# LAB 5

1. Write a C program that accepts a positive integer n less than 50 from the terminal and prints out the sum $1^4 + 2^4 + 4^4 + 7^4 + 11^4 + \cdots + m^4$, where m is less than or equal to n. If the input is outside the range, the program terminates with appropriate message.
2. Write a program which calculates $^nc_r$ .
3. Write a program to find next prime palindrome. A user will enter a number 'n' and we have to find a number greater than 'n' which is a prime as well as palindrome. For example, if input is 7 than next number is 11, which is prime as well as palindrome.
4. Write a C program to find HCF and LCM of two numbers.
5. Write a C program that accepts a non-negative integer from the keyboard and checks whether the entered number is a Armstrong number. (An n-digit number that is the sum of the n-th powers of its digits is called an Armstrong number)
   Test data and expected output:
   Enter a non-negative integer:-2 Input must be non-negative integer
   Enter a non-negative integer:9 9 is an Armstrong number
   Enter a non-negative integer:1634 1634 is an Armstrong number
   Enter a non-negative integer:1636 1636 is NOT an Armstrong number

6.   A perfect number is a positive number in which sum of all positive divisors excluding that number is equal to that number. Write a C program that accepts a positive integer from the keyboard and checks whether the entered number is a perfect number.

   Test data and expected output:
   Enter a positive integer:-2
   Input must be positive
   Enter a positive integer:8128
   8128 is a perfect number
   Enter a positive integer:28
    28 is a perfect number
   Enter a positive integer:64
   64 is NOT a perfect number

7.   Write a C program that prints out the prime numbers between 1 and 100. The output should be such that each row contains a maximum of 7 prime numbers.
   Expected output:
   The prime numbers between 1 and 100 are:
   2   3   5  7  11  13  17
   19  23  29 31 37   41  43

47 53 59 61 67  71  73
79  83  89 97

8.  Write a C program that reads a real number x from the keyboard and calculates the sum of the exponential by adding terms as long as $|t_n| > 10^{-8}$. Also, print out the value from the C math library function exp(x).
    Test data and expected output:
    Enter the value of x:1.5
     Sum of the series at 1.50 is 4.48169e+00
    Value from C math library=4.48169e+00
    Enter the value of x:-20
    Sum of the series at -20.00 is 2.06115e-09
     Value from C math library=2.06115e-09

9.  Write a C program to print the following pyramid patterns

| | | | | |
|---|---|---|---|---|
| ```       *      * *     *  *  *    *  *   *  *  *  *   *  *  * ``` | ```      *     * * *    * * * * *     * * *        *    ``` | ```   1    2 2    3 3 3   4 4 4 4   5 5 5 5 5 ``` | ```   1    2   3    4   5   6   7  8   9   10  11 12 13  14 15 ``` | ```    A    B C    D E F    G H I J   K L M N O ``` |

10. Write a C program to print following patterns

```
ABCDEDCBA              **********
 BCDEDCB               ****    ****
  CDEDC                ***        ***
   DED                 **          **
    E                  *            *
```