

## Week 0.

1. Write a C program that evaluate the following expressions. Assume suitable values for various variables and print the left hand side variable.
  - a)  $D=ut+1/2 ut^2$
  - b)  $B=a*e^{-kt}$
  - c)  $P=RT/v$
  - d)  $Val=ax^2+bx+c$
  - e)  $F=(ax+b)/(ax-b)$
2. Write a C program to read marks of three subjects calculate the sum and print the grade that falls in according to the range of the average given below.

Grade	Range
Grade E	00-35
Grade D	36-50
Grade C	51-60
Grade B	61-75
Grade A	above 75

3. A worker is paid weekly wages at the hourly at the rate of Rs.8 per hour for the first 40 hours worked. Overtime is paid 1.5 times the hourly rate for the next 25 hours worked and two times hourly rate for all other hours worked. Write a program to input the number of hours worked per week , calculate and display the hours worked and weekly wages.

Note: weekly hours : ( $40 \leq \text{hrs} \leq 96$ )

4. Write a C program to find the roots of an algebraic equation and state them ( as real equal or real unequal or imaginary).
5. Write a C program that reads three float values and prints whether they could represent the sides of a triangle.
6. Write a C program to read a character (digits or lower case alphabets) and convert it into upper case letter.

## Week1

1)Acompany wants to prepare a pay bill for its employees. And the calculations are as follows.

Earnings:-Basic is given

DA is 30% of basic

HRA is 15% of basic

Conveyance is 0 if basic <5000  
is 750 if  $5000 \leq \text{basic} < 10000$   
is 1500 if  $\text{basic} \geq 10000$

CCA is Rs 240

Deductions:- Professional tax is Rs 200

Provident fund is 10% of Basic

Tax is 0 if basic <5000  
20% of basic If  $5000 \leq \text{basic} < 10000$   
30% of basic if  $\text{basic} \geq 10000$

Net Salary =Earnings- deductions;

Read the employee number , Basic

Print employee Number, Earnings,Deductions and Net salary.

2) A electric company prepares bill of electricity consumption for its customers.the details are as follows.

Consumption	Rate
0-50 units	Rs 1.00 per unit
51- 100 units	Rs 50 + Rs 2.00 perunit for the units above 50
101-200 units	Rs 150 + Rs 3.00 per unit for the units above 100
201 and above	Rs 450 + Rs 5.00 per unit for above 200 units.

There is a Meter rental of Rs 200 for consumer .  
 Read the consumer number , previous meter reading , present meter reading, month.  
 Print the electricity bill giving consumer number, total consumption, electric charges

3) A company wants to evaluate its canteen performance from 40 employees .  
 Each employee gives a grading between 1 to 5.  
 Find the frequency distribution of grades given by the employees.

4) Given the month name , year and start day of the month . print the calendar as follows.  
 Ex:- suppose the data is january 2008 the start day is 2 the output is as follows.  
 Calendar for the month of-----(jan 2008)

Sun	mon	tue	wed	thu	fri	sat
*	*	1	2	3	4	5
6	7	8	9	10	11	12

## Week2

1. Write a C program to find the sum of individual digits of a positive integer.
2. A Fibonacci Sequence is defined as follows: the first and second terms in the sequence are 0 and 1.subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
3. Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

### Additional Exercises:

1. Write a C program to reverse of a given number.  
 Ex: 432->234
2. Write a C program to generate all the twin primes between 1 and n ,where n is supplied by the user: (the difference between two successive primes is 2 they are called a twin primes.)  
 Ex:5,7 i.e. 7-5=2
3. Write a C program to convert time in seconds into hours, minutes and seconds.
4. Write a C program to add 'n'(0≤n≤60)seconds to a given time in hrs:mts:sec and print the resultant time for a given 'n'.

### Week3.

1. Write a C program to calculate the following sum:  
Sum= $1-x^2/2!+x^4/4!-x^6/6!+x^8/8!-x^{10}/10!$
2. Write a C program to find the roots of a quadratic equation.

#### Additional Exercises:

1. Write a C program to calculate the following sum:
  - a) sum= $1+x+x^2/1^2+\dots+x^n/n^2$  for given x and n
  - b) sum= $x-x^3/1^3+\dots+(-1)^{n+1} \cdot x^{2n+1}/(2n+1)!$
  - c) sum=  $1!+2!+3!+\dots+n!$
  - d) sum= $1+1/2+1/3+1/4+\dots+1/n$
  - e) sum= $1+1/2!+1/3!+1/4!+\dots+1/n!$

### Week4.

1. Write a C programs that use both recursive and non-recursive functions:
  - i) To find the factorial of a given integer.
  - ii) To find the GCD( greatest common divisor) of two given integers.
  - iii) To solve Towers of Hanoi problem.

#### Additional Exercises:

1. Write a C program that reads an integer value of n and then adds the integers from n to 2n if n is non-negative or 2n to n if n is negative.
2. Write a C program to print the Fibonacci series using recursive function .
3. Write a C iterative and recursive program to calculate 'x power y'(don't use pow() function ) where x, y are integers.
4. Write a C recursive program for multiplication of two integers a and b.

### Week5.

1. The total distance traveled by vehicle in 't' seconds is given by distance =  $ut+1/2at^2$  where 'u' and 'a' are the initial velocity(m/sec.) and acceleration(m/sec<sup>2</sup>). Write a C program to find the distance traveled at regular intervals of time given the values of 'u' and 'a' .The program should provide the flexibility to the user to select his own time intervals and repeat the calculations for different values of 'u' and 'a'.
2. Write a C program, which take two integer operands and one operator from the user, perform the operation and then prints the result.( consider the operators +,-,\*,/,% and use switch Statement).

#### Additional Exercises:

1. Write a C program to read a number and print it in words.  
Ex: 123→ one two three.
2. Write a C program to read a positive integer number and print it as:  
EX 123→ one hundred and twenty three

3. Write a C program to check whether the given number is AMICABLE or not.  
Ex:  $3025=30+25=55$ ;  $55 \times 55=3025$
4. Write a C program to print the following.

- a)
 

```

1
1 2
1 2 3
1 2 3 4
      
```
- b)
 

```

1
2 3
4 5 6
7 8 9 10
      
```
- c)
 

```

1 2 3 4
1 2 3
1 2
1
      
```
- d)
 

```

A
A B
A B C
A B C D
      
```
- e)
 

```

1 2 3 4 5 4 3 2 1
1 2 3 4 4 3 2 1
1 2 3 3 2 1
1 2 2 1
1 1
      
```
- f)
 

```

A
B C
D E F
G H I J
      
```

### Week6.

1. Write a C program to find both the largest and smallest number in a list of integers.
2. Write a C program that uses functions perform the following:
  - a) Addition of two Matrices
  - b) Multiplication of two matrices

### Additional Exercises:

1. Write a C program to calculate the mean and standard deviation of given an array of n numbers.
2. Write a C program to determine whether a given item 'x' is present in a given list of items, if so identify all occurrences of 'x' in the list.
3. Write a C program to check whether a given matrix is symmetric.
4. Write a C program to find
  - a) row sum
  - b) column sum
 for a given mxn matrix.

## Week7.

1. Write a C program that uses functions to perform the following operations
  - a) To insert a sub-string in to given main string from a given position.
  - b) To delete n characters from a given position in a given string.
2. Write a C program to determine if the given string is a palindrome or not?

### Additional Exercises:

1. Write a C program to read characters from the keyboard until new line is encountered and print the number of
  - (i) vowels
  - (ii) consonants
  - (iii) uppercase letters
  - (iv) lowercase letters
2. Write a C program that uses a function to accept three strings (EX A, B C) if A occurs in C not only its position is returned but the first occurrence of A is replaced by B.  
EX: A=cat B=dog C= concatenate=condogenate
3. Create a table of strings comprising of capitals of state and given s state name find whether it exists or not?

## Week8.

1. Write a C program that display the position or index in the string S where the string T begins, or -1 if S doesn't contain T.
2. Write a C program to count the lines, words and characters in a given text.

### Additional Exercises:

1. Write a C program to delete the vowels from a word.
2. Write a C program to sort an array of given names in dictionary order.
3. Write a C program to input a line of characters from the terminal and remove all blanks and punctuation.
4. Write a C program to read a sentence (a line of text). Find the following list of individual words and their associated count where the reading of the text is completed.  
□ a □ as □ is □ are □ the  
Display the words and its count in a neat format. In addition remove that words from the line and display a new line.

## Week9.

1. Write a C program to generate Pascal's triangle.
2. Write a C program to construct a pyramid of numbers.

## Week10.

1. Write a C program to read two numbers x and n and then compare the sum of this Geometric progression.  $1+x+x^2+x^3+\dots+x^n$   
For Example if n is 3 and x is 5 then the program computes  $1+5+25+125$   
print the x, n, the sum  
Perform error checking. For Example, then formula does not sense for negative exponents—if n is less than 0. Have your program print an error message if  $n < 0$ , then go back and read in the next pair of number of without computing the sum. are any values of x also illegal? If so test for them too.

**Additional Exercises:**

1. Write a C program that will read 10 integers through keyboard and places them in an array, the program will sort the array into ascending and descending order and print the sorted order. The program should not change the original array or create any other integer array.

**Week11.**

1. 2's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2's complement of 11100 is 00100. Write a C program.
2. Write a C program to convert a Roman numeral to its decimal equivalent.

**Week 12.**

1. Write a C program that uses functions to perform the following operations:
  - i) Reading a complex number
  - ii) Writing a complex number
  - iii) Addition of two complex numbers
  - iv) Multiplication of two complex number.(note: represent complex numbers using a structure.)

**Additional Exercises:**

1. Write a C program to read different sets of name, date of birth and address and rearrange the name in alphabetical order and write the list.
2. Define a structure called Cricket that contains the following information.
  - a)player name b)team name c) Bating averageUsing Cricket declare an array players with 10 elements and Write a C program to read the information about all the 10 players. Print team wise list containing names of players with their bating average.

**Week 13.**

1. Write a C program which copies on file to another.
2. Write a C program to reverse the first n characters in a file (Note: the file name and n are specified on the command line).

**Additional Exercises:**

1. Write a C program to create a file with the fields Empno, ename, designation, department and basic pay. Access this file to find the number of Employees whose basic pay is 10000.
2. Write a C program to read a text terminated by '\n' and write into the file. And also read the created file and display on the monitor.

**Week 14.**

1. Write a C program that uses functions to perform the following operations on singly linked list:
  - i) Creation ii) Insertion iii) Deletion iv) Traversal

**Week 15.**

1. Write a C program that uses functions to perform the following operations on doubly linked list:
  - i) Creation ii) Insertion iii) Deletion iv) Traversal in both ways.

**Week 16.**

1. Write a C program that implement stack(its operations) using.
  - i) Arrays ii) Pointers

**Week 17.**

1. Write a C program that implement Queue(its operations) using.
  - i) Arrays ii) Pointers.

**Week 18.**

1. Write a C program uses stack operation to perform the following:
  - i) converting infix expression into postfix expression.
  - ii) Evaluating the postfix expression.

**Week 19.**

1. Write a C program that uses functions to perform the following :
  - i) Creating Binary Tree of integers.
  - ii) Traversing the binary tree in preorder, in order and post order.

**Week 20.**

1. Write a C program that uses both recursive functions to perform the following searching operations for a key value list of integers:
  - i) Linear search ii) Binary search

**Week 21.**

1. Write a C program that implement the following sort a list of integers in ascending Order:
  - i) Bubble sort ii) Quick sort

**Week 22.**

1. Write a C program that implement the following sort a list of integers in ascending Order:
  - i) Insertion sort ii) Merge sort

**Week 23.**

1. Write C programs to implement the Lagrange interpolation and Newton-Gregory forward interpolation.

**Week 24.**

1. Write C programs to implement the Linear regression and polynomial regression algorithms.

**Week 25.**

1. Write C programs to implement Trapezoidal and Simpson methods.