Assignment 3

Shri G.S Institute of Technology & Science

C Programming Lab

Assignment 2 – INDEX

P1. Write a C program to print all natural numbers from 1 to n. – using while loop

```
#include <stdio.h>
void main() {
   int num;
   printf("SHIV ARORA\n");
   printf("Enter a number: ");
   scanf("%d", &num);
   int i=1;

   while(i <= num){
      printf("%d  ", i);
      i++;
   }printf("\n");
}
```

OUTPUT:

```
SHIV ARORA
Enter a number: 10
1  2  3  4  5  6  7  8  9  10
PS D:\C Assignements\Run C Programs>
```

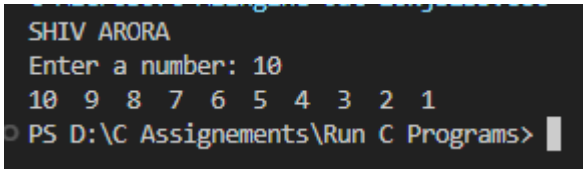
P2. Write a C program to print all natural numbers in reverse (from n to 1). – using while loop

```
#include <stdio.h>
void main() {
   int num;
   printf("SHIV ARORA\n");
   printf("Enter a number: ");
   scanf("%d", &num);
   int i=num;

   while(i >= 1){
      printf("%d  ", i);
      i--;
   }printf("\n");
```

```
}
```

OUTPUT:

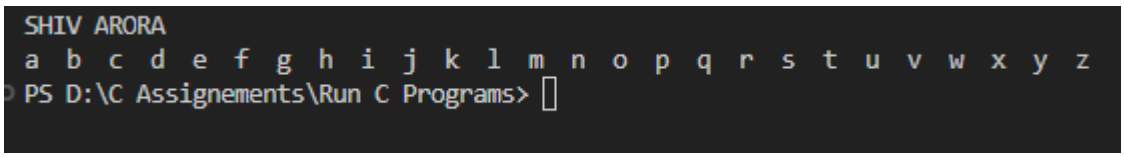


P3. Write a C program to print all alphabets from a to z. – using while loop

```
#include <stdio.h>
void main() {
   char c = 'a';
   printf("SHIV ARORA\n");
   char i=c;

   while(i <= 'z'){
      printf("%c  ", i);
      i++;
   }printf("\n");
}
```

OUTPUT:

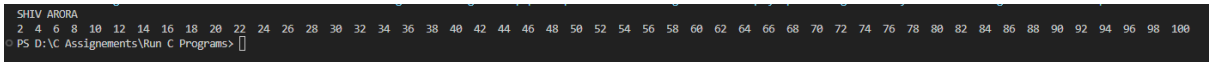


P4. Write a C program to print all even numbers between 1 to 100. – using while loop

```
#include <stdio.h>
void main() {
   int i = 1;
   printf("SHIV ARORA\n");
   while(i <= 100){
      if(i % 2 == 0)
         printf("%d  ", i);
      i++;
```

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

OUTPUT:



P5. Write a C program to print all odd number between 1 to 100.

```
#include <stdio.h>
void main() {
    int i = 1;
    printf("SHIV ARORA\n");
    while(i <= 100){
        if(i % 2 != 0)
            printf("%d  ", i);
        i++;
    }printf("\n");
}
```

OUTPUT:

P6. Write a C program to find sum of all natural numbers between 1 to n

```
#include <stdio.h>
void main() {
    int n;
    printf("SHIV ARORA\n");
    printf("Enter a number ");
    scanf("%d", &n);
    int sum = 0;
    int i = 1;
    while(i <= n){
        sum += i;
        i++;
```

```
    }printf("SUM  = %d\n", sum);
}
```

OUTPUT:

```
SHIV ARORA
Enter a number 5
SUM  = 15
PS D:\C Assignements\Run C Programs>
```

P7. Write a C program to find sum of all even numbers between 1 to n.

```
#include <stdio.h>
void main() {
    int n;
    printf("SHIV ARORA\n");
    printf("Enter a number ");
    scanf("%d", &n);
    int sum = 0;
    int i = 1;
    while(i <= n){
        if (i% 2 == 0)
            sum += i;
        i++;
    }printf("SUM  = %d\n", sum);
}
```

OUTPUT:

```
SHIV ARORA
Enter a number 10
SUM  = 30
PS D:\C Assignements\Run C Programs>
```

P8. Write a C program to find sum of all odd numbers between 1 to n.

```
#include <stdio.h>
void main() {
    int n;
    printf("SHIV ARORA\n");
```

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

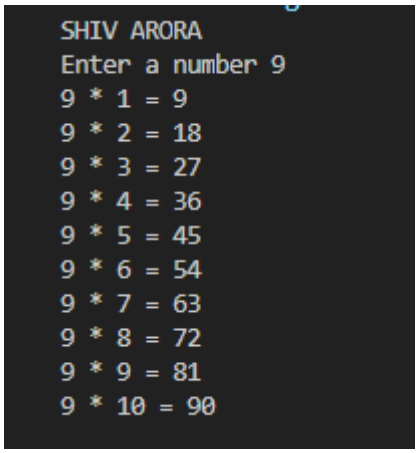
OUTPUT:

```
SHIV ARORA
Enter a number 10
SUM  = 25
PS D:\C Assignements\Run C Programs>
```

P9. Write a C program to print multiplication table of any number.

```
#include <stdio.h>
void main() {
   int n;
   printf("SHIV ARORA\n");
   printf("Enter a number ");
   scanf("%d", &n);
   int i = 1;
   while(i <= 10){
      printf("%d * %d = %d\n", n, i, n*i);
      i++;
   }printf("\n");
}
```

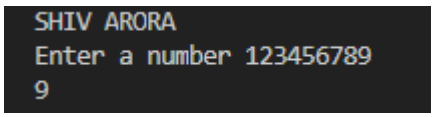
OUTPUT:



P10. Write a C program to count number of digits in a number.

```
#include <stdio.h>
void main() {
   int n;
   printf("SHIV ARORA\n");
   printf("Enter a number ");
   scanf("%d", &n);
   int i = 0;
   while(n != 0){
      n /= 10;
      i++;
   }printf("%d\n", i);
}
```

OUTPUT:



P11. Write a C program to find first and last digit of a number

```
#include <stdio.h>
void main() {
   int n, ld;
   printf("SHIV ARORA\n");
```

```
    printf("Enter a number ");
    scanf("%d", &n);
    ld = n% 10;
    printf("%d\n", ld);
}
```

OUTPUT:

```
SHIV ARORA
Enter a number 34864
4
PS D:\C Assignements\Run C Programs>
```

P12. Write a C program to swap first and last digits of a number.

```
#include <stdio.h>
void main() {
    int n, ld, fd;
    printf("SHIV ARORA\n");
    printf("Enter a number ");
    scanf("%d", &n);
    ld = n% 10;
     while (n >= 10) {
        n /= 10;
    }
    fd = n;
    printf("%d\n", ld+fd);
}
```

OUTPUT:

```
SHIV ARORA
Enter a number 38464
7
PS D:\C Assignements\Run C Programs>
```

P13. Write a C program to swap first and last digits of a number.

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

```
    int n, fd, ld, swap, digits = 0;
    printf("SHIV ARORA\n");
    printf("Enter a number: ");
    scanf("%d", &n);
    int temp = n;
    ld = n % 10;
    while (n >= 10) {
       n /= 10;
       digits++;
    }
    fd = n;
    swap = ld;
    for (int i = 0; i < digits - 1; i++) {
       temp = temp / 10;
       swap = swap * 10 + (temp % 10);
    }
    swap = swap * 10 + fd;
    printf("Swapperd Number %d\n", swap);
}
```

OUTPUT:

```
SHIV ARORA
Enter a number: 76890534
Swapperd Number 43509867
PS D:\C Assignements\Run C Programs>
```

P14. Write a C program to calculate sum of digits of a number

```
#include <stdio.h>
void main() {
    int n, sum = 0;
    printf("SHIV ARORA\n");
    printf("Enter a number: ");
    scanf("%d", &n);
    while (n > 0) {
```

```
        sum += n % 10;
        n /= 10;
    }
    printf("Sum = %d\n", sum);
}
```

OUTPUT:

```
SHIV ARORA
Enter a number: 3456
Sum = 18
PS D:\C Assignements\Run C Programs>
```

P15. Write a C program to calculate product of digits of a number.

```
#include <stdio.h>
void main() {
    int n, sum = 1;
    printf("SHIV ARORA\n");
    printf("Enter a number: ");
    scanf("%d", &n);
    while (n > 0) {
        sum *= n % 10;
        n /= 10;
    }
    printf("Sum = %d\n", sum);
}
```

OUTPUT:

```
SHIV ARORA
Enter a number: 345
Product = 60
PS D:\C Assignements\Run C Programs>
```

P16. Write a C program to enter a number and print its reverse.

```
#include <stdio.h>
void main() {
    int n, rev = 0;
```

```
    printf("SHIV ARORA\n");
    printf("Enter a number: ");
    scanf("%d", &n);
    while (n != 0) {
       rev = rev*10 + n%10;
       n /= 10;
    }
    printf("Reverse = %d\n", rev);
}
```

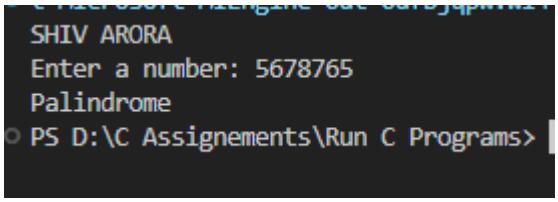
OUTPUT:

```
SHIV ARORA
Enter a number: 4567
Reverse = 7654
PS D:\C Assignements\Run C Programs>
```

P17. Write a C program to check whether a number is palindrome or not

```
#include <stdio.h>
void main() {
    int n, rev =0;
    printf("SHIV ARORA\n");
    printf("Enter a number: ");
    scanf("%d", &n);
    int org = n;
    while (n != 0) {
       rev = rev*10 + n%10;
       n /= 10;
    }
    if(org == rev)
    printf("Palindrome");
    else
    printf("Not Palindrome");
}
```

OUTPUT:

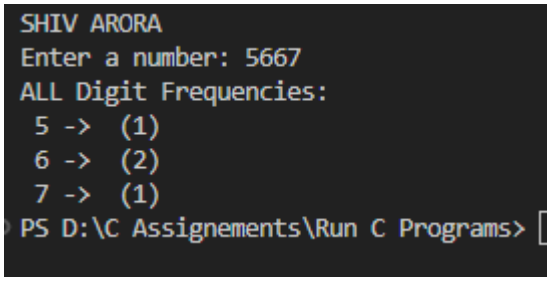


P18. Write a C program to find frequency of each digit in a given integer.

```
#include <stdio.h>
void main() {
   int n, digit = 0;
   printf("SHIV ARORA\n");
   printf("Enter a number: ");
   scanf("%d", &n);
   int freq[10] = {0};
   while (n != 0) {
      digit = n% 10;
      freq[digit]++;
      n /= 10;

   }
   printf("ALL Digit Frequencies:\n");
   for (digit = 0; digit < 10; digit++) {
      if(freq[digit] == 0 ) continue;
      else printf(" %d ->  (%d)\n", digit, freq[digit]);
   }
}
```

OUTPUT:

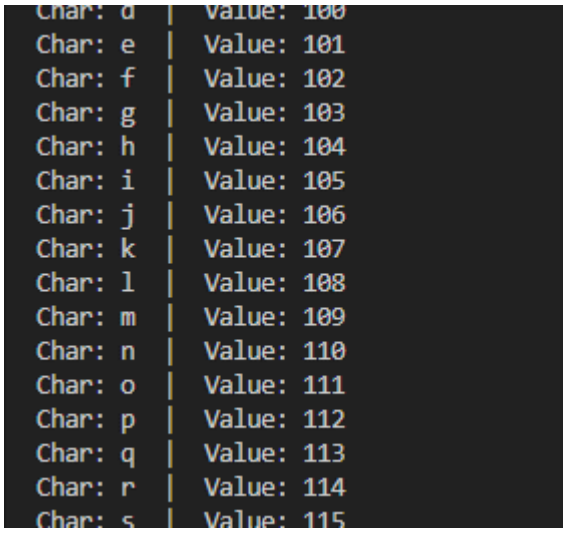


P20. Write a C program to print all ASCII character with their values.

```
#include <stdio.h>
void main() {
   printf("SHIV ARORA");
   printf("ASCII Characters and their Values are :\n");

   for (int i = 0; i < 128; i++) {
      printf("Char: %c  |  Value: %d\n", i, i);
   }
}
```

OUPUT:



P21. Write a C program to find power of a number using for loop

```
#include <stdio.h>
void main() {
   int exp, n;
   printf("SHIV ARORA\n");
   printf("Enter the number then the exponent ");
   scanf("%d %d", &n, &exp);
   int ans = 1;
   for (int i = 0; i < exp; i++) {
      ans *= n;
```

```
    }
    printf("%d", ans);
}
```

OUTPUT:

```
SHIV ARORA
Enter the number then the exponent 3 5
243
PS D:\C Assignements\Run C Programs>
```

P22. Write a C program to find all factors of a number.

```
#include <stdio.h>
void main() {
   int  n;
   printf("SHIV ARORA\n");
   printf("Enter the number ");
   scanf("%d", &n);
   for (int i = 1; i <= n; i++) {
      if (n % i == 0)  printf("%d ", i);
   }
}
```

OUTPUT:

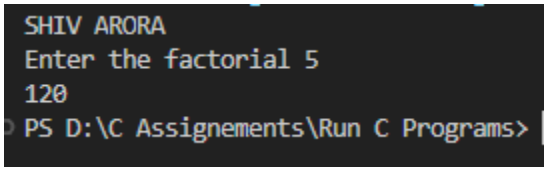
```
SHIV ARORA
Enter the number 78
1 2 3 6 13 26 39 78
PS D:\C Assignements\Run C Programs>
```

P23. Write a C program to calculate factorial of a number.

```
#include <stdio.h>
void main() {
   int  n;
   printf("SHIV ARORA\n");
   printf("Enter the factorial ");
   scanf("%d", &n);
```

```
        int ans = 1;
        for (int i = 0; i < n; i++) {
            ans *= n-i;
        }
        printf("%d", ans);
    }
```

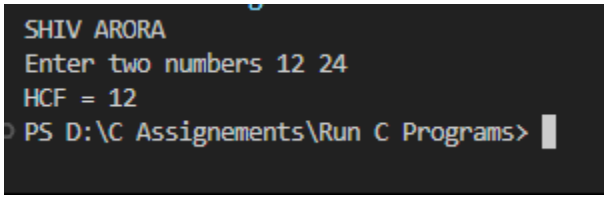
OUTPUT:



P24. Write a C program to find HCF (GCD) of two numbers.

```
#include <stdio.h>
void main() {
   int  n1, n2 , hcf;
   printf("SHIV ARORA\n");
   printf("Enter two numbers ");
   scanf("%d %d", &n1, &n2);
   while (n2 != 0) {
      hcf = n2;
      n2 = n1 % n2;
      n1 = hcf;
   }
   printf("HCF = %d", hcf);
}
```

OUTPUT:



P25. Write a C program to find LCM of two numbers.

```
#include <stdio.h>
void main() {
   int  n1, n2 , hcf, lcm;
   printf("SHIV ARORA\n");
   printf("Enter two numbers ");
   scanf("%d %d", &n1, &n2);
   int t1= n1, t2 = n2;
   while (n2 != 0) {
      hcf = n2;
      n2 = n1 % n2;
      n1 = hcf;
   }
   lcm = (t1 * t2) / hcf;
   printf("LCM = %d", lcm);
}
```

OUTPUT:

```
SHIV ARORA
Enter two numbers 12 18
LCM = 36
PS D:\C Assignements\Run C Programs>
```

P26. Write a C program to check whether a number is Prime number or not.

```
#include <stdio.h>
void main() {
   int  n , prime_check;
   printf("SHIV ARORA\n");
   printf("Enter a numbers ");
   scanf("%d", &n);
    if (n < 2) {
      prime_check = 0;
   } else {
      for (int i = 2; i * i <= n; i++) {
```

```
            if (n % i == 0) {
                prime_check = 0;
                break;
            }
        }
    }
    if (prime_check) {
        printf("prime number.\n");
    } else {
        printf("not a prime number.\n");
    }
}
```

OUTPUT:

```
SHIV ARORA
Enter a numbers 78
not a prime number.
PS D:\C Assignements\Run C Programs>
```

P27. Write a C program to print all Prime numbers between 1 to n.

```
#include <stdio.h>
void main() {
    int  n;
    printf("SHIV ARORA\n");
    printf("Enter a numbers ");
    scanf("%d", &n);
    for (int i = 2; i <= n; i++) {
        int prime_check = 1;
        for (int j = 2; j * j <= i; j++) {
            if (i % j == 0) {
                prime_check = 0;
                break;
            }
        }
```

```
            if (prime_check) {
                printf("%d ", i);
            }
        }
    }
```

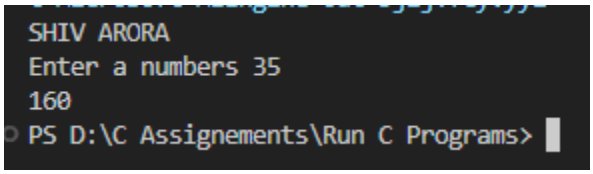
OUTPUT:

```
SHIV ARORA
Enter a numbers 35
2 3 5 7 11 13 17 19 23 29 31
PS D:\C Assignements\Run C Programs>
```

P28. Write a C program to find sum of all prime numbers between 1 to n

```
#include <stdio.h>
void main() {
    int  n, sum=0;
    printf("SHIV ARORA\n");
    printf("Enter a numbers ");
    scanf("%d", &n);
    for (int i = 2; i <= n; i++) {
        int prime_check = 1;
        for (int j = 2; j * j <= i; j++) {
            if (i % j == 0) {
                prime_check = 0;
                break;
            }
        }
        if (prime_check) {
            sum += i;
        }
    }
    printf("%d", sum);
}
```

OUTPUT:

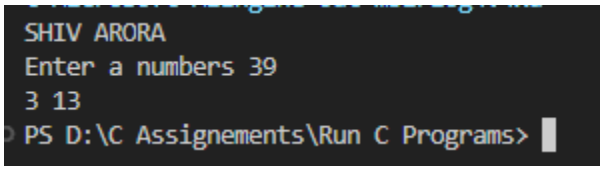


P29. Write a C program to find all prime factors of a number.

```
#include <stdio.h>
int isPrime(int num) {
    if (num < 2) return 0;
    for (int i = 2; i * i <= num; i++) {
        if (num % i == 0) return 0;
    }
    return 1;
}
void main() {
    int  n;
    printf("SHIV ARORA\n");
    printf("Enter a numbers ");
    scanf("%d", &n);
    for (int i = 2; i <= n; i++) {

        while (n % i == 0) {
            if (isPrime(i)) {
                printf("%d ", i);
            }
            n /= i;
        }
    }
}
```

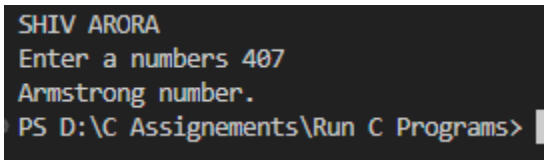
OUTPUT:



P30. Write a C program to check whether a number is Armstrong number or not.

```
#include <stdio.h>
void main() {
   int  n, remainder, ans =0;
   printf("SHIV ARORA\n");
   printf("Enter a numbers ");
   scanf("%d", &n);
   int org = n;
   while (org != 0) {
      remainder = org % 10;
      ans += remainder * remainder * remainder;
      org /= 10;
   }
   if (ans == n) {
      printf("Armstrong number.\n");
   } else {
      printf("not an Armstrong number.\n");
   }
}
```

OUTPUT:



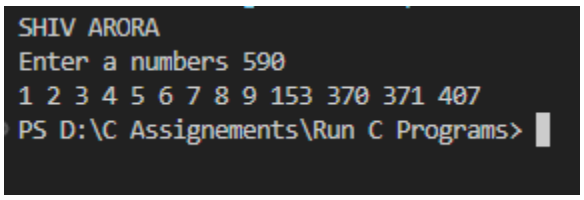
P31. Write a C program to print all Armstrong numbers between 1 to n

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

```
void main() {
   int  n, remainder;
   printf("SHIV ARORA\n");
   printf("Enter a numbers ");
   scanf("%d", &n);
   for (int num = 1; num <= n; num++) {
      int org = num, remainder, ans = 0, digit = 0;

      while (org != 0) {
         org /= 10;
         digit++;
      }
      org = num;
      while (org != 0) {
         remainder = org % 10;
         ans += pow(remainder, digit);
         org /= 10;
      }
      if (ans == num) {
         printf("%d ", num);
      }
   }
}
```

OUTPUT:



P32. Write a C program to check whether a number is Perfect number or not.

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

```
    int  n, sum;
    printf("SHIV ARORA\n");
    printf("Enter a numbers ");
    scanf("%d", &n);
   for (int i = 1; i <= n / 2; i++) {
       if (n % i == 0) sum += i;
    }
    if (sum == n && n != 0)  printf("Perfect number.\n");
     else  printf("not a Perfect number.\n");
}
```

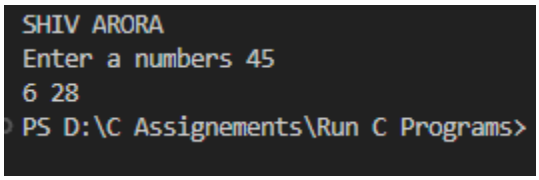
OUTPUT:

```
SHIV ARORA
Enter a numbers 567
not a Perfect number.
PS D:\C Assignements\Run C Programs>
```

P33. Write a C program to print all Perfect numbers between 1 to n.

```
#include <stdio.h>
void main() {
   int  n;
   printf("SHIV ARORA\n");
   printf("Enter a numbers ");
   scanf("%d", &n);
  for (int num = 1; num <= n; num++) {
      int sum = 0;
      for (int i = 1; i <= num / 2; i++) {
         if (num % i == 0) sum += i;
      }
      if (sum == num) printf("%d ", num);
   }
}
```

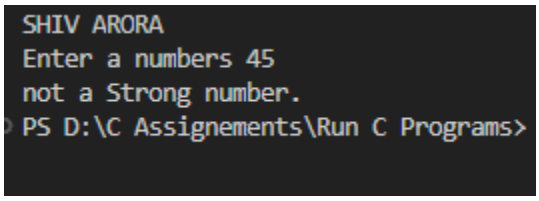
OUTPUT:



P34. Write a C program to check whether a number is Strong number or not.

```
#include <stdio.h>
int factorial(int num) {
    int fact = 1;
    for (int i = 1; i <= num; i++) {
        fact *= i;
    }
    return fact;
}
void main() {
    int  n, sum=0;
    printf("SHIV ARORA\n");
    printf("Enter a numbers ");
    scanf("%d", &n);
    int org = n;
    while (n != 0) {
        int digit = n % 10;
        sum += factorial(digit);
        n /= 10;
    }
    if (sum == org) {
        printf("Strong number.\n");
    } else {
        printf("not a Strong number.\n");
    }
}
```

OUTPUT:

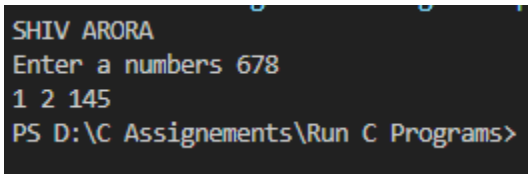


P35. Write a C program to print all Strong numbers between 1 to n.

```
#include <stdio.h>
int factorial(int num) {
    int fact = 1;
    for (int i = 1; i <= num; i++) {
        fact *= i;
    }
    return fact;
}
void main() {
    int  n;
    printf("SHIV ARORA\n");
    printf("Enter a numbers ");
    scanf("%d", &n);
    for (int i = 1; i<= n; i++) {
        int sum = 0, org = i;
        while (org != 0) {
            int digit = org % 10;
            sum += factorial(digit);
            org /= 10;
        }
        if (sum == i) printf("%d ", i);

    }
}
```

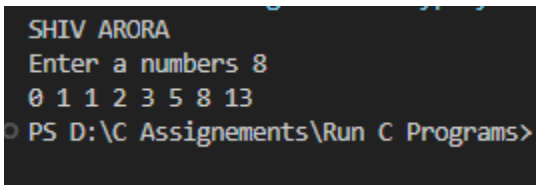
OUTPUT:



P36. Write a C program to print Fibonacci series up to n terms.

```
#include <stdio.h>
int fib(int n) {
   if (n <= 0) {
      return 0;
   } else if (n == 1) {
      return 1;
   } else {
      return fib(n - 1) + fib(n - 2);
   }
}
void main() {
   int  n;
   printf("SHIV ARORA\n");
   printf("Enter a numbers ");
   scanf("%d", &n);
   for (int i = 0; i < n; i++) {
      printf("%d ", fib(i));
   }
}
```

OUTPUT:



P37. Write a C program to find one's complement of a binary number.

```
#include <stdio.h>
#include <string.h>
void main() {
   printf("SHIV ARORA\n");
   char b[100];
   printf("Enter a binary number: ");
   scanf("%s", b);
   for (int i = 0; i < strlen(b); i++) {
      if (b[i] == '0') printf("1");
      else printf("0");
      }
}
```

OUTPUT:

```
SHIV ARORA
Enter a binary number: 101001111
010110000
PS D:\C Assignements\Run C Programs>
```

P38. Write a C program to find two's complement of a binary number.

```
#include <stdio.h>
#include <string.h>
void main() {
   printf("SHIV ARORA\n");
   char b[100];
   int carry = 1;
   printf("Enter a binary number: ");
   scanf("%s", b);
   for (int i = strlen(b) - 1; i >= 0; i--) {
      if (b[i] == '0' && carry == 1) {
         b[i] = '1';
         carry = 0;
         break;
```

```
        } else if (b[i] == '1' && carry == 1) b[i] = '0';
    }
    if (carry == 1) printf("Two's complement cannot be represented.\n");
    else printf("%s\n", b);
}
```

OUTPUT:

```
SHIV ARORA
Enter a binary number: 1010111100
1010111101
PS D:\C Assignements\Run C Programs>
```

P39. Write a C program to convert Binary to Octal number system.

```
#include <stdio.h>
#include <string.h>
void main() {
    printf("SHIV ARORA\n");
    char b[100];
    int decimal = 0, octal = 0, remain;
    printf("Enter a binary number: ");
    scanf("%s", b);
    for (int i = 0; b[i] != '\0'; i++) {
        decimal = decimal * 2 + (b[i] - '0');
    }
    int a = 1;
    while (decimal != 0) {
        remain = decimal % 8;
        octal += remain * a;
        decimal /= 8;
        a *= 10;
    }
    printf("%d\n", octal);
}
```

OUTPUT:

```
SHIV ARORA
Enter a binary number: 1010111001
1271
PS D:\C Assignements\Run C Programs>
```

P40. Write a C program to convert Binary to Decimal number system.

```
#include <stdio.h>
#include <string.h>
void main() {
   printf("SHIV ARORA\n");
   char b[100];
   int decimal = 0;
   printf("Enter a binary number: ");
   scanf("%s", b);
   for (int i = 0; b[i] != '\0'; i++) {
      decimal = decimal * 2 + (b[i] - '0');
   }
   printf("%d\n", decimal);
}
```

OUTPUT:

```
SHIV ARORA
Enter a binary number: 100110001
305
PS D:\C Assignements\Run C Programs>
```

P41. Write a C program to convert Binary to Hexadecimal number system.

```
#include <stdio.h>
#include <string.h>
void main() {
   printf("SHIV ARORA\n");
   char b[100];
   int decimal = 0;
```

```
    printf("Enter a binary number: ");
    scanf("%s", b);
    for (int i = 0; b[i] != '\0'; i++) {
        decimal = decimal * 2 + (b[i] - '0');
    }
    printf("%X\n", decimal);
}
```

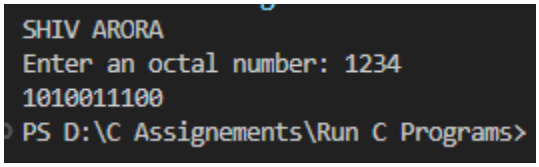
OUTPUT:

```
SHIV ARORA
Enter a binary number: 10011101011
4EB
PS D:\C Assignements\Run C Programs>
```

P42. Write a C program to convert Octal to Binary number system.

```
#include <stdio.h>
void main() {
    printf("SHIV ARORA\n");
    int oct, decimal = 0, b = 0, i = 1;
    printf("Enter an octal number: ");
    scanf("%d", &oct);
    while (oct != 0) {
        decimal += (oct % 10) * i;
        oct /= 10;
        i *= 8;
    }
    i = 1;
    while (decimal != 0) {
        b += (decimal % 2) * i;
        decimal /= 2;
        i *= 10;
    }
    printf("%d\n", b);
}
```

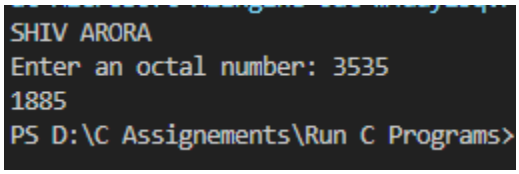
OUTPUT:



P43. Write a C program to convert Octal to Decimal number system.

```
#include <stdio.h>
void main() {
   printf("SHIV ARORA\n");
   int oct, decimal = 0, i = 0;
   printf("Enter an octal number: ");
   scanf("%d", &oct);
   while (oct != 0) {
      decimal += (oct % 10) * (1 << (3 * i));
      oct /= 10;
      i++;
   }
   printf("%d\n", decimal);
}
```

OUTPUT:



P44. Write a C program to convert Octal to Hexadecimal number system.

```
#include <stdio.h>
void main() {
   printf("SHIV ARORA\n");
   int oct, decimal = 0, hex = 0, i = 1;
   printf("Enter an octal number: ");
   scanf("%d", &oct);
```

```
    while (oct != 0) {
        decimal += (oct % 10) * i;
        oct /= 10;
        i *= 8;
    }
    i = 1;
    while (decimal != 0) {
        hex += (decimal % 16) * i;
        decimal /= 16;
        i *= 10;
    }
    printf("%d\n", hex);
}
```

OUTPUT:

```
SHIV ARORA
Enter an octal number: 4435
923
PS D:\C Assignements\Run C Programs>
```

P45. Write a C program to convert Decimal to Binary number system.

```
#include <stdio.h>
void main() {
    printf("SHIV ARORA\n");
    int decimal, b[32], i = 0;
    printf("Enter a decimal number: ");
    scanf("%d", &decimal);
    while (decimal > 0) {
        b[i++] = decimal % 2;
        decimal /= 2;
    }
    for (i = i - 1; i >= 0; i--) {
        printf("%d", b[i]);
    }
```

```
}
```

OUTPUT:

```
SHIV ARORA
Enter a decimal number: 6372
1100011100100
PS D:\C Assignements\Run C Programs>
```

P46. Write a C program to convert Decimal to Octal number system.

```
#include <stdio.h>
void main() {
   printf("SHIV ARORA\n");
    int decimal, oct = 0, i = 1;
   printf("Enter a decimal number: ");
   scanf("%d", &decimal);
   while (decimal > 0) {
      oct += (decimal % 8) * i;
      decimal /= 8;
      i *= 10;
   }
   printf("%d\n", oct);
}
```

OUTPUT:

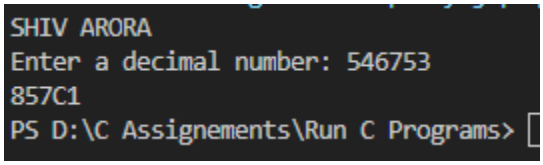
```
SHIV ARORA
Enter a decimal number: 54722
152702
PS D:\C Assignements\Run C Programs>
```

P47. Write a C program to convert Decimal to Hexadecimal number system.

```
#include <stdio.h>
void main() {
   printf("SHIV ARORA\n");
    int decimal;
   printf("Enter a decimal number: ");
   scanf("%d", &decimal);
```

```
    printf("%X\n", decimal);
}
```

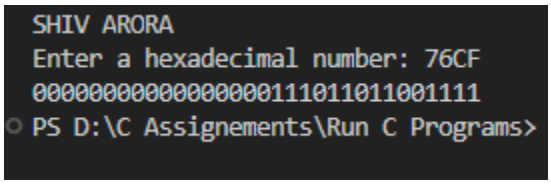
OUTPUT:



P48. Write a C program to convert Hexadecimal to Binary number system.

```
#include <stdio.h>
#include<stdlib.h>
void main() {
    printf("SHIV ARORA\n");
    char hex[100];
    int decimal;
    printf("Enter a hexadecimal number: ");
    scanf("%s", hex);
    decimal = strtol(hex, NULL, 16);
    for (int i = sizeof(decimal) * 8 - 1; i >= 0; i--) {
        printf("%d", (decimal >> i) & 1);
    }
}
```

OUTPUT:



P49. Write a C program to convert Hexadecimal to Octal number system.

```
#include <stdio.h>
#include<stdlib.h>
void main() {
    printf("SHIV ARORA\n");
    char hex[100];
```

```
    long decimal;
    printf("Enter a hexadecimal number: ");
    scanf("%s", hex);
    decimal = strtol(hex, NULL, 16);
    printf("%lo\n", decimal);
}
```

OUTPUT:

```
SHIV ARORA
Enter a hexadecimal number: 65AE
62656
PS D:\C Assignements\Run C Programs>
```

P50. Write a C program to convert Hexadecimal to Decimal number system.

```
#include <stdio.h>
#include<stdlib.h>
void main() {
    printf("SHIV ARORA\n");
    char hex[100];
    int decimal;
    printf("Enter a hexadecimal number: ");
    scanf("%s", hex);
    decimal = strtol(hex, NULL, 16);
    printf(" %d\n", decimal);
}
```

OUTPUT:

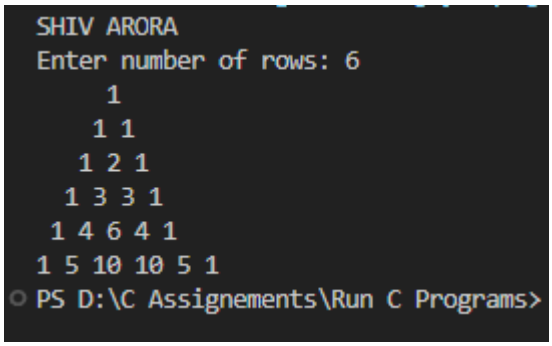
```
SHIV ARORA
Enter a hexadecimal number: 65DD
 26077
PS D:\C Assignements\Run C Programs>
```

P51. Write a C program to print Pascal triangle up to n rows.

```
#include <stdio.h>
void main() {
    printf("SHIV ARORA\n");
```

```
        int n, coef = 1;
        printf("Enter number of rows: ");
        scanf("%d", &n);
        for (int line = 0; line < n; line++) {
            for (int space = 0; space < n - line - 1; space++)
                printf(" ");
            coef = 1;
            for (int i = 0; i <= line; i++) {
                printf("%d ", coef);
                coef = coef * (line - i) / (i + 1);
            }
            printf("\n");
        }
    }
```

OUTPUT:



P52. Star pattern programs – Write a C program to print the given star patterns.

```
#include <stdio.h>
void pyramidPattern(int n) {
    for (int i = 0; i < n; i++) {
        for (int j = 0; j < n - i - 1; j++)
            printf(" ");
        for (int j = 0; j <= i; j++)
            printf("* ");
        printf("\n");
    }
```

```
}
void inverseRightTriangle(int n) {
    for (int i = n; i > 0; i--) {
        for (int j = 0; j < i; j++)
            printf("* ");
        printf("\n");
    }
}
void hollowInvertedPyramid(int n) {
    for (int i = n; i > 0; i--) {
        for (int j = 0; j < n - i; j++)
            printf(" ");
        for (int j = 0; j < (2 * i - 1); j++) {
            if (j == 0 || j == (2 * i - 2) || i == n)
                printf("*");
            else
                printf(" ");
        }
        printf("\n");
    }
}
void hollowPyramid(int n) {
    for (int i = 0; i < n; i++) {
        for (int j = 0; j < n - i - 1; j++)
            printf(" ");
        for (int j = 0; j <= i; j++) {
            if (j == 0 || j == i || i == n - 1)
                printf("* ");
            else
                printf("  ");
        }
        printf("\n");
```

```
    }
}
void diamondPattern(int n) {
    int i, k, count = n - 1;
    for (k = 1; k <= n; k++) {
        for (i = 1; i <= count; i++)
            printf(" ");
        count--;
        for (i = 1; i <= 2 * k - 1; i++)
            printf("*");
        printf("\n");
    }
    count = 1;
    for (k = 1; k <= n - 1; k++) {
        for (i = 1; i <= count; i++)
            printf(" ");
        count++;
        for (i = 1; i <= 2 * (n - k) - 1; i++)
            printf("*");
        printf("\n");
    }
}
void halfDiamondPattern(int n) {
    for (int i = 0; i <= n; i++) {
        for (int j = 0; j < i; j++)
            printf("* ");
        printf("\n");
    }
    for (int i = n - 1; i >= 0; i--) {
        for (int j = 0; j < i; j++)
            printf("* ");
        printf("\n");
```

```
    }
}
void main() {
    printf("SHIV ARORA\n");
    int n;
    printf("Enter number of rows: ");
    scanf("%d", &n);
    printf("Pyramid Pattern:\n");
    pyramidPattern(n);
    printf("Inverse Right Triangle:\n");
    inverseRightTriangle(n);
    printf("Hollow Inverted Pyramid:\n");
    hollowInvertedPyramid(n);
    printf("Hollow Pyramid:\n");
    hollowPyramid(n);
    printf("Diamond Star Pattern:\n");
    diamondPattern(n);
    printf("\nHalf Diamond Pattern:\n");
    halfDiamondPattern(n);
}
```

OUTPUT:

```
SHIV ARORA
Enter number of rows: 5
Pyramid Pattern:
    *
   * *
  * * *
 * * * *
* * * * *
Inverse Right Triangle:
* * * * *
* * * *
* * *
* *
*
Hollow Inverted Pyramid:
*********
 *     *
  *   *
   * *
    *
Hollow Pyramid:
    *
   * *
  *   *
 *     *
* * * * *
Diamond Star Pattern:
    *
   ***
  *****
 *******
*********
 *******
  *****
   ***
    *

Half Diamond Pattern:

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

P53. Number pattern programs – Write a C program to print the given number patterns.

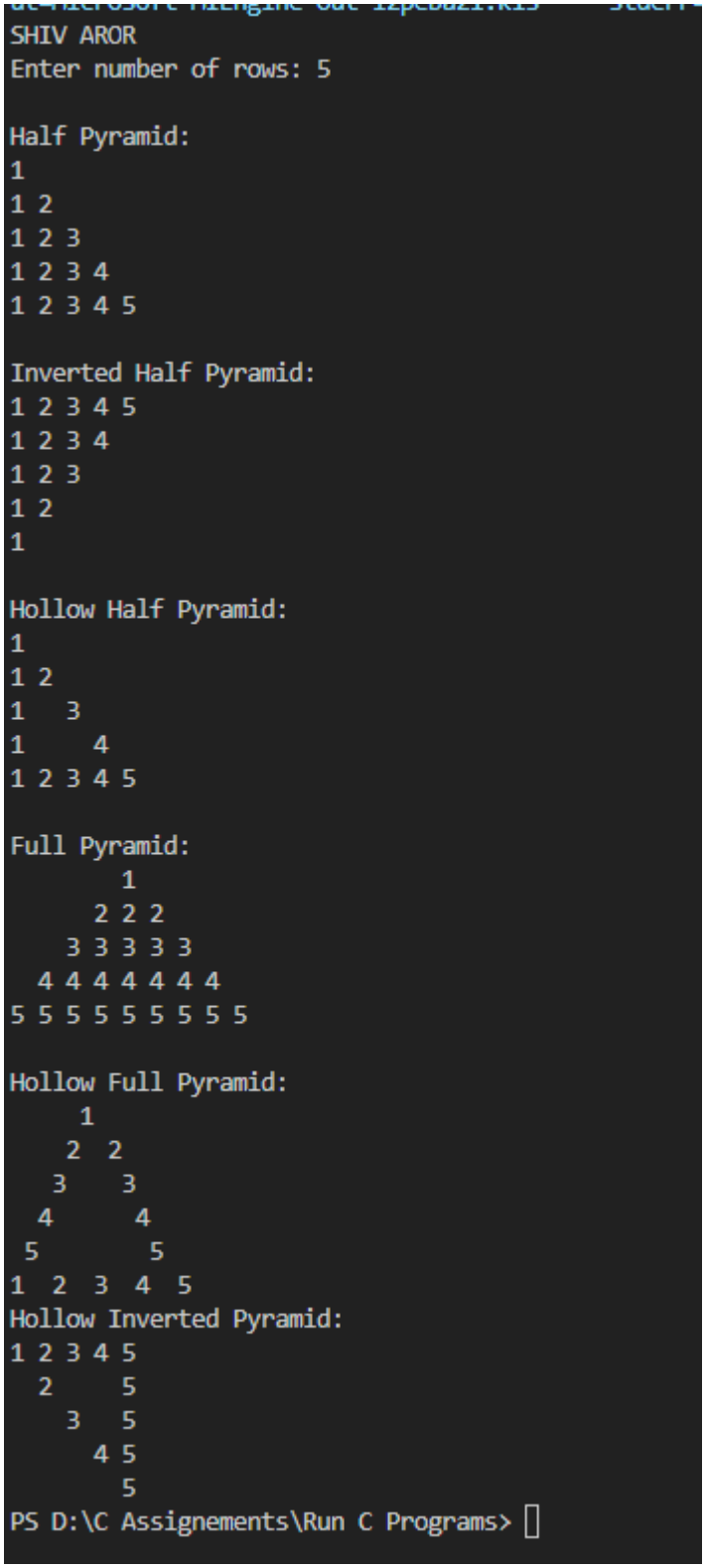
```
#include <stdio.h>
void halfPyramid(int rows) {
    for (int i = 1; i <= rows; ++i)  {
      for (int j = 1; j <= i; ++j)  {
         printf ("%d ", j);
      }
      printf ("\n");
   }
}
void invertedHalfPyramid(int n) {
   for (int i = n; i >= 1; i--) {
      for (int j = 1; j <= i; j++)
         printf("%d ", j);
      printf("\n");
   }
}
void hollowHalfPyramid(int n) {
   for (int i = 1; i <= n; i++) {
      for (int j = 1; j <= i; j++) {
         if (j == 1 || j == i || i == n)
            printf("%d ", j);
         else
            printf("  ");
      }
      printf("\n");
   }
}
void fullPyramid(int rows) {
   for (int i =1; i <= rows; i++) {
      for (int j = 1; j <= rows - i; j++) {
```

```
            printf ("  ");
        }
        for (int k = 1; k <= ( 2 * i - 1); k++){
            printf ("%d ",i);
        }
        printf ("\n");
    }
}
void hollowFullPyramid(int n) {
    for (int i = 1; i <= n; i++) {
        for (int j = i; j < n; j++)
            printf(" ");
        for (int j = 1; j <= (2 * i - 1); j++) {
            if (j == 1 || j == (2 * i - 1))
                printf(" %d", i);
            else
                printf(" ");
        }
        printf("\n");
    }
    for (int i = 1; i <= n; i++)
        printf("%d  ", i);
}
void hollowInvertedPyramid(int n) {
   for (int i = 1; i <= n; i++) {
        for (int j = 1; j <= n; j++) {
            if (i == 1) {
                printf("%d ", j);
            } else if (j == i || j == n) {
                printf("%d ", j);
            } else {
                printf("  ");
```

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

int main() {
    printf("SHIV AROR\n");
    int n;
    printf("Enter number of rows: ");
    scanf("%d", &n);
    printf("\nHalf Pyramid:\n");
    halfPyramid(n);
    printf("\nInverted Half Pyramid:\n");
    invertedHalfPyramid(n);
    printf("\nHollow Half Pyramid:\n");
    hollowHalfPyramid(n);
    printf("\nFull Pyramid:\n");
    fullPyramid(n);
    printf("\nHollow Full Pyramid:\n");
    hollowFullPyramid(n);
    printf("\nHollow Inverted Pyramid:\n");
    hollowInvertedPyramid(n);
}
```

OUTPUT:


SHIV AROR
Enter number of rows: 5
Half Pyramid:
1
1 2
1 2 3
1 2 3 4
1 2 3 4 5
Inverted Half Pyramid:
1 2 3 4 5
1 2 3 4
1 2 3
1 2
1
Hollow Half Pyramid:
1
1 2
1 3
1 4
1 2 3 4 5
Full Pyramid:
1
2 2 2
3 3 3 3 3
4 4 4 4 4 4 4
5 5 5 5 5 5 5 5 5
Hollow Full Pyramid:
1
2 2
3 3
4 4
5 5
1 2 3 4 5
Hollow Inverted Pyramid:
1 2 3 4 5
2 5
3 5
4 5
5
PS D:\C Assignements\Run C Programs>