1. Program to calculate square of numbers whose least significant digit is 5.
2. Program to calculate Arithmetic Operations depending on operator.
3. Program to print sum of series 1 + x2/2! - x3/3!+....
4. Display Pascal's Triangle.
5. Take an array of 10 integers and accept values into it. Sort the array in descending order.
6. Program to solve multiplication of 2 matrices
7. Program to check whether given string is palindrome or not
8. Program to accept a string and display string in uppercase.
9. Program to accept a string and display it in reverse.
10. Program to Copy one string to another string
11. Common Elements In Two Arrays
12. Diagonal-Difference
13. Even Fibonacci numbers
14. kth smallest no in an array
15. nCr Calculator.

16. Given a number = $d_5\ d_4\ d_3\ d_2\ d_1$ find $\sum i\ d_i \bmod 11$ where i varies from 1 to 5.

17. A program to find the roots of a quadratic equation will now be developed. Given a quadratic equation

$$ax^2 + bx + c = 0$$

the roots are given by the formula

$$x = \{ -b \pm (b^2 - 4ac)^{1/2} \}/(2a)$$

18. Given a point (x, y) write a program to find out if it lies on the x-axis, y-axis or at the origin, namely, (0, 0).

Extend the program [redacted] to find whether it lies in the first, second, third or fourth quadrant in x - y plane.

Given a point (x, y) write a program to find out whether it lies inside, outside or on a circle with unit radius and centre at (0, 0).

19. Given three points (x_1, y_1), (x_2, y_2) and (x_3, y_3) write a program to find out whether they are collinear.

Assume that the following series is to be summed:

20. $$\text{Sum} = x - x^3/3! + x^5/5! - x^7/7! + \ldots (-1)^{n-1}\, x^{2n-1}/(2n-1)!$$

Given values for a, b, c and d and a set of values for the variable x, evaluate the function defined by

21.
$$f(x) = ax^2 + bx + c \quad \text{if } x < d$$
$$f(x) = 0 \quad \text{if } x = d$$
$$f(x) = -ax^2 + bx - c \quad \text{if } x > d$$

22.

		Watt					Watt				
		15	25	40	60	100	15	25	40	60	100
		0	1	2	3	4	0	1	2	3	4
Brand											
GEC	0	20	15	0	25	60	5.5	6.0	4.5	5.0	6.0
Philips	1	0	22	34	62	0	6.0	7.0	7.5	8.0	8.5
Crompton	2	10	0	25	14	18	5.5	5.0	6.0	6.5	7.0
Surya	3	28	32	0	48	60	6.5	6.0	7.0	7.5	8.0
Mysore	4	43	25	25	34	68	5.0	7.5	8.0	7.5	8.0
Bajaj	5	22	30	41	0	25	6.0	5.0	5.5	6.5	7.5
		stock					cost				

1. Print out the brand and wattage codes for items out of stock, and
2. Calculate and print the total cost of bulbs in the inventory.

The offshore gas company bills its customers according to the following rate schedule:

First	50 cmeters	Rs. 40 (flat rate)
Next	300 cmeters	Rs. 1.25 per 10 cmeters
Next	3000 cmeters	Rs. 1.20 per 10 cmeters
Next	2500 cmeters	Rs. 1.10 per 10 cmeters
Next	2500 cmeters	Re. 0.90 per 10 cmeters

Above this Re. 0.80 per 10 cmeters

Given an input for each customer in the format:
Customer number, Previous meter reading, New meter reading.
Write a program to output the following:
Customer number, Previous reading, New reading, Gas used, Total bill.

23.

24. Write a C function to evaluate the series

$$f(x) = 1 + \frac{x^2}{2!} - \frac{x^4}{4!} + \frac{x^6}{6!} - \frac{x^8}{8!} + \frac{x^{10}}{10!} - \frac{x^{12}}{12!}$$

Write C function to evaluate the series

$$\sin(x) = x - \frac{x^3}{3!} + \frac{x^5}{5!} \cdots$$

25. Write a function to multiply a square-matrix by a vector. Assume a $n \times n$ matrix and a n component vector. The call would give the size of the matrix and the names of the matrix and a vector.

26. Write a function to sort a set on n numbers in ascending order of magnitude. How would this routine be called?

27. Write a program which takes a set of names of individuals and abbreviates the first, middle and other names except the last name by their first letter. For example: RAMA RAO would become R. RAO. SURESH KUMAR SHARMA would become S.K. SHARMA.

28. Write a program to convert decimal numbers to hexadecimal. For example the hexadecimal equivalent of 43919 is AB8F.

29. Write a program to arrange a set of names in alphabetic order. The sorting is to be on the first two characters of the last name. For example, given the list:

Ramaswamy R.
Arumugam B.
Agarwal K.
Sarma A.B.
Bagchi D.R.

the sorted list should be

Agarwal K.
Arumugam B.
Bagchi D.R.
Ramaswamy R.
Sarma A.B.

30. Create a structure to specify data on students given below:

Roll no., Name, Department, Course, Year of joining

A typical student's data will be

1456 S. Raghavan C.S. B.E. 1991

Assume that there are not more than 500 students in the college.

(i) Write a function to print names of all students who joined in a particular year.

(ii) Write a function to print the data on a student whose roll number is given.

31. Create a structure to store employee's data with the following information:

Employee's no., Employee's name, Employee's pay, date of joining (which is itself a structure)

(i) It is decided to increase the pay as per the following rules:

Pay <= Rs. 2000	: 15 % increase
Pay <= Rs. 5000 but > Rs. 2000	: 10 % increase
Pay > Rs. 5000	: no increase

Write a program to do this. (Assume there are 200 employees.)

(ii) Write a program to print details of employees who have completed 20 years service.

32. Given an array p of size 5. Write a function to shift it circularly left by two positions. Thus p[0] = 5, p[1] = 3, p[2] = 8, p[3] = 9, p[4] = 6 then after the shift p[0] = 8, p[1] = 9, p[2] = 6, p[3] = 5 and p[4] = 3. Call this function with a (3×5) matrix and get its rows left shifted.

33. Write routines to do the following in a linear sequential list:

(i) Append an element to the tail of the list.

(ii) Concatenate two lists.

(iii) Reverse a list so that the last element becomes the first and vice versa.

(iv) Insert a node as the n^{th} node of the list.

(v) Copy a list into another.

(vi) Count the number of nodes in a list.

(vii) Delete all even nodes in the list.

(viii) Interchange the n^{th} and k^{th} nodes of a list.

below:

Let Committee *(n, k)* be the number of committees of *k* persons which can be formed from among *n* persons. For example Committee (4, 3) = 4. Given four persons X, Y, Z, W there are 4 committees which can be formed with three persons, the committees being XYZ, XYW, YZW, XZW. Show that

Committee (*n, k*) = Committee (*n* − 1, *k*) + Committee (*n* − 1, *k* − 1); (n, k > 0)
Committee (1, 1) = 1, Committee (2, 1) = 2.

Write a recursive C program to compute

34. Committee *(n, k)* for *n, k* >= 1.

A bank gives account numbers in serial order starting with serial number 1. The structure of a customer record is:

Account No. 4 digits
Balance in acct : XXXXX.XX (Rs & ps)
Account active or closed : 1 digit (1 for active 0 for closed)

We will write a program to

1. Store customer records in a file.

2. Retrieve the record of a customer with a specified account number and display it. Update it (if required) and store it back in file.

3. Append a new customer record to the file.

35.