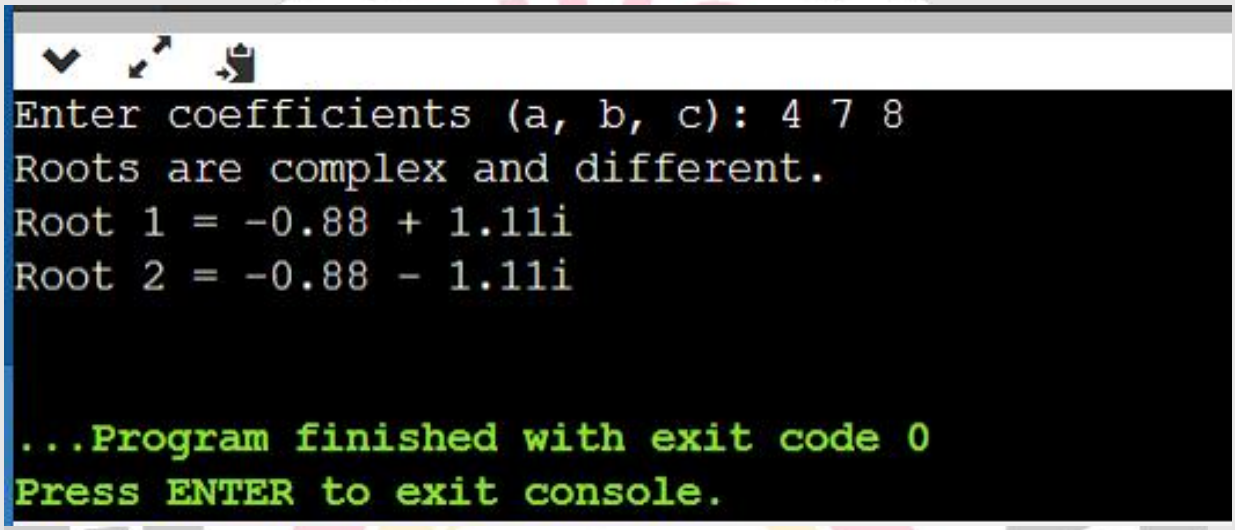


19. Write a C program to find all roots of a quadratic equation.

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

int main() {
   double a, b, c;
```

```
    double discriminant, root1, root2;

    printf("Enter coefficients (a, b, c): ");
    scanf("%lf %lf %lf", &a, &b, &c);
    discriminant = b*b - 4*a*c;

    if (discriminant > 0) {
        root1 = (-b + sqrt(discriminant)) / (2*a);
        root2 = (-b - sqrt(discriminant)) / (2*a);
        printf("Roots are real and different.\n");
        printf("Root 1 = %.2lf\n", root1);
        printf("Root 2 = %.2lf\n", root2);
    }
    else if (discriminant == 0) {
        root1 = -b / (2*a);
        printf("Roots are real and same.\n");
        printf("Root 1 = Root 2 = %.2lf\n", root1);
    }
    else {
        double realPart = -b / (2*a);
        double imaginaryPart = sqrt(-discriminant) / (2*a);
        printf("Roots are complex and different.\n");
        printf("Root 1 = %.2lf + %.2lfi\n", realPart,
imaginaryPart);
```

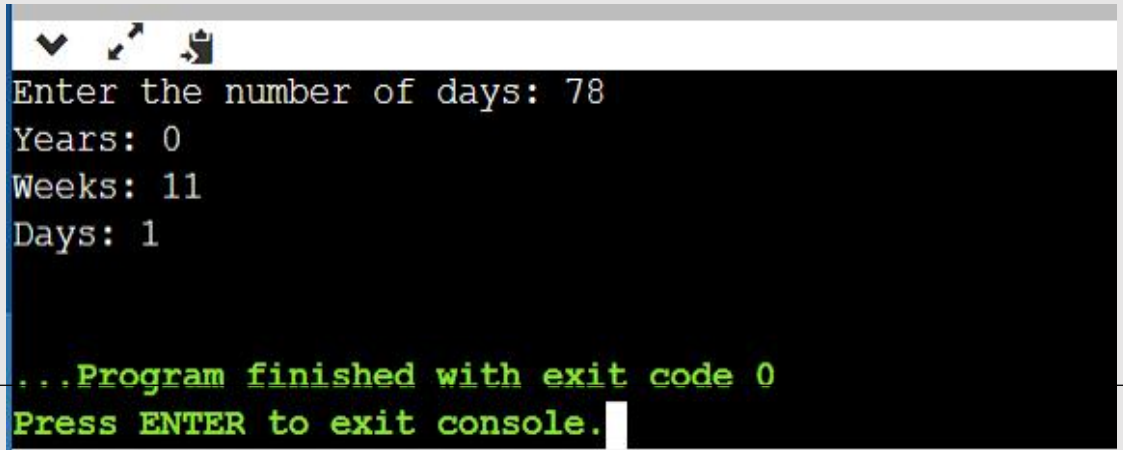
```
    printf("Root 2 = %.2lf - %.2lfi\n", realPart,
imaginaryPart);
  }


  return 0;
}
```



20. Write a C program to convert specified days into years, weeks and days.

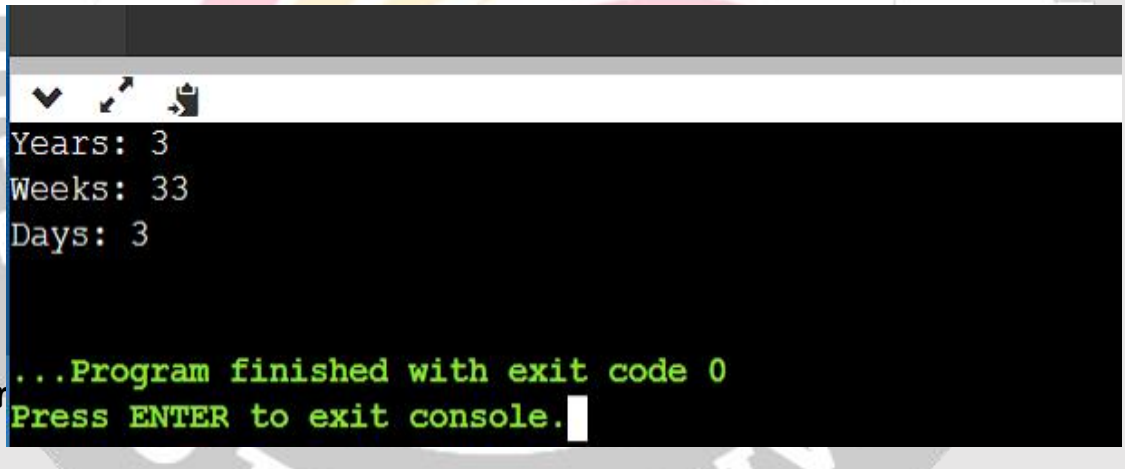
```
#include <stdio.h>
int main()
{
 int days, years, weeks;
 days = 1329;
```

```
#include <stdio.h>

int main() {
    int days, years, weeks;

    // Input the number of days
    printf("Enter the number of days: ");
    scanf("%d", &days);

    // Convert days into years, weeks, and days
    years = days / 365;
    days = days % 365;
    weeks = days / 7;
    days = days % 7;

    // Output the result
    printf("Years: %d\n", years);
    printf("Weeks: %d\n", weeks);
    printf("Days: %d\n", days);

    return 0;
}
```




```
#include <stdio.h>

int main() {
   int days, years, weeks;
   days = 1329;

   // Converts days to years, weeks, and days
```

```
    years = days / 365;
    int remainingDays = days % 365;

    weeks = remainingDays / 7;
    int remainingDays2 = remainingDays % 7;

    printf("Years: %d\n", years);
    printf("Weeks: %d\n", weeks);
    printf("Days: %d\n", remainingDays2);

    return 0;
}
```



20. Wr

```
#include <stdio.h>
int main() {
    float cost_price, selling_price, profit_loss;

    // Get cost price and selling price from the user
    printf("Enter cost price: ");
    scanf("%f", &cost_price);
```

```
    printf("Enter selling price: ");
    scanf("%f", &selling_price);

    // Calculate profit or loss
    profit_loss = selling_price - cost_price;

    // Determine if it's a profit or loss and display the result
    if (profit_loss > 0) {
        printf("Profit: %.2f\n", profit_loss);
    } else if (profit_loss < 0) {
        printf("Loss: %.2f\n", -profit_loss);
    } else {
        printf("No profit, no loss.\n");
    }

    return 0;
}
```

```
Enter cost price: 600
Enter selling price: 900
Profit: 300.00

...Program finished with exit code 0
Press ENTER to exit console.
```

23. Write a C pr
n to 1).

```
#include <stdio.h>

int main() {
    int n;

    // Prompt user for input
    printf("Enter a positive integer (n): ");
```

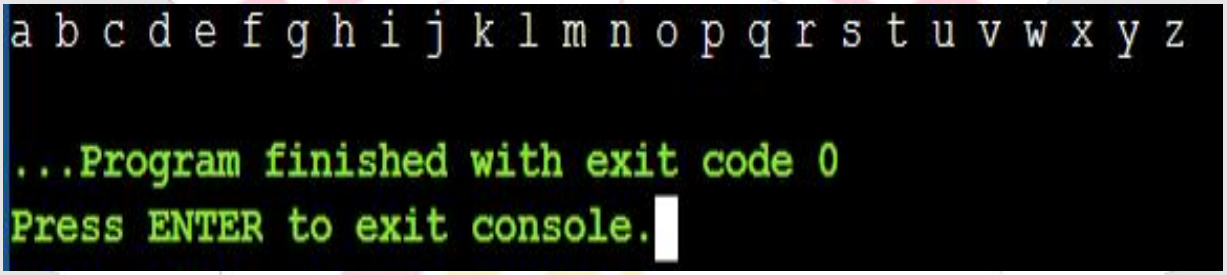
```
    scanf("%d", &n);

    // Check if n is positive
    if (n <= 0) {
        printf("Please enter a positive integer.\n");
        return 1; // Return an error code
    }

    // Print natural numbers in reverse order
    for (int i = n; i >= 1; i--) {
        printf("%d ", i);
    }

    printf("\n");

    return 0;
}
```

```
Enter a positive integer (n): 5
5 4 3 2 1


...Program finished with exit code 0
Press ENTER to exit console.
```

24. Write a C program

```
#include <stdio.h>

int main() {
    char alphabet;

    for (alphabet = 'a'; alphabet <= 'z'; alphabet++) {
        printf("%c ", alphabet);
```

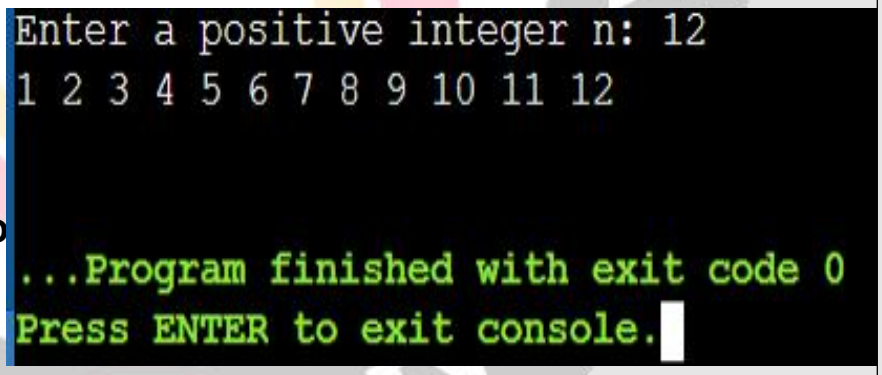
```
    }

    return 0;
}
```



25. Write a CWrite a C program to print all natural numbers from 1 to n.

```
#include <stdio.h>

int main() {
    int n, i;

    // Ask the user for the value of n
    printf("Enter a positive integer n: ");
```

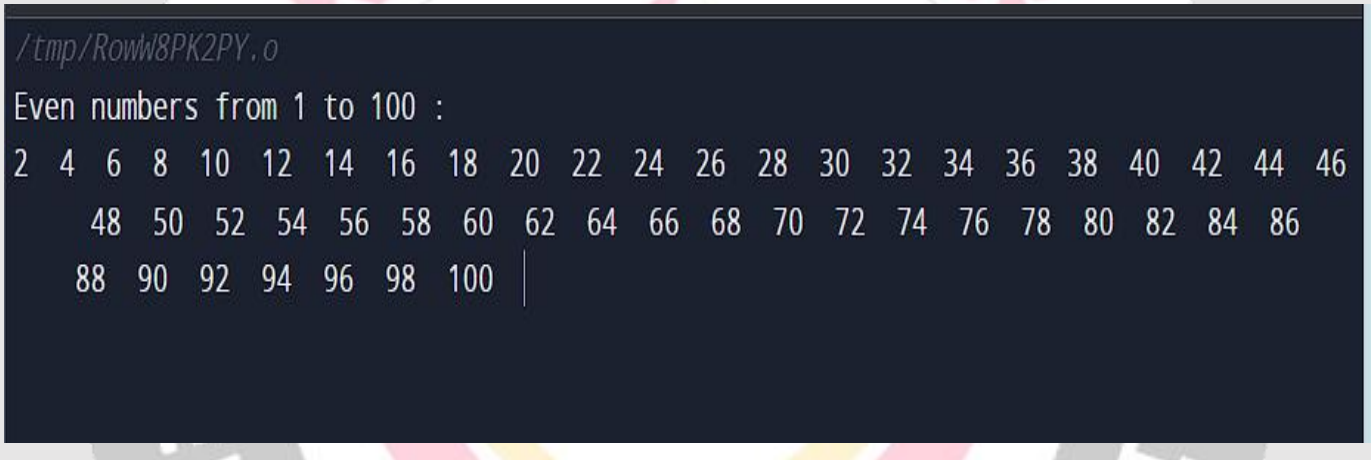
```
    scanf("%d", &n);

    // Check if n is a positive integer
    if (n <= 0) {
        printf("Please enter a positive integer.\n");
        return 1; // Return an error code
    }

    // Loop from 1 to n and print the natural numbers
    for (i = 1; i <= n; i++) {
        printf("%d ", i);
    }
    printf("\n");
    return 0;
}
```



26. Write a program to
to 100.

```
#include<stdio.h>
int main() {
   int i;

   printf("\nEven numbers from 1 to 100 :\n");
for (i = 1; i <= 100; i++) {
      if (i % 2 != 0) {
```

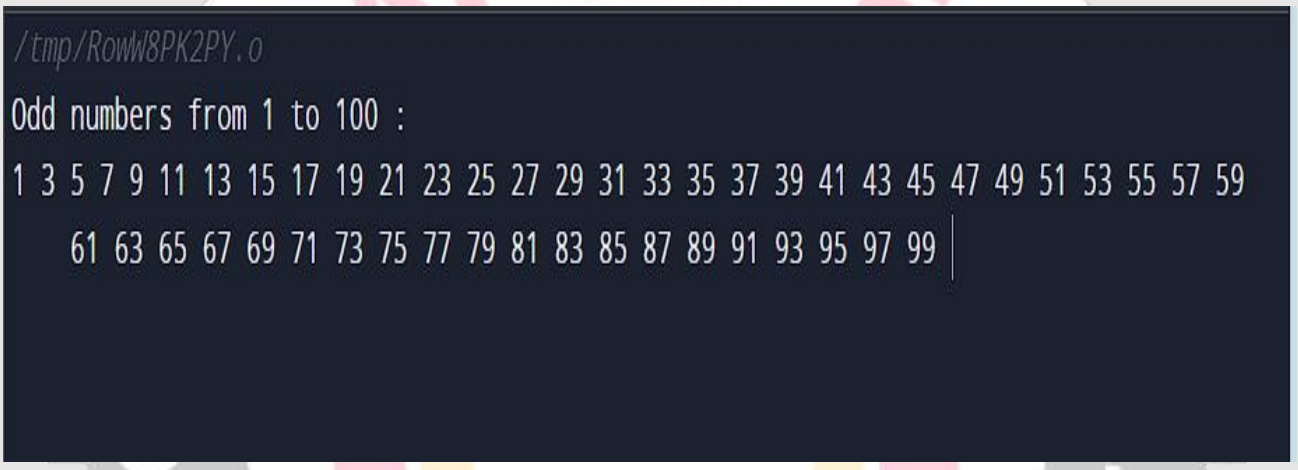
```
        continue;
      }
      printf("%d  ", i);
    }
    return 0;
}
```



27. Write a C program to print all odd number between 1 to 100.

```
#include<stdio.h>
int main() {
    int i;
    printf("\nOdd numbers from 1 to 100 :\n");
for (i = 1; i <= 100; i++) {
      if (i % 2 == 0) {
        continue;
      }
```

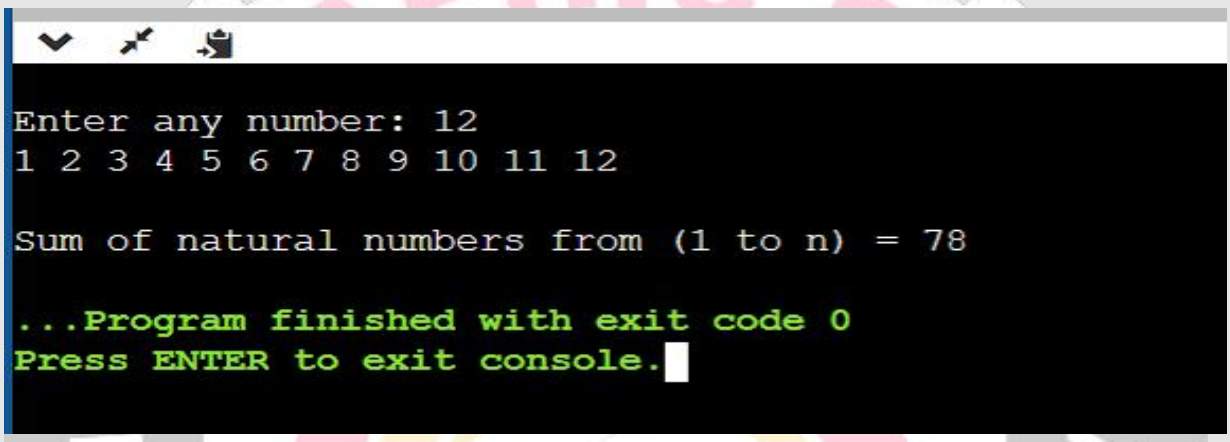
```
    printf("%d ", i);
  }
  return 0;
}
```



28. Write a C program to find sum of all natural numbers between 1 to n.

```
#include<stdio.h>
int main()
{
  int i, n, sum = 0;
  printf("\nEnter any number: ");
  scanf("%d", &n);

  for (i = 1; i <= n; i++) {
    printf("%d ", i);
```

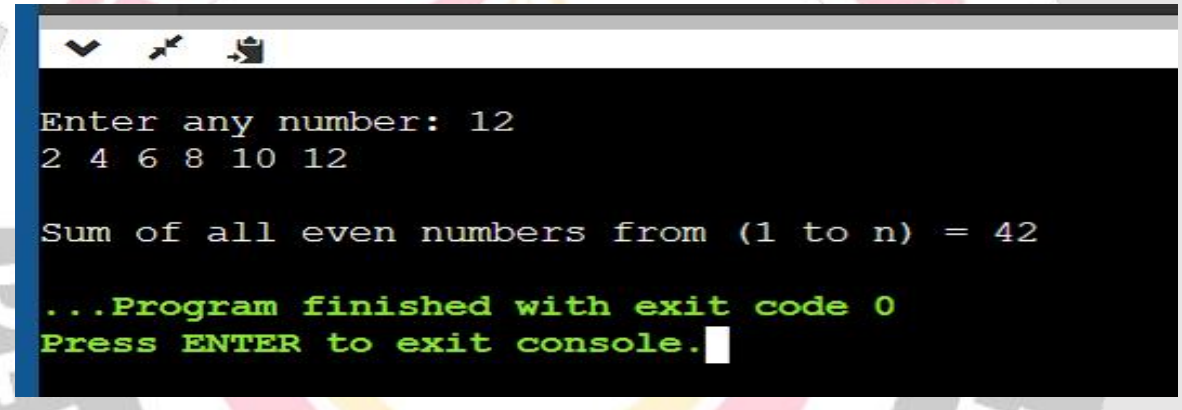
```
    sum = sum + i;
  }
  printf("\n\nSum of natural numbers from (1 to n) = %d",
sum);
  return 0;
}
```



29. Write a C program to find sum of all even numbers between 1 to n.

```
#include<stdio.h>
int main()
{
  int i, n, sum = 0;
  printf("\nEnter any number: ");
  scanf("%d", &n);
  for (i = 1; i <= n; i++) {
    if (i % 2 != 0) {
      continue;
```

```
    }
    printf("%d ", i);
    sum = sum + i;
   }
  printf("\n\nSum of all even numbers from (1 to n) = %d",
sum);
  return 0;
}
```



30.Write a C program to find sum of all odd numbers between 1 to n.

```
#include<stdio.h>
int main()
{
  int i, n, sum = 0;
  printf("\nEnter any number: ");
  scanf("%d", &n);
```

```
  for (i = 1; i <= n; i++) {
    if (i % 2 == 0) {
      continue;
    }
    printf("%d ", i);
    sum = sum + i;
  }
  printf("\n\nSum of all odd numbers from (1 to n) = %d", sum);
  return 0;
}
```

```
Enter any number: 15
1 3 5 7 9 11 13 15

Sum of all odd numbers from (1 to n) = 64

...Program finished with exit code 0
Press ENTER to exit console.
```

31. Write a C prog
number.

```
#include<stdio.h>
int main()
{
  int i, n, product;
  printf("\nEnter any number: ");
  scanf("%d", &n);

  for (i = 1; i <= 10; i++) {
```

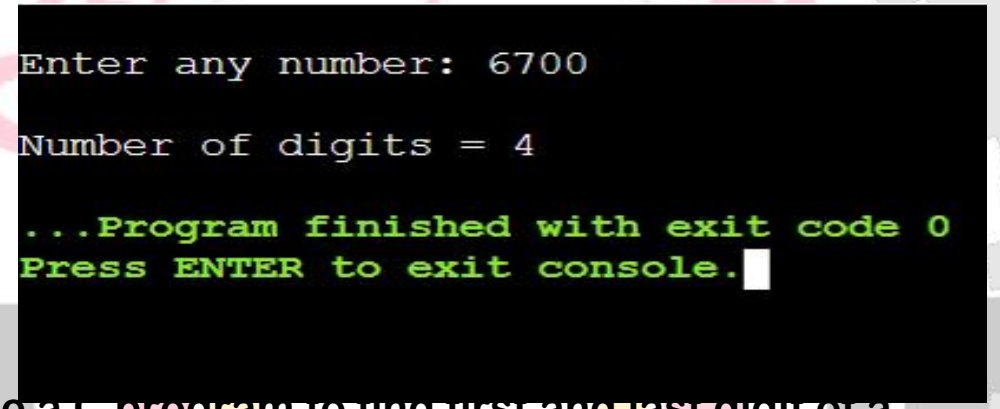
```
    product = n * i;
    printf("%d * %d = %d\n", n, i, product);
  }
  return 0;
}
```

```
Enter any number: 14
14 * 1 = 14
14 * 2 = 28
14 * 3 = 42
14 * 4 = 56
14 * 5 = 70
14 * 6 = 84
14 * 7 = 98
14 * 8 = 112
14 * 9 = 126
14 * 10 = 140


...Program finished with exit code 0
Press ENTER to exit console.
```

32. Write a C program to count number of digits in a number.

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

  int n, count = 0;
  printf("\nEnter any number: ");
  scanf("%d", &n);
```

```
  while (n > 0) {
    n = n / 10;
    count++;
   }

  printf("\nNumber of digits = %d", count);
  return 0;
}
```



33. Write a C program to find first and last digit of a number

```
#include <stdio.h>

int main() {
   int number, firstDigit, lastDigit;

   printf("Enter a number: ");
   scanf("%d", &number);
   lastDigit = number % 10;
   while (number >= 10) {
      number /= 10;
```

```
    }
    firstDigit = number;

    printf("First digit: %d\n", firstDigit);
    printf("Last digit: %d\n", lastDigit);

    return 0;
}
```

```
Enter a number: 124
First digit: 1
Last digit: 4

...Program finished with exit code 0
Press ENTER to exit console.
```

34. Write a C program to f
number

```
#include <stdio.h>

int main() {
    int num, firstDigit, lastDigit, sum;
    printf("Enter a number: ");
    scanf("%d", &num);
    lastDigit = num % 10;
    while (num >= 10) {
        num /= 10;
    }
    firstDigit = num;
```

```
    sum = firstDigit + lastDigit;

    printf("The sum of the first and last digits of the number
is: %d\n", sum);

    return 0;
}
```

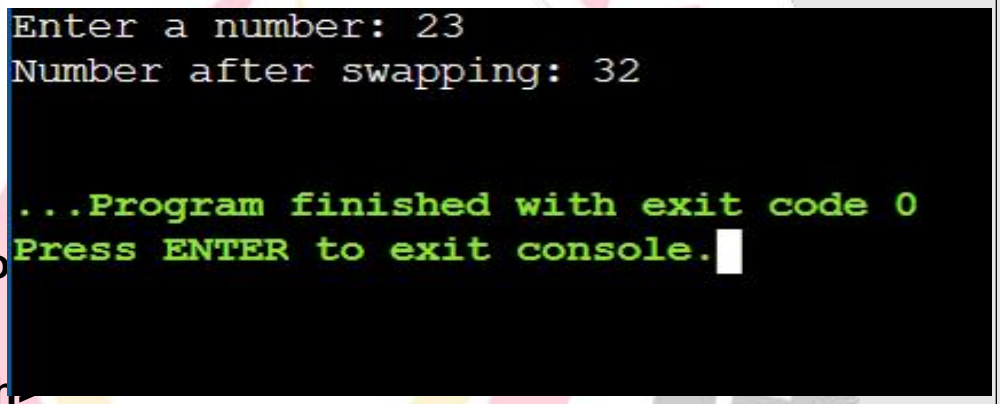
```
Enter a number: 89
The sum of the first and last digits of the number is: 17


...Program finished with exit code 0
Press ENTER to exit console.
```

35. Write a C p
number.

```
#include <stdio.h>

int main() {
    int number, originalNumber, firstDigit, lastDigit, temp;

    printf("Enter a number: ");
    scanf("%d", &number);

    originalNumber = number;

    // Get the last digit
```

```
    lastDigit = number % 10;

    // Find the number of digits in the given number
    while (number >= 10) {
        number /= 10;
    }

    // The first digit is now the remaining number
    firstDigit = number;

    // Swap the first and last digits
    temp = firstDigit;
    firstDigit = lastDigit;
    lastDigit = temp;

    // Reconstruct the new number
    int swappedNumber = 0;
    number = originalNumber;
    while (number >= 10) {
        swappedNumber = swappedNumber * 10 + (number %
10);
        number /= 10;
    }
    swappedNumber = swappedNumber * 10 + number;
```

```
    printf("Number after swapping: %d\n",
swappedNumber);


    return 0;
}
```



36. Write a C pro
number.

```
#include <stdio.h>

int main() {
    int num, sum = 0, digit;
    printf("Enter an integer: ");
    scanf("%d", &num);
    while (num > 0) {
        digit = num % 10;   // Get the last digit
        sum += digit;       // Add it to the sum
        num = num / 10;     // Remove the last digit
    }
```

```
    printf("The sum of the digits is: %d\n", sum);

    return 0;
}
```

```
Enter an integer: 23
The sum of the digits is: 5


...Program finished with exit code 0
Press ENTER to exit console.
```

37. W
numb
#incl

```
int main() {
    int num, digit, product = 1;

    /* Input number from the user */
    printf("Enter a number: ");
    scanf("%d", &num);

    while (num != 0) {
        digit = num % 10;   // Get the last digit
        product *= digit;   // Multiply it with the product
```

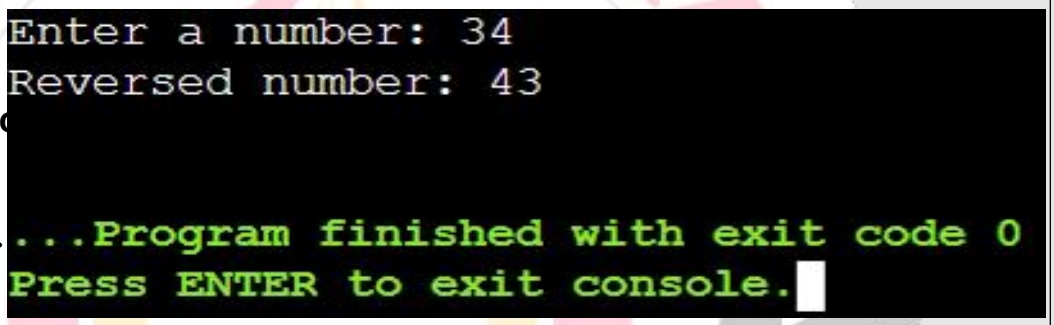
```
        num = num / 10;     // Remove the last digit
    }
    printf("Product of digits = %d\n", product);
    return 0;
}
```

```
Enter a number: 27
Product of digits = 14


...Program finished with exit code 0
Press ENTER to exit console.
```

38. Write a
reverse.

```
#include <stdio.h>

int main() {
    int num, reversed = 0;

    printf("Enter a number: ");
    scanf("%d", &num);

    while (num != 0) {
        int digit = num % 10;
        reversed = reversed * 10 + digit;
```

```
    num /= 10;
  }

  printf("Reversed number: %d\n", reversed);
  return 0;

}
```



39. Write a C pr
or not.

```
#include <stdio.
int main() {
  int num, originalNum, reversed = 0;

  printf("Enter a number: ");
  scanf("%d", &num);

  originalNum = num;  // Store the original number

  // Reverse the number
  while (num != 0) {
    int digit = num % 10;
    reversed = reversed * 10 + digit;
    num /= 10;
  }
```

```
    // Check if the reversed number is the same as the original
number
    if (originalNum == reversed) {
        printf("%d is a palindrome.\n", originalNum);
    } else {
        printf("%d is not a palindrome.\n", originalNum);
    }

    return 0;
}
```

```
Enter a number: 47
47 is not a palindrome.


...Program finished with exit code 0
Press ENTER to exit console.
```

40. Write a C p
integer.

```
#include <stdio

int main() {
    int num, digit, count;
    int frequency[10] = {0};  // Initialize an array to store the
frequency of each digit

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

    while (num != 0) {
        digit = num % 10;  // Get the last digit
        frequency[digit]++;  // Increment the count for that digit
        num /= 10;  // Remove the last digit
```

```
    }

    printf("Digit Frequency:\n");
    for (digit = 0; digit <= 9; digit++) {
        if (frequency[digit] > 0) {
            printf("%d: %d times\n", digit, frequency[digit]);
        }
    }

    return 0;
}
```

```
Enter an integer: 45
Digit Frequency:
4: 1 times
5: 1 times


...Program finished with exit code 0
Press ENTER to exit console.
```

41. Write a C program
words.

```
#include <stdio.h>

// Function to print a number in words for single-digit
numbers
void printDigitInWords(int digit) {
    switch (digit) {
        case 0:
            printf("Zero ");
            break;
        case 1:
            printf("One ");
            break;
        case 2:
```

```
        printf("Two ");
        break;
    case 3:
        printf("Three ");
        break;
    case 4:
        printf("Four ");
        break;
    case 5:
        printf("Five ");
        break;
    case 6:
        printf("Six ");
        break;
    case 7:
        printf("Seven ");
        break;
    case 8:
        printf("Eight ");
        break;
    case 9:
        printf("Nine ");
        break;
  }
}
```

```
int main() {
   int num, digit, reversed = 0;

   printf("Enter a number: ");
   scanf("%d", &num);

   if (num == 0) {
      printf("Zero\n");
      return 0;
   }
   // Reverse the number to print it correctly
   while (num != 0) {
      digit = num % 10;
      reversed = reversed * 10 + digit;
      num /= 10;
   }

   // Print the number in words
   while (reversed != 0) {
      digit = reversed % 10;
      printDigitInWords(digit);
      reversed /= 10;
   }
  printf("\n");
```

```
    return 0;
}
```

```
Enter a number: 67
Six Seven


...Program finished with exit code 0
Press ENTER to exit console.
```

42. Write a C prog
their values.

```
#include <stdio.h>

int main() {
printf("ABHISHEK SHARMA");
    int i;
    for (i = 0; i < 128; i++) {
        printf("ASCII value %d represents character: %c\n", i,
i);
    }
    return 0;
}
```

```
ASCII value 124 represents character: |
ASCII value 125 represents character: }
ASCII value 126 represents character: ~
ASCII value 127 represents character:


...Program finished with exit code 0
Press ENTER to exit console.
```

43. Write a C program to find power of a number using for loop.

```
#include <stdio.h>
int main() {
   double base, exponent, result = 1;

   // Input the base and exponent
   printf("Enter the base: ");
   scanf("%lf", &base);
   printf("Enter the exponent: ");
   scanf("%lf", &exponent);

   // Calculate the power using a for loop
   for (int i = 1; i <= exponent; i++) {
      result *= base;
```

```
    }
    // Print the result
    printf("%.2lf^%.2lf = %.2lf\n", base, exponent, result);
    return 0;

}
```

```
Enter the base: 4
Enter the exponent: 20
4.00^20.00 = 1099511627776.00


...Program finished with exit code 0
Press ENTER to exit console.
```

44. W

```
#include <stdio.h>
int main() {
    int number;

    // Input the number
    printf("Enter a positive integer: ");
    scanf("%d", &number);

    if (number <= 0) {
        printf("Please enter a positive integer.\n");
        return 1; // Exit with an error code
    }
    printf("Factors of %d are: ", number);
```

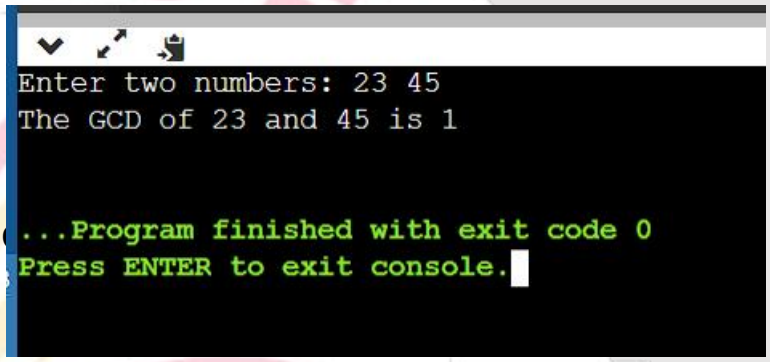
```
    // Use a for loop to find and print factors
    for (int i = 1; i <= number; i++) {
        if (number % i == 0) {
            printf("%d ", i);
        }
    }
    printf("\n");
    return 0;
}
```

```
Enter a positive integer: 44
Factors of 44 are: 1 2 4 11 22 44


...Program finished with exit code 0
Press ENTER to exit console.
```

46. Write a C p

```
#include <stdi
// Function to find the HCF/GCD of two numbers
int findGCD(int a, int b) {
    if (b == 0) {
        return a;
    } else {
        return findGCD(b, a % b);
    }
}
int main() {
    int num1, num2;
    printf("Enter two numbers: ");
    scanf("%d %d", &num1, &num2);
```

```
    int gcd = findGCD(num1, num2);

    printf("The GCD of %d and %d is %d\n", num1, num2,
gcd);

    return 0;
}
```



47.write a C program to fin

```
#include <stdio.h>
// Function to find the GCD (HCF) of two numbers
int findGCD(int a, int b) {
    if (b == 0) {
        return a;
    } else {
        return findGCD(b, a % b);
    }
}
// Function to find the LCM of two numbers
int findLCM(int a, int b) {
    int gcd = findGCD(a, b);
    int lcm = (a * b) / gcd;
```

```
    return lcm;
}
int main() {
    int num1, num2;

    printf("Enter two numbers: ");
    scanf("%d %d", &num1, &num2);
    int lcm = findLCM(num1, num2);

    printf("The LCM of %d and %d is %d\n", num1, num2,
lcm);

    return 0;
}
```

```
Enter two numbers: 34 56
The LCM of 34 and 56 is 952


...Program finished with exit code 0
Press ENTER to exit console.
```

48. Write a C program to check whether a number is Prime number or not.

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

// Function to check if a number is prime
bool isPrime(int n) {
    if (n <= 1) {
        return false; // 0 and 1 are not prime numbers
    }
    for (int i = 2; i * i <= n; i++) {
        if (n % i == 0) {
            return false; // n is divisible by i, so it's not prime
        }
    }
    return true; // If no divisors are found, it's a prime number
}

int main() {
    int num;
```

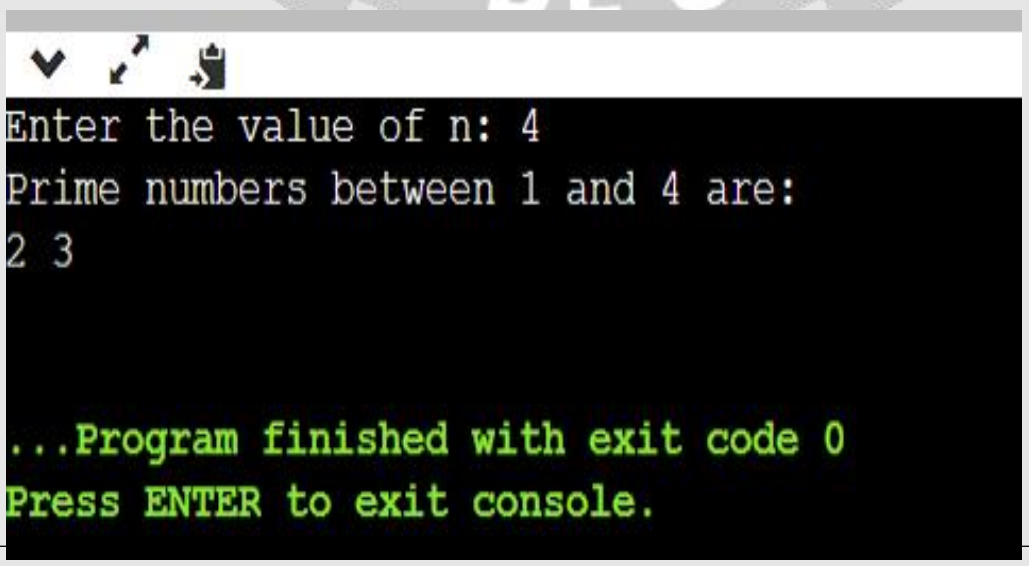
```
    printf("Enter a number: ");
    scanf("%d", &num);

    if (isPrime(num)) {
        printf("%d is a prime number.\n", num);
    } else {
        printf("%d is not a prime number.\n", num);
    }
    return 0;
}
```

```
Enter a number: 23
23 is a prime number.


...Program finished with exit code 0
Press ENTER to exit console.
```

49. Write a C program
1 to n.

```
#include <stdio.h>
int isPrime(int num) {
    if (num <= 1) return 0;
    if (num <= 3) return 1;
    if (num % 2 == 0 || num % 3 == 0) return 0;

    for (int i = 5; i * i <= num; i += 6) {
        if (num % i == 0 || num % (i + 2) == 0) {
            return 0;
        }
    }

    return 1;
}
```

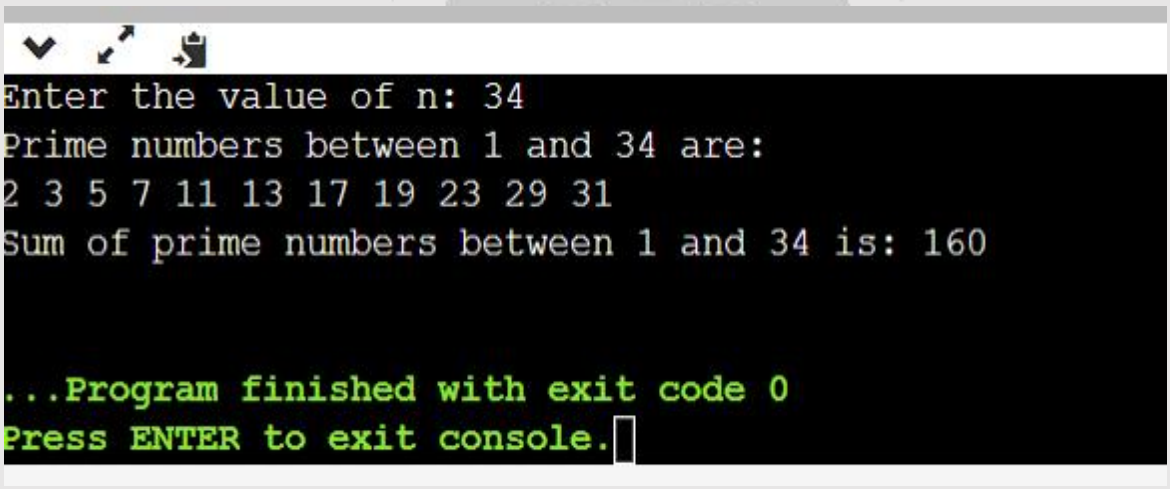
```
int main() {
    int n;
    printf("Enter the value of n: ");
    scanf("%d", &n);

    printf("Prime numbers between 1 and %d are:\n", n);

    for (int i = 2; i <= n; i++) {
        if (isPrime(i)) {
            printf("%d ", i);
        }
    }

    printf("\n");
    return 0;
}
```



50. Write a C program to find sum of all prime numbers between 1 to n.

```
#include <stdio.h>

int isPrime(int num) {
   if (num <= 1) return 0;
   if (num <= 3) return 1;
   if (num % 2 == 0 || num % 3 == 0) return 0;

   for (int i = 5; i * i <= num; i += 6) {
      if (num % i == 0 || num % (i + 2) == 0) {
         return 0;
      }
   }

   return 1;
}
```

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

    int sum = 0;
    printf("Prime numbers between 1 and %d are:\n", n);

    for (int i = 2; i <= n; i++) {
        if (isPrime(i)) {
            printf("%d ", i);
            sum += i;
        }
    }

    printf("\nSum of prime numbers between 1 and %d
is: %d\n", n, sum);
    return 0;
}
```



51. Write a C program to find all prime factors of a number.

```
#include <stdio.h>
// Function to find and print all prime factors of a number
void primeFactors(int n) {
   // Print the number of 2s that divide n
   while (n % 2 == 0) {
      printf("2 ");
      n = n / 2;
   }
 // n must be odd at this point, so a skip of 2 ( i = i + 2) can be used
   for (int i = 3; i * i <= n; i = i + 2) {
      // While i divides n, print i and divide n
      while (n % i == 0) {
         printf("%d ", i);
         n = n / i;
      }
   }
   // If n is a prime greater than 2
   if (n > 2) {
      printf("%d ", n);
   }
}
```

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

   printf("Prime factors of %d are: ", n);
   primeFactors(n);
   return 0;
}
```

```
Enter a number: 12
Prime factors of 12 are: 2 2 3

...Program finished with exit code 0
```

52. Write a C program to check v Armstrong number or not.

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

int isArmstrong(int num) {
   int originalNum, remainder, n = 0, result = 0;

   originalNum = num;

   while (originalNum != 0) {
      originalNum /= 10;
      ++n;
   }

   originalNum = num;

   while (originalNum != 0) {
```

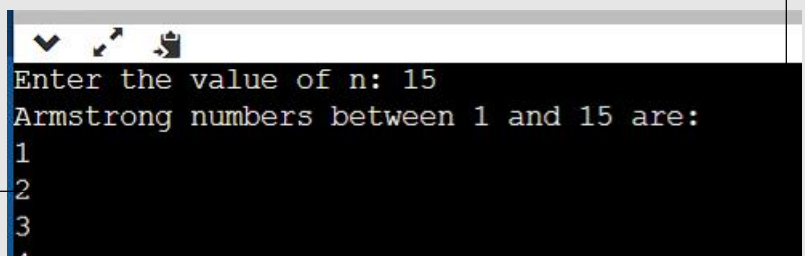
```
        remainder = originalNum % 10;
        result += pow(remainder, n);
        originalNum /= 10;
    }

    if (result == num)
        return 1; // It's an Armstrong number
    else
        return 0; // It's not an Armstrong number
}

int main() {
    int num;

    printf("Enter a number: ");
    scanf("%d", &num);

    if (isArmstrong(num))
        printf("%d is an Armstrong number.\n");
    else
        printf("%d is not an Armstrong number.\n");

    return 0;
}
```

```
Enter a number: 12
0 is not an Armstrong number.


...Program finished with exit code 0
Press ENTER to exit console.
```

53. Write a C program to print all Armstrong numbers between 1 to n.

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

int isArmstrong(int num) {
   int originalNum, remainder, result = 0, n = 0;

   originalNum = num;

   while (originalNum != 0) {
      originalNum /= 10;
      ++n;
   }

   originalNum = num;

   while (originalNum != 0) {
```

```
        remainder = originalNum % 10;
        result += pow(remainder, n);
        originalNum /= 10;
    }

    if (result == num)
        return 1;
    else
        return 0;
}

int main() {
    int n, i;

    printf("Enter the value of n: ");
    scanf("%d", &n);

    printf("Armstrong numbers between 1 and %d are:\n",
n);

    for (i = 1; i <= n; i++) {
        if (isArmstrong(i))
            printf("%d\n", i);
    }
```

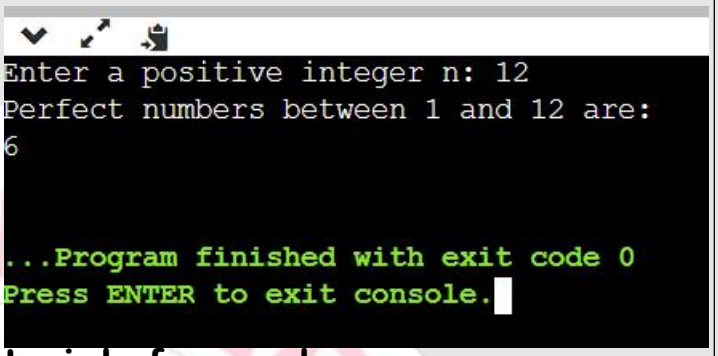


```
    return 0;
}
```

55. Write a C program to print all Perfect numbers between 1 to n.

```
#include <stdio.h>
int isPerfect(int num) {
    int sum = 0;
    for (int i = 1; i <= num / 2; i++) {
        if (num % i == 0) {
            sum += i;
        }
    }
    return (sum == num);
}

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

    printf("Perfect numbers between 1 and %d are: \n", n);

    for (int i = 1; i <= n; i++) {
        if (isPerfect(i)) {
            printf("%d\n", i);
        }
```

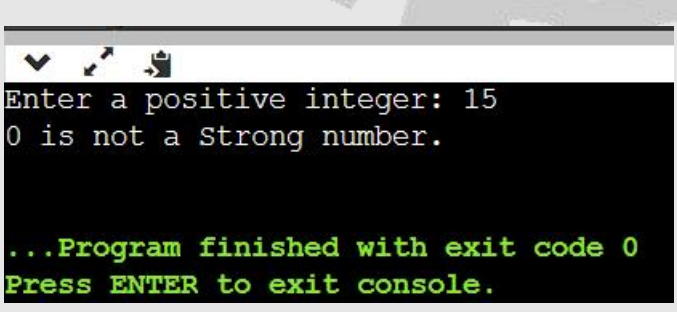
```
    }

    return 0;
}
```



56. Write a C program to chec
Strong number or not.

```
#include <stdio.h>
// Function to calculate the factorial of a number
int factorial(int num) {
    int fact = 1;
    for (int i = 1; i <= num; i++) {
        fact *= i;
    }
    return fact;
}

// Function to check if a number is a strong number
int isStrongNumber(int num) {
    int originalNum = num;
    int sum = 0;
    while (num > 0) {
        int digit = num % 10;
        sum += factorial(digit);
        num /= 10;
```

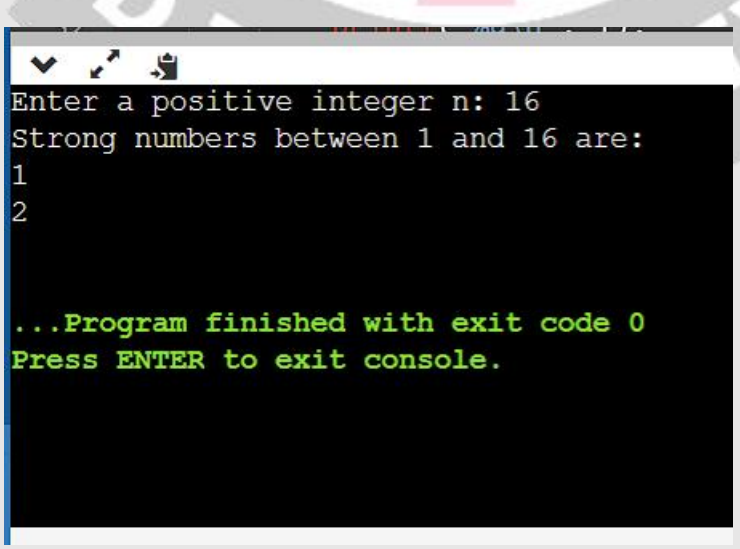
```
    }
    return (sum == originalNum);
}

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

    if (isStrongNumber(n)) {
        printf("%d is a Strong number.\n");
    } else {
        printf("%d is not a Strong number.\n");
    }

    return 0;
}
```



57. Write a C program to print all Strong numbers between 1 to n.

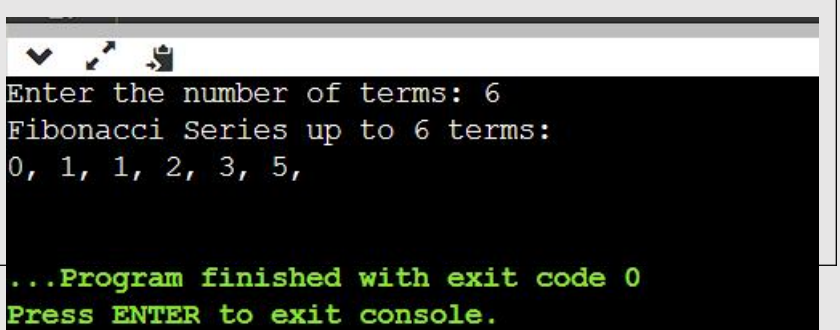
```
#include <stdio.h>
// Function to calculate the factorial of a number
int factorial(int num) {
    int fact = 1;
    for (int i = 1; i <= num; i++) {
        fact *= i;
    }
    return fact;
}

// Function to check if a number is a strong number
int isStrongNumber(int num) {
    int originalNum = num;
    int sum = 0;
    while (num > 0) {
        int digit = num % 10;
        sum += factorial(digit);
        num /= 10;
    }
```

```
    return (sum == originalNum);
}

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

    printf("Strong numbers between 1 and %d are: \n", n);

    for (int i = 1; i <= n; i++) {
        if (isStrongNumber(i)) {
            printf("%d\n", i);
        }
    }

    return 0;
}
```



58. Write a C program to print Fibonacci series up to n terms.

```
#include <stdio.h>
int main() {
   int n, first = 0, second = 1, next;

   printf("Enter the number of terms: ");
   scanf("%d", &n);

   printf("Fibonacci Series up to %d terms: \n", n);

   for (int i = 1; i <= n; i++) {
      if (i == 1) {
         printf("%d, ", first);
      } else if (i == 2) {
         printf("%d, ", second);
      } else {
         next = first + second;
         printf("%d, ", next);
         first = second;
         second = next;
      }
   }

   printf("\n");

   return 0;
```



```
}
```

59. Write a C program to find one's complement of a binary number.

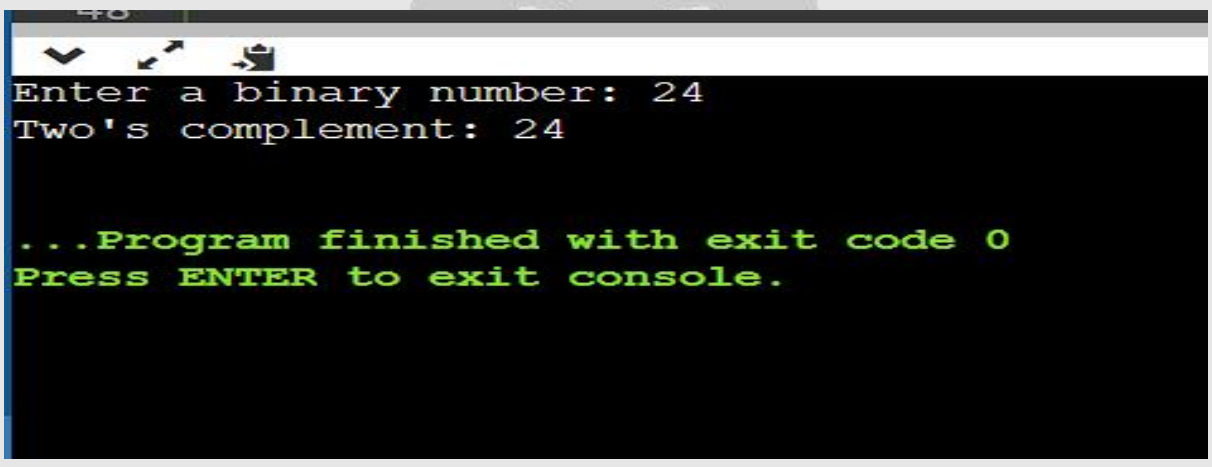
```
#include <stdio.h>
int main() {
   char binary[32]; // Assuming a maximum of 32-bit binary number
   int length, i;

   printf("Enter a binary number: ");
   scanf("%s", binary);

   // Find the length of the binary number
   length = strlen(binary);

   // Perform one's complement
   for (i = 0; i < length; i++) {
      if (binary[i] == '0') {
         binary[i] = '1';
      } else if (binary[i] == '1') {
         binary[i] = '0';
      }
   }

   printf("One's complement: %s\n", binary);

    return 0;
}
```

```
Enter a binary number: 20
One's complement: 21


...Program finished with exit code 0
Press ENTER to exit console.
```

60. Write a C program to find two's comp

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

// Function to reverse a binary string
void reverseString(char str[]) {
    int length = strlen(str);
    for (int i = 0; i < length / 2; i++) {
        char temp = str[i];
        str[i] = str[length - i - 1];
        str[length - i - 1] = temp;
    }
}

// Function to add 1 to a binary string
void addOne(char binary[]) {
    int length = strlen(binary);
    int carry = 1;

    for (int i = 0; i < length; i++) {
        if (binary[i] == '0' && carry == 1) {
            binary[i] = '1';
            carry = 0;
        } else if (binary[i] == '1' && carry == 1) {
            binary[i] = '0';
        }
    }
```

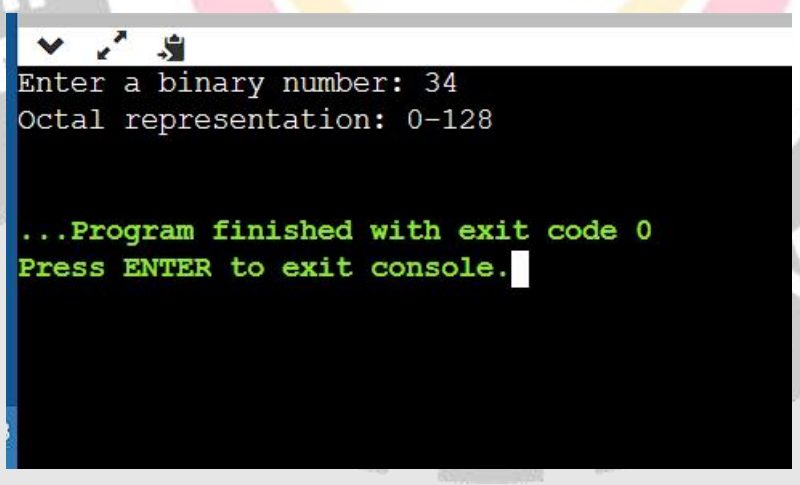
```
}

int main() {
    char binary[32]; // Assuming a maximum of 32-bit binary number

    printf("Enter a binary number: ");
    scanf("%s", binary);

    // Reverse the binary string
    reverseString(binary);

    // Add 1 to the reversed binary string
    addOne(binary);

    // Reverse the result to get the two's complement
    reverseString(binary);

    printf("Two's complement: %s\n", binary);

    return 0;
```



61. Write a C program to convert Binary to Octal number system.

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

// Function to convert a binary number to an octal number
void binaryToOctal(char binary[]) {
   int length = strlen(binary);

   // Pad the binary number with leading zeros if needed to make the length a multiple of 3
   int padding = (3 - (length % 3)) % 3;
   for (int i = 0; i < padding; i++) {
      printf("0");
   }

   // Iterate through the binary number in groups of 3 and convert to octal
   for (int i = padding; i < length; i += 3) {
      int octalDigit = (binary[i] - '0') * 4 + (binary[i + 1] - '0') * 2 + (binary[i + 2] - '0');
      printf("%d", octalDigit);
   }
   printf("\n");
```

```
}

int main() {
   char binary[32]; // Assuming a maximum of 32-bit binary
number

   printf("Enter a binary number: ");
   scanf("%s", binary);

   printf("Octal representation: ");
   binaryToOctal(binary);

   return 0;
}
```



62. Write a C program to convert Binary to Decimal number system.#include <stdio.h>

```
#include <string.h>

// Function to convert a binary number to decimal
int binaryToDecimal(char binary[]) {
    int length = strlen(binary);
    int decimal = 0;
    int base = 1;

    for (int i = length - 1; i >= 0; i--) {
        if (binary[i] == '1') {
            decimal += base;
        }
        base *= 2;
    }

    return decimal;
}

int main() {
    char binary[32]; // Assuming a maximum of 32-bit binary number

    printf("Enter a binary number: ");
    scanf("%s", binary);

    int decimal = binaryToDecimal(binary);

    printf("Decimal representation: %d\n", decimal);
```

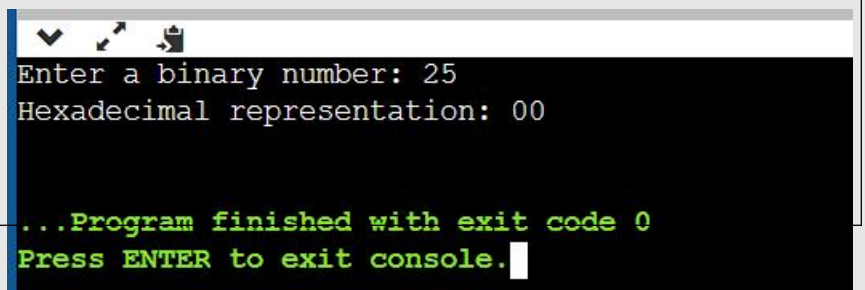
```
    return 0;
}
```

```
Enter a binary number: 22
Decimal representation: 0


...Program finished with exit code 0
Press ENTER to exit console.
```

63. Write a C program to conv
number system.

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

// Function to convert a binary number to hexadecimal
void binaryToHexadecimal(char binary[]) {
    int length = strlen(binary);

    // Pad the binary number with leading zeros if needed to make the length a multiple of 4
    int padding = (4 - (length % 4)) % 4;
    for (int i = 0; i < padding; i++) {
        printf("0");
    }

    // Iterate through the binary number in groups of 4 and convert to hexadecimal
    for (int i = padding; i < length; i += 4) {
        int hexDigit = 0;
        for (int j = 0; j < 4; j++) {
            hexDigit = (hexDigit << 1) | (binary[i + j] - '0');
        }
```

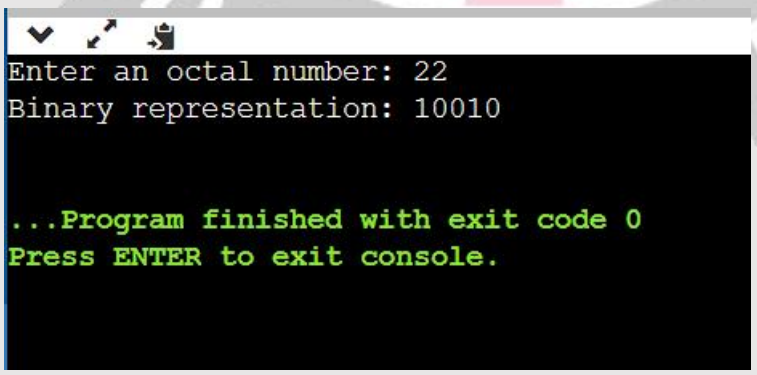
```
        if (hexDigit < 10) {
            printf("%d", hexDigit);
        } else {
            printf("%c", 'A' + hexDigit - 10);
        }
    }
    printf("\n");
}

int main() {
    char binary[32]; // Assuming a maximum of 32-bit binary
number

    printf("Enter a binary number: ");
    scanf("%s", binary);

    printf("Hexadecimal representation: ");
    binaryToHexadecimal(binary);

    return 0;


}
```



64. Write a C program to convert Octal to Binary number system.

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

// Function to convert an octal digit to a binary string
char *octalToBinary(char octalDigit) {
    switch (octalDigit) {
        case '0': return "000";
        case '1': return "001";
        case '2': return "010";
        case '3': return "011";
        case '4': return "100";
        case '5': return "101";
        case '6': return "110";
        case '7': return "111";
        default: return "Invalid";
    }
}

int main() {
    char octal[32]; // Assuming a maximum of 32-bit octal number
    char binary[128]; // To store the binary equivalent

    printf("Enter an octal number: ");
    scanf("%s", octal);

    int length = strlen(octal);
```

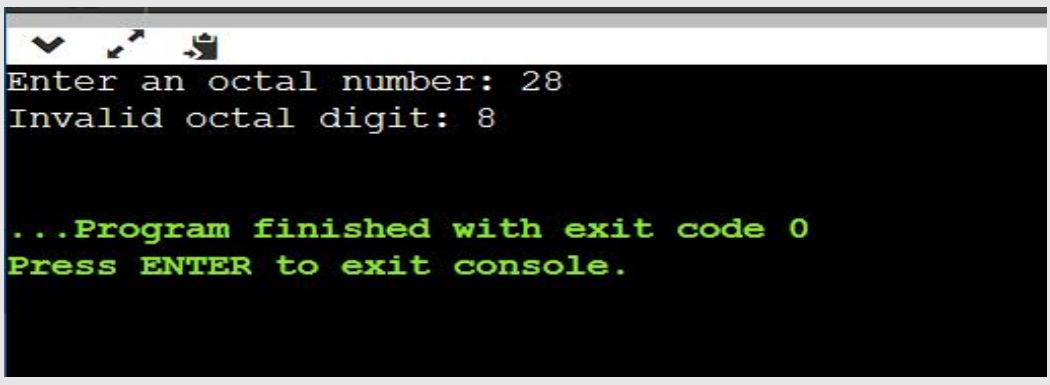
```
    int binaryIndex = 0;

    // Convert each octal digit to binary and concatenate
    for (int i = 0; i < length; i++) {
        char *binaryDigit = octalToBinary(octal[i]);

        // Skip the first digit if it results in leading zeros
        if (i == 0 && binaryDigit[0] == '0') {
            binaryDigit += 1;
        }

        // Copy the binary digits to the binary string
        strcpy(binary + binaryIndex, binaryDigit);
        binaryIndex += strlen(binaryDigit);
    }

    printf("Binary representation: %s\n", binary);

    return 0;
}
```



65. Write a C program to convert Octal to Decimal number system.

```
#include <stdio.h>
#include <math.h>
int octalToDecimal(char octal[]) {
    int length = 0;
    while (octal[length] != '\0') {
        length++;
    }

    int decimal = 0;
    int base = 1;

    for (int i = length - 1; i >= 0; i--) {
        if (octal[i] < '0' || octal[i] > '7') {
            printf("Invalid octal digit: %c\n", octal[i]);
            return -1;
        }

        int octalDigit = octal[i] - '0';
        decimal += octalDigit * base;
        base *= 8;
```

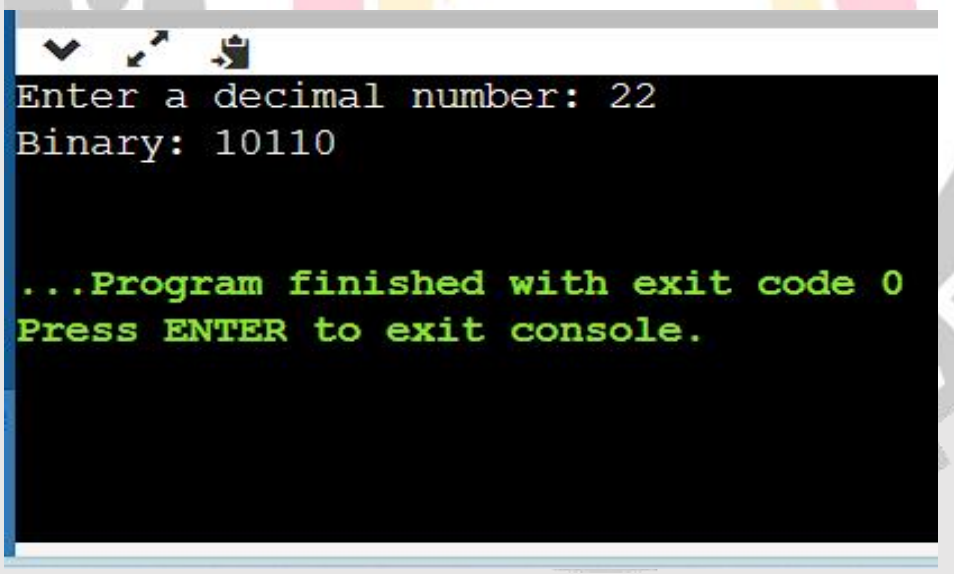
```
    }

    return decimal;
}

int main() {
    char octal[32]; // Assuming a maximum of 32-bit octal
number

    printf("Enter an octal number: ");
    scanf("%s", octal);

    int decimal = octalToDecimal(octal);

    if (decimal != -1) {
        printf("Decimal representation: %d\n", decimal);
    }

    return 0;
}
```



67. Write a C program to convert Decimal to Binary number system.

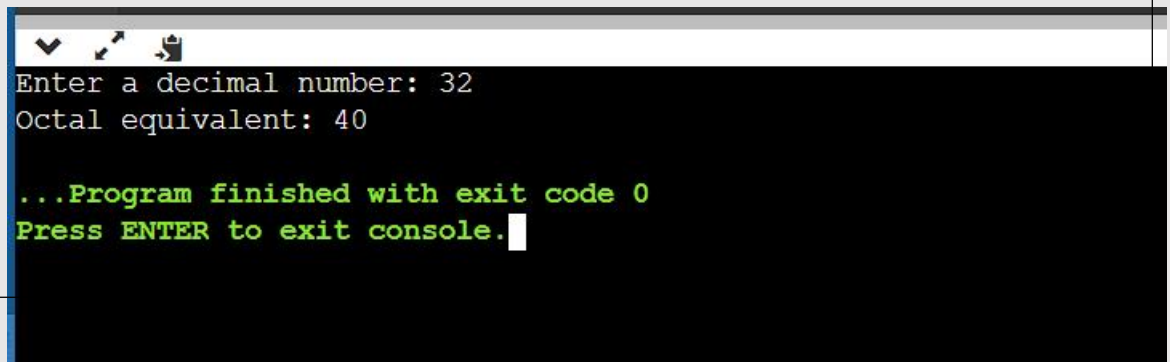
```
#include <stdio.h>
void decimalToBinary(int decimal) {
   if (decimal == 0) {
      printf("Binary: 0\n");
      return;
   }

   int binary[32];
   int i = 0;

   while (decimal > 0) {
      binary[i] = decimal % 2;
      decimal /= 2;
      i++;
   }

   printf("Binary: ");
   for (int j = i - 1; j >= 0; j--) {
      printf("%d", binary[j]);
   }
```

```
    printf("\n");
}

int main() {
    int decimal;

    printf("Enter a decimal number: ");
    scanf("%d", &decimal);

    decimalToBinary(decimal);

    return 0;
}
```



68. Write a C program to convert Decimal to Octal number system.

```
#include <stdio.h>
int main() {
   int decimal, octal[100], i = 0;

   printf("Enter a decimal number: ");
   scanf("%d", &decimal);

   while (decimal > 0) {
      octal[i] = decimal % 8;
      decimal /= 8;
      i++;
   }

   printf("Octal equivalent: ");
   for (int j = i - 1; j >= 0; j--) {
      printf("%d", octal[j]);
   }

   return 0;
}
```



69. Write a C program to convert Decimal to Hexadecimal number system.

```
#include <stdio.h>

int main() {

   int decimal, remainder, i = 0;
   char hexadecimal[100];

   printf("Enter a decimal number: ");
   scanf("%d", &decimal);

   while (decimal > 0) {
      remainder = decimal % 16;
      if (remainder < 10) {
         hexadecimal[i] = remainder + '0';
      } else {
         hexadecimal[i] = remainder - 10 + 'A';
      }
      decimal /= 16;
      i++;
   }

   printf("Hexadecimal equivalent: 0x");
   for (int j = i - 1; j >= 0; j--) {
      printf("%c", hexadecimal[j]);
   }
```

```
    return 0;
}
```

```
Enter a decimal number: 68
Hexadecimal equivalent: 0x44

...Program finished with exit code 0
Press ENTER to exit console.
```

70. Write a C program t
number system.

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

int main() {
    char hexadecimal[100];
    printf("Enter a hexadecimal number: ");
    scanf("%s", hexadecimal);

    int length = strlen(hexadecimal);
    printf("Binary equivalent: ");

    for (int i = 0; i < length; i++) {
        char hexDigit = hexadecimal[i];
        int decimalValue;

        if (hexDigit >= '0' && hexDigit <= '9') {
            decimalValue = hexDigit - '0';
        } else if (hexDigit >= 'A' && hexDigit <= 'F') {
            decimalValue = hexDigit - 'A' + 10;
        } else if (hexDigit >= 'a' && hexDigit <= 'f') {
            decimalValue = hexDigit - 'a' + 10;
```

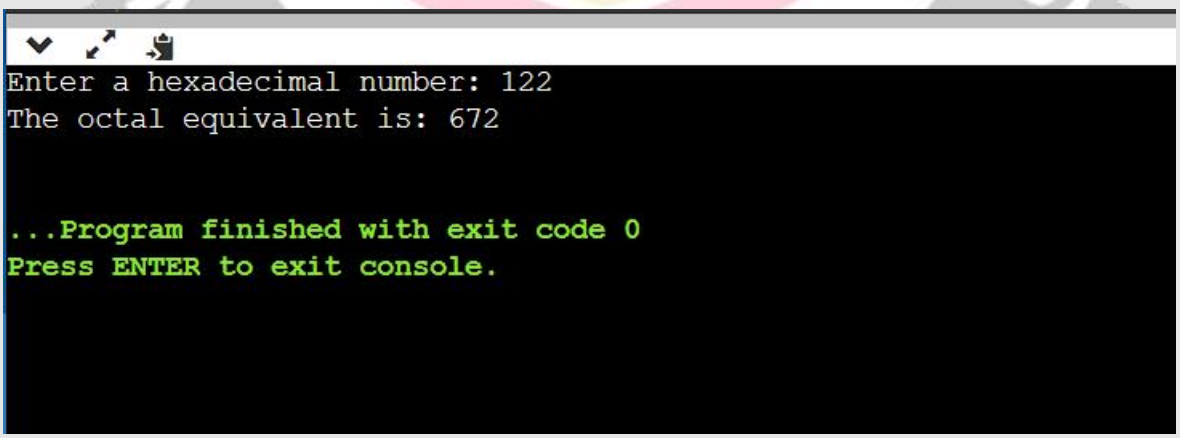
```
    } else {
        printf("Invalid hexadecimal input.\n");
        return 1;
    }

    for (int j = 3; j >= 0; j--) {
        if (decimalValue & (1 << j)) {
            printf("1");
        } else {
            printf("0");
        }
    }
  }

  printf("\n");
  return 0;
}
```

```
input
Enter a hexadecimal number: 33
Binary equivalent: 00110011


...Program finished with exit code 0
Press ENTER to exit console.
```

71. Write a C program to convert Hexadecimal to Octal number system

```
#include <stdio.h>
#include <string.h>
int main() {
   char hex[20];
   printf("Enter a hexadecimal number: ");
   scanf("%s", hex);

   long int dec = 0, oct = 0, i = 0;

   // Convert hexadecimal to decimal
   for (int j = strlen(hex) - 1; j >= 0; j--) {
      int digit;
      if (hex[j] >= '0' && hex[j] <= '9')
         digit = hex[j] - '0';
      else if (hex[j] >= 'A' && hex[j] <= 'F')
         digit = hex[j] - 'A' + 10;
      else if (hex[j] >= 'a' && hex[j] <= 'f')
         digit = hex[j] - 'a' + 10;
      dec += digit * (1 << (4 * i));
      i++;
```

```
    }

    i = 1;
    // Convert decimal to octal
    while (dec != 0) {
        oct += (dec % 8) * i;
        dec /= 8;
        i *= 10;
    }

    printf("The octal equivalent is: %lo\n", oct);

    return 0;
}
```



72. Write a C program to convert Hexadecimal to Decimal number system.

```
#include <stdio.h>
#include <math.h>
int main() {
   char hexNum[10];
   int decimalNum = 0;
   int i, j, len;

   printf("Enter a hexadecimal number: ");
   scanf("%s", hexNum);

   // Find the length of the hexadecimal number
   len = strlen(hexNum);

   // Iterate through the hexadecimal number in reverse order
   for (i = 0; hexNum[i] != '\0'; i++) {
      len--;
      if (hexNum[i] >= '0' && hexNum[i] <= '9')
         j = hexNum[i] - '0';
      else if (hexNum[i] >= 'a' && hexNum[i] <= 'f')
         j = hexNum[i] - 'a' + 10;
      else if (hexNum[i] >= 'A' && hexNum[i] <= 'F')
         j = hexNum[i] - 'A' + 10;

      decimalNum += j * pow(16, len);
   }
   printf("Decimal equivalent: %d\n", decimalNum);
```

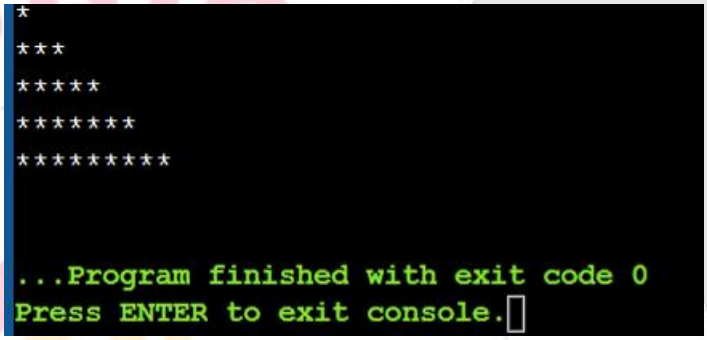
```
Enter a hexadecimal number: 33
Decimal equivalent: 51
```

```
    return 0;
}
```

Pattern Exercises

1. Star pattern programs - Write a C program to print the given star patterns.

```
*
***
*****
*******
*********
```



Pyramid Star Pattern

```
#include <stdio.h>

void printStarPattern(int n) {
    for(int i = 1; i <= n; i++) {
        for(int j = 1; j <= 2*i-1; j++) {
            printf("*");
        }
        printf("\n");
    }
}
int main() {
    int n = 5; // Change this value to adjust the number of rows
```

```
    printStarPattern(n);
    return
}
```

2. *

```
   * *
  * *
  * *
 *********
```

Hollow Pyramid Star Pattern

```
#include <stdio.h>

void printHollowPyramid(int n) {
    int i, j;
    // Print upper part of the pyramid
    for(i = 1; i <= n; i++) {
        for(j = i; j < n; j++) {
            printf(" ");
        }
        for(j = 1; j <= 2*i-1; j++) {
            if(j == 1 || j == 2*i-1 || i == n) {
                printf("*");
            }
            else {
```

```
            printf(" ");
        }
    }
    printf("\n");
  }
}

int main() {
  int n;
  printf("Enter the number of rows: ");
  scanf("%d", &n);

  if(n <= 0) {
    printf("Invalid input. Please enter a positive integer.\n");
    return 1;
  }

  printHollowPyramid(n);

  return 0;

}
```

```
Enter the number of rows: 3
  *
 * *
*****


...Program finished with exit code 0
Press ENTER to exit console.
```

****

****

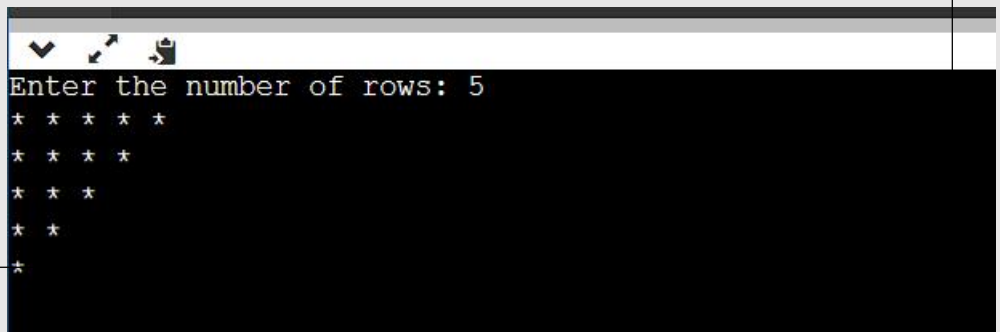
*****

***

*

3.Inverted Pyramid Star Pattern

```
#include <stdio.h>

int main() {
   int i, j, rows;

   printf("Enter the number of rows: ");
   scanf("%d", &rows);

   for(i = rows; i >= 1; --i) {
      for(j = 1; j <= i; ++j) {
         printf("* ");
      }
      printf("\n");
   }
```



```
    return 0;
}
```

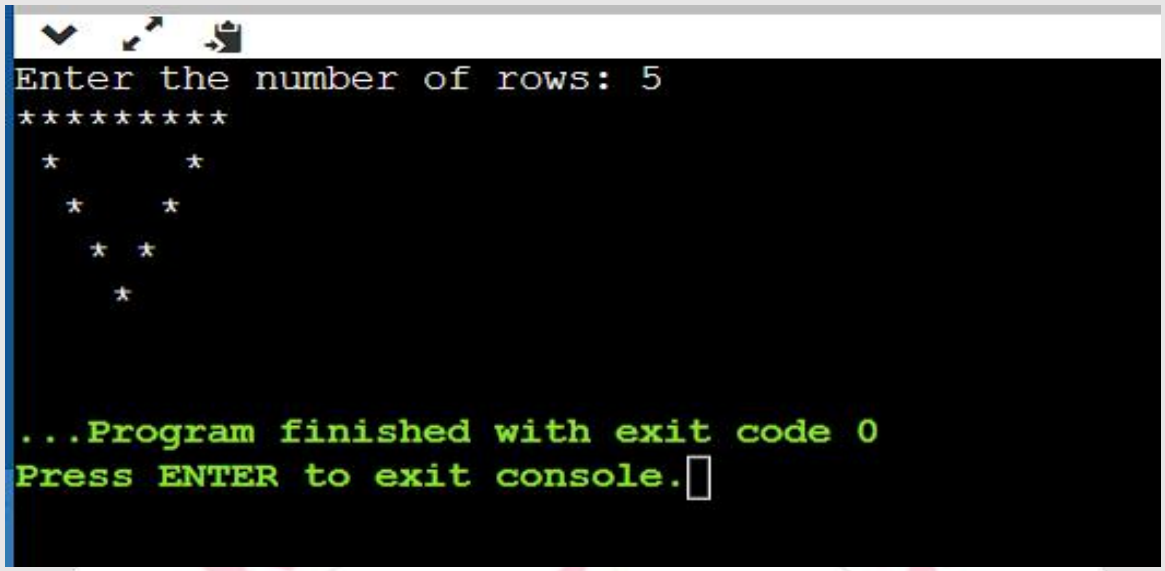
```
*********
****
* *
* *
* *
*
```

4.Hollow Inverted Pyramid Star Pattern

```
#include <stdio.h>

int main() {
    int rows, i, j;

    printf("Enter the number of rows: ");
    scanf("%d", &rows);

    for(i = 1; i <= rows; i++) {
        // Print spaces
        for(j = 1; j < i; j++) {
            printf(" ");
        }
```

```
        // Print stars for the first row or the last row
        if(i == 1 || i == rows) {
            for(j = 1; j <= (2 * (rows - i) + 1); j++) {
                printf("*");
            }
        } else { // Print stars for other rows
            printf("*");

            for(j = 1; j < (2 * (rows - i)); j++) {
                printf(" ");
            }

            printf("*");
        }

        printf("\n");
    }

    return 0;
```

}

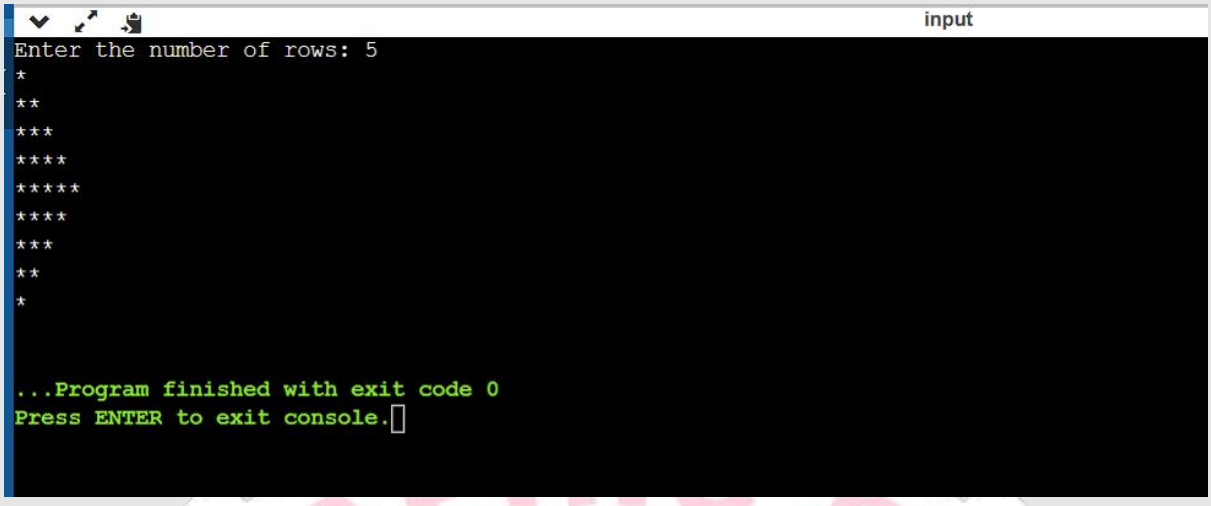



```
*
**
***
****


****
***
**
*
```

5.Half Diamond Star Pattern

```
#include <stdio.h>

int main() {
    int i, j, rows;

    printf("Enter the number of rows: ");
    scanf("%d", &rows);
```

```
    // Print upper half of the diamond
    for(i = 1; i <= rows; i++) {
        for(j = 1; j <= i; j++) {
            printf("*");
        }
        printf("\n");
    }

    // Print lower half of the diamond
    for(i = rows-1; i >= 1; i--) {
        for(j = 1; j <= i; j++) {
            printf("*");
        }
        printf("\n");
    }

    return 0;
}
```



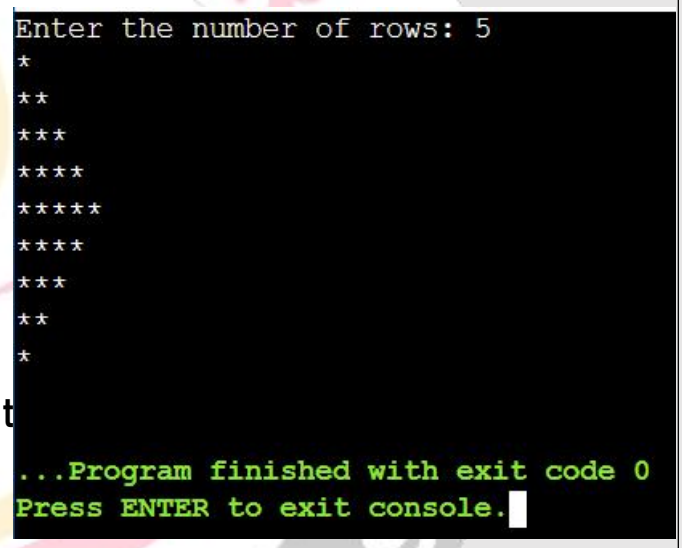

```
*
**
***
****
*****
****
***
**
*
```

6.Mirrored Half Diamond Star Pattern

#include <stdio.h>

```
void printHalfDiamond(int n) {
    int i, j;

    // Upper half of the pattern
    for(i = 1; i <= n; i++) {
        for(j = 1; j <= i; j++) {
            printf("*");
        }
        printf("\n");
    }

    // Lower half of the pattern
    for(i = n-1; i >= 1; i--) {
        for(j = 1; j <= i; j++) {
            printf("*");
        }
        printf("\n");
    }
}

int main() {
    int n;
```

```
// Get user input for the number of rows
printf("Enter the number of rows: ");
scanf("%d", &n);

// Call the function to print the pattern
printHalfDiamond(n);
return 0;
}
```



2. Number pattern programs - Writ
given number patterns

Square number patterns

11111

11111

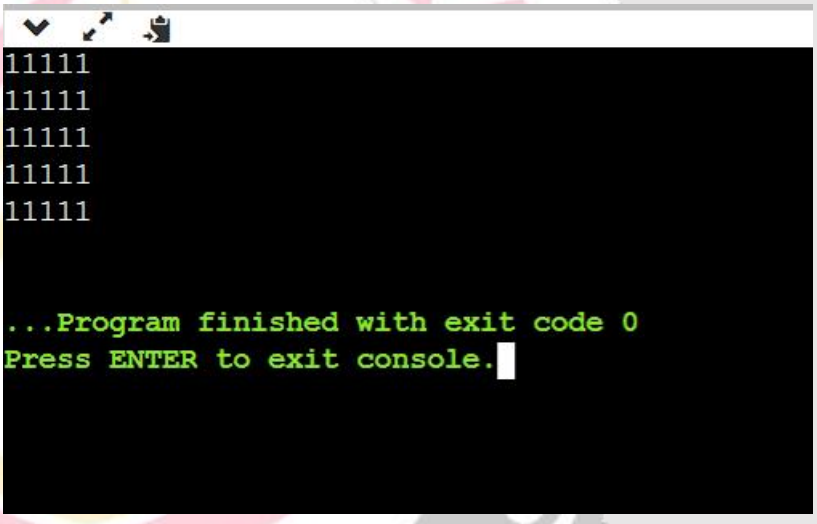
11111

11111

11111

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

```
int main() {
    int i, j;

    for(i = 0; i < 5; i++) {
        for(j = 0; j < 5; j++) {
            printf("1");
        }
        printf("\n");
    }

    return 0;
}
```



Number pattern 1

11111

00000

11111

00000

11111

```
#include <stdio.h>

int main() {
    int i, j;
```

```
    for (i = 1; i <= 5; i++) {
        for (j = 1; j <= 5; j++) {
            if (i % 2 == 1) {
                printf("1");
            } else {
                printf("0");
            }
        }
        printf("\n");
    }
return 0;
}
```

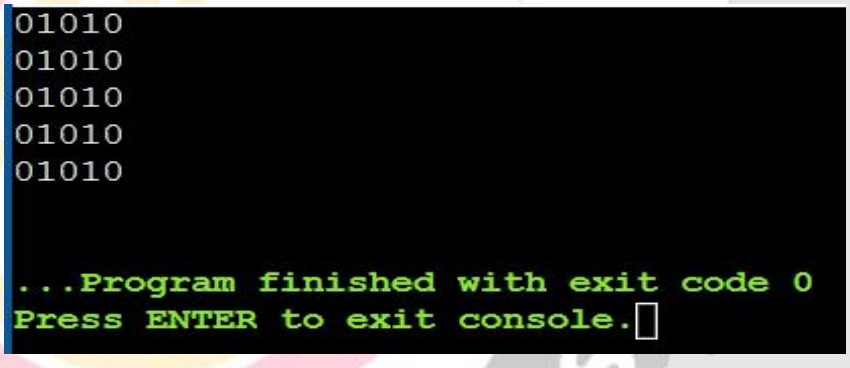
```
11111
00000
11111
00000
11111


...Program finished with exit code 0
Press ENTER to exit console.
```

Number pattern 2

```
01010
01010
01010
01010
01010
```

```
#include <stdio.h>
int main() {
    int i, j;
```

```
    for(i = 1; i <= 5; i++) {
        for(j = 1; j <= 5; j++) {
            if(j % 2 == 0) {
                printf("1");
            } else {
                printf("0");
            }
        }
        printf("\n");
    }
    return 0;
}
```



Number pattern 3

11111

10001

10001

10001

11111

```
#include <stdio.h>

int main() {
    int n = 5; // Number of rows and columns
```

```
    for (int i = 0; i < n; i++) {
        for (int j = 0; j < n; j++) {
            if (i == 0 || i == n - 1 || j == 0 || j == n - 1)
                printf("1");
            else
                printf("0");
        }
        printf("\n");
    }

    return 0;
}
```

```
11111
10001
10001
10001
11111


...Program finished with exit code 0
Press ENTER to exit console.
```

Number pattern 4

11111

11111

11011

11111

11111

```
#include <stdio.h>
int main() {
    int n = 5; // Size of the pattern (5x5 in this case)
```

```
    for(int i = 0; i < n; i++) {
        for(int j = 0; j < n; j++) {
            if (i == n/2 && j == n/2) { // If we're at the center, print 0
                printf("0");
            } else {
                printf("1");
            }
        }
        printf("\n"); // Move to the next line after each row
    }
    return 0;
}
```

```
11111
10001
10001
10001
11111


...Program finished with exit code 0
Press ENTER to exit console.
```

Number pattern 5

10101

01010

10101

01010

10101

```
#include <stdio.h>
int main() {
    int rows = 5;
    int cols = 5;
```

```
    for(int i = 0; i < rows; i++) {
        for(int j = 0; j < cols; j++) {
            if((i+j) % 2 == 0) {
                printf("1");
            } else {
                printf("0");
            }
        }
        printf("\n");
    }
    return 0;
}
```

```
10101
01010
10101
01010
10101


...Program finished with exit code 0
Press ENTER to exit console.
```

If…Else Exercises

1. Write a C program to find maximum between two numbers.

```
#include <stdio.h>

int main() {
    int num1, num2;

    // Input the two numbers
    printf("Enter first number: ");
    scanf("%d", &num1);
```

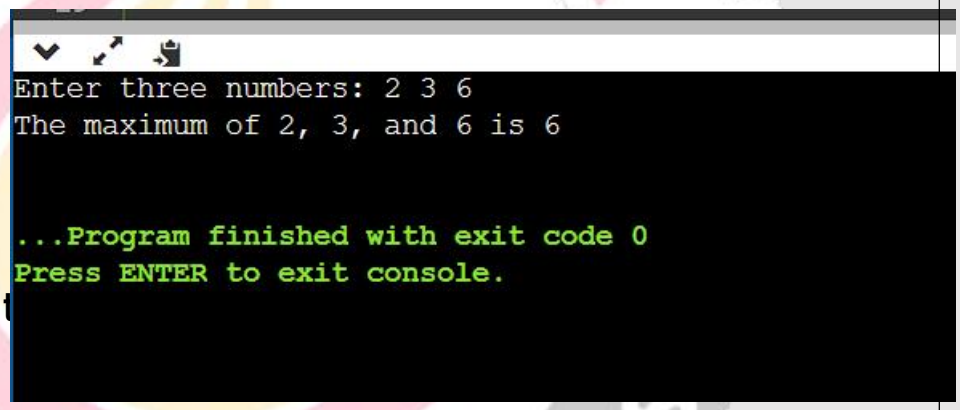
```
    printf("Enter second number: ");
    scanf("%d", &num2);

    // Compare the numbers
    if (num1 > num2) {
        printf("%d is the maximum\n", num1);
    } else {
        printf("%d is the maximum\n", num2);
    }

    return 0;
}
```

```
Enter first number: 23
Enter second number: 45
45 is the maximum


...Program finished with exit code 0
Press ENTER to exit console.
```

2.Write a C program t

```
#include <stdio.h

int findMax(int a, int b, int c) {
    int max = a;

    if (b > max) {
        max = b;
    }

    if (c > max) {
        max = c;
    }

    return max;
```

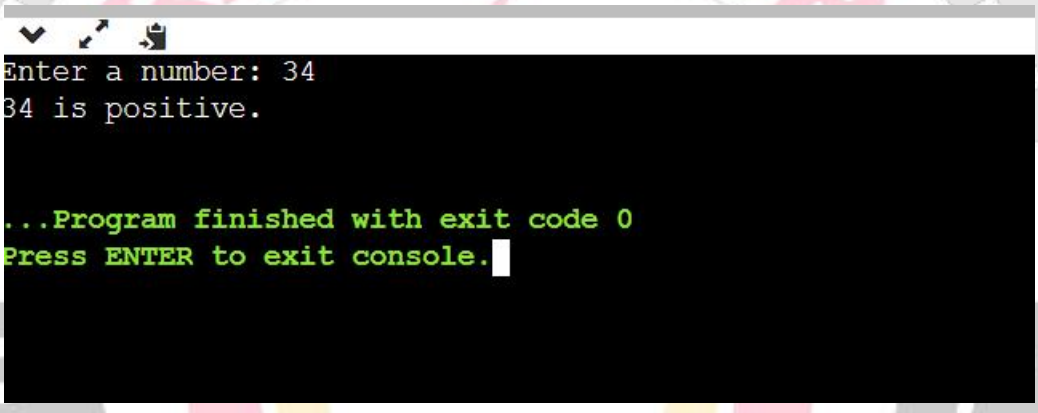
```
}

int main() {
    int num1, num2, num3;

    printf("Enter three numbers: ");
    scanf("%d %d %d", &num1, &num2, &num3);

    int max = findMax(num1, num2, num3);

    printf("The maximum of %d, %d, and %d is %d\n", num1,
num2, num3, max);

    return 0;
}
```



3.Write a C program t
positive or zero.

```
#include <stdio.h>

int main() {
    int num;

    // Read the number from the user
    printf("Enter a number: ");
    scanf("%d", &num);

    if (num > 0) {
        printf("%d is positive.\n", num);
    } else if (num < 0) {
```

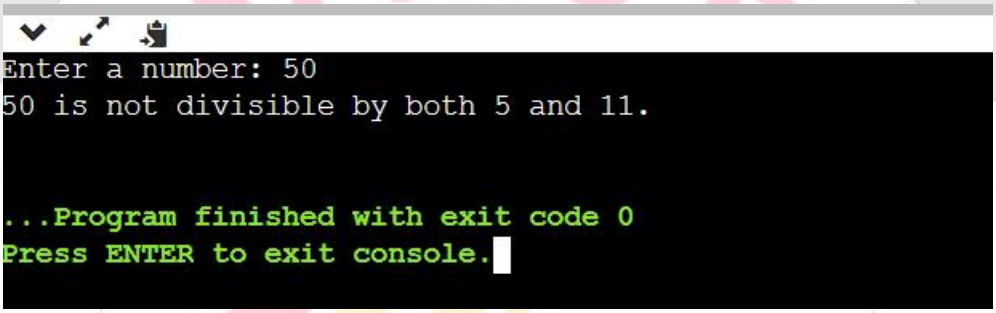
```
        printf("%d is negative.\n", num);
    } else {
        printf("%d is zero.\n", num);
    }

    return 0;
}
```



4.Write a C program to check whether a number is divisible by 5 and 11 or not.

```
#include <stdio.h>

int main() {
    int num;

    // Read input from user
    printf("Enter a number: ");
    scanf("%d", &num);

    // Check if the number is divisible by both 5 and 11
    if (num % 5 == 0 && num % 11 == 0) {
```

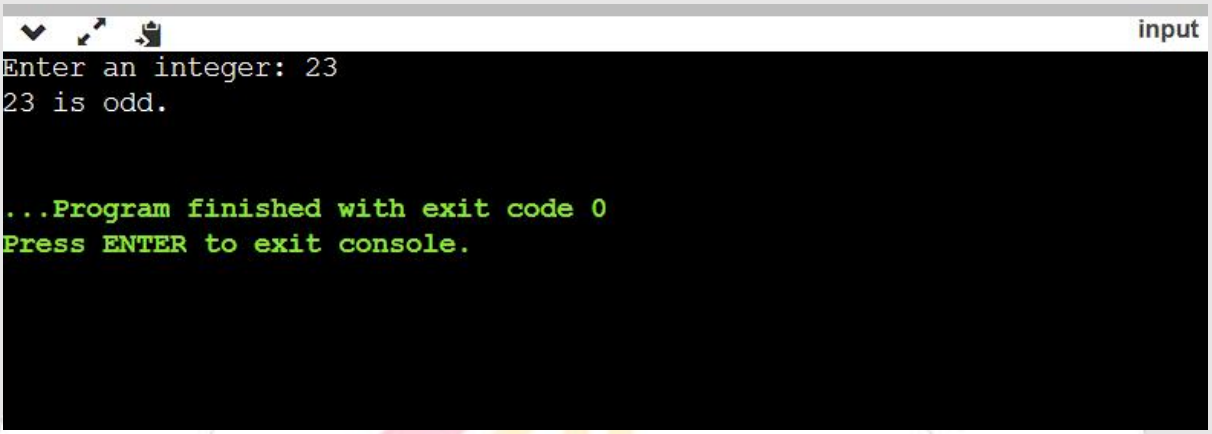
```
        printf("%d is divisible by both 5 and 11.\n", num);
    } else {
        printf("%d is not divisible by both 5 and 11.\n", num);
    }

    return 0;
}
```



5.Write a C program to check whether a number is even or odd.

```
#include <stdio.h>

int main() {
    int num;

    // Prompt the user to enter a number
    printf("Enter an integer: ");
    scanf("%d", &num);

    // Check if the number is even or odd
    if (num % 2 == 0) {
        printf("%d is even.\n", num);
    } else {
```

```
        printf("%d is odd.\n", num);
    }
    return 0;
}
```

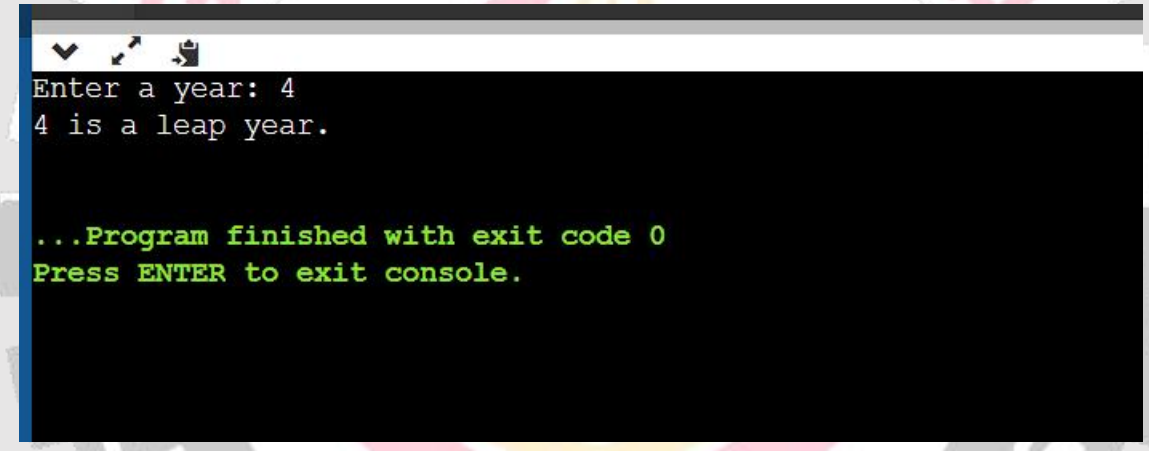


6.Write a C program to check whether a year is leap year or not.

```
#include <stdio.h>

int main() {
    int year;

    // Input year from user
    printf("Enter a year: ");
    scanf("%d", &year);

    // Check if the year is a leap year
```

```
    if ((year % 4 == 0 && year % 100 != 0) || (year % 400 == 0))
{
        printf("%d is a leap year.\n", year);
    } else {
        printf("%d is not a leap year.\n", year);
    }

    return 0;
}
```

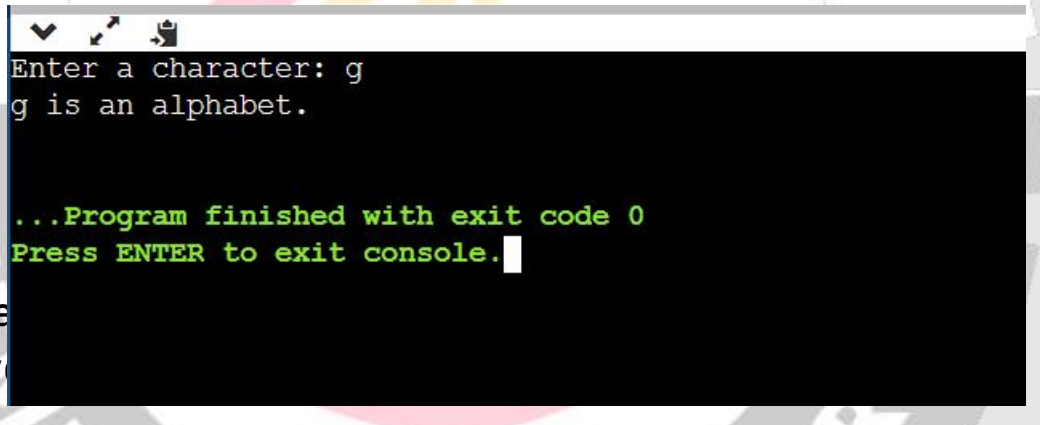
7. Write a C program to check whether a character is alphabet



or not #include <stdio.h>

```
int main() {
    char ch;

    // Input character from user
    printf("Enter a character: ");
    scanf("%c", &ch);
```

```
    // Check if the character is an alphabet
    if ((ch >= 'a' && ch <= 'z') || (ch >= 'A' && ch <= 'Z')) {
        printf("%c is an alphabet.\n", ch);
    } else {
        printf("%c is not an alphabet.\n", ch);
    }

    return 0;
}
```



8.Write a
it is vow

```
#include <stdio.h>
int main() {
    char ch;
    printf("Enter an alphabet: ");
    scanf("%c", &ch);
        // Using switch case to check if it's a vowel or consonant
    switch(ch) {
```

```
        case 'a':
        case 'e':
       case 'i':
             case 'o':
          case 'u':
          case 'A':
             case 'E':
          case 'I':
       case 'O':
         case 'U':
            printf("%c is a vowel.\n", ch);
                break;
            default:
          printf("%c is a consonant.\n", ch);
          }

          return 0;
       }
```

```
Enter an alphabet: d
d is a consonant.


...Program finished with exit code 0
Press ENTER to exit console.
```

9. Write a C program to input alphabet, digit or special character.

```
#include <stdio.h>

int main() {
    char character;

    // Ask user to enter a character
    printf("Enter a character: ");
    scanf("%c", &character);
```

```
    // Check if the character is an alphabet
    if ((character >= 'a' && character <= 'z') || (character >= 'A' && 
character <= 'Z')) {
        printf("%c is an alphabet.\n", character);
    }
    // Check if the character is a digit
    else if (character >= '0' && character <= '9') {
        printf("%c is a digit.\n", character);
    }
    // If it's not an alphabet or a digit, it's a special character
    else {
        printf("%c is a special character.\n", character);
    }
    return 0;
}
```

```
Enter a character: k
k is an alphabet.


...Program finished with exit code 0
Press ENTER to exit console.
```