CHAPTER 1 (Getting Started)

1. Ramesh's basic salary is input through the keyboard. His dearness allowance is 40% of basic salary, and house rent allowance is 20% of basic salary. Write a program to calculate his gross salary.
   Hint: Gross Salary = Basic Salary + DA + HRA

2. The distance in kilometers between two cities is input through the keyboard. Write a program to convert and print distance in meters, feet, inches and centimeters.
   Hint: 1 Km = 3280.84 ft

3. If the marks obtained by a student in three different subjects are input through the keyboard, find out the aggregate marks and percentage marks obtained by the student. Assume that, maximum marks that can be obtained by a student in each subject is 100.
   Hint: Use subjects as Hindi, English and Mathematics

4. Temperature of a city in Fahrenheit degrees is input through the keyboard. Write a program to convert this temperature into Centigrade degrees.
   Hint: Centigrade = (Fahrenheit – 32) *5/9

5. The length & breadth of a rectangle and radius of a circle are input through the keyboard. Write a program to calculate the area & perimeter of the rectangle, and the area & circumference of the circle.

6. Two numbers are input through the keyboard into two locations num1 and num2. Write a program to interchange the contents of num1 and num2.

7. If a five-digit number is input through the keyboard, write a program to calculate the sum of its digits.
   Test Case: Num = 12341 Sum = 11

8. If a five-digit number is input through the keyboard, write a program to reverse the number.
   Test Case: Num = 12341 Reverse = 14321

9. If a four-digit number is input through the keyboard, write a program to obtain the sum of the first and last digit of this number.

10. A cashier has currency notes of denominations 10, 50 and 100. If the amount to be withdrawn is input through the keyboard, find the total number of currency notes of each denomination the cashier will have to give to the withdrawer.
    Test Case: Amount = Rs 570 Hundred_Note = 5 Fifity_Note = 1 Ten_Note = 2

CHAPTER 2 (The Decision Control Structure)

11. Find the absolute value of a number entered through the keyboard.
    Hint: Absolute value of any negative number id is positive value for example absolute(-5) = 5 and absolute(5) =5.

12. If cost price and selling price of an item is input through the keyboard, write a program to determine whether the seller has made profit or incurred loss. Also determine how much profit he made or loss he incurred.

13. Any integer is input through the keyboard. Write a program to find out whether it is an odd number or even number.

14. Three angles of the triangle are entered through the keyboard, write a program to check whether a triangle is valid or not. A triangle is valid if the sum of all the three angles is equal to 180 degrees.

15. A four-digit number is entered through the keyboard. Write a program to obtain the reversed number and to determine whether the original and reversed numbers are equal or not. Such a number is also called palindrome number for example Reverse of 1221 is 1221.

16. If the ages of Ram, Shyam and Ajay are input through the keyboard, write a program to determine the youngest of the three.

17. Any year is input through the keyboard. Write a program to determine whether the year is a leap year or not.

18. Any character is entered through the keyboard, write a program to determine whether the character entered is a capital letter, a small case letter, a digit or a special symbol.
    The following table shows the range of ASCII values for various characters.

Characters	ASCII Values
A – Z	65 – 90
a –z	97 – 122
0 – 9	48 – 57
Special symbols	0 – 47, 58 – 64, 91 – 96, 123 - 127

19. Any year is entered through the keyboard, write a program to determine whether the year is leap or not. Use the logical operators && and || operator.

20. Write a program which reads a character from keyboard and reports whether it is a vowel, consonant or any other non-alphabet. Use the logical operators && and || operator.

21. A library charges per day fine for every book returned late. For first 5 days the fine is 50 paise per day, for 6-10 days fine is one rupee per day and above 10 days and till 30 days fine is 5 rupees per day. If you return the book after 30 days your membership will be cancelled. Write a program to accept the number of days the member is late to return the book and display the fine or appropriate message.
    Hint : late_days = 4 fine = Rs 2
    late_days = 7 fine = Rs 4.50
    late_days = 12 fine = Rs 17.50

22. If the three sides of a triangle are entered through the keyboard, write a program to check whether the triangle is isosceles, equilateral, scalene or right angled triangle.
    Isosceles **:** Has two sides equal and third is different.
    Equilateral **:** Has all three sides equal.
    Scalene **:** None of the tree sides are equal.
    Right Angled **:** Pythagoras theorem ($H^2 = B^2 + P^2$) is true.

23. In a company, worker efficiency is determined on the basis of the time required for a worker to complete a particular job. If the time taken by the worker is between 2-10 hours, then the worker is said to be highly efficient. If the time required by the worker is between 10-20 hours, then the worker ordered to improve speed. If the time taken is between 20-30 hours, the worker is given training to improve his speed, and if the time taken by the worker is more than 30 hours, then the worker has to leave the company. If the time taken by the worker is input through the keyboard, write a program to print the efficiency of the worker.

CHAPTER 3 (The Loop Control Structure)

24. Write a program to calculate overtime pay of 3 employees. Overtime is paid at the rate of Rs. 12.00 per hour for every hour worked above 40 hours. Assume that employees do not work for fractional part of an hour.

25. Write a program to print all the ASCII values and their equivalent characters using a while loop. The ASCII values vary from 0 to 255.

26. Write a program to find the factorial value of any number entered through the keyboard.

27. Write a program to reverse a number using while loop.

28. Write a program to find is a given number is palindrome or not.

29. Two numbers are entered through the keyboard. Write a program to find the value of one number raised to the power of another.

30. Write a program to find if the entered 3 digit number is Armstrong or not. Armstrong number is a number in which sum of cube of digits is equal to number, Ex: 153 = (1 * 1 * 1) + (5 * 5 * 5) + (3 * 3 * 3)

31. Write a program to print out all Armstrong numbers between 100 and entered number(Only 3 digit number to be input). For example if entered number is 500 then the program should find all Armstrong numbers between 1 and 500.

32. Write a program to find if the entered number is prime or not.

33. Write a program to print all prime numbers from 2 the number entered by user. For example if entered number is 100 then the program should find all prime numbers between 1 and 100.

34. Write a program to print first N prime numbers. For example if entered number is 5 then the program should print first 5 prime numbers as 2, 3, 5, 7, 11.

35. Write a program to convert decimal number to its binary equivalent.

36. Write a program to convert decimal number to its octal equivalent.

37. Write a program to enter the numbers till the user wants and at the end it should display the count of positive, negative and zero's entered. Use do-while loop.

38. Write a program to find the range of a set of numbers entered by user. Range is the difference between the smallest and largest number in the list. The user should be able to enter multiple numbers as per choice. Use do-while loop.

39. Write a c program to find out prime factor of given number. For example prime factors of 12 = 2 x 2 x 3

40. Write a program to generate all combinations of 1, 2 and 3 using for loop.

41. Write a program to print Fibonacci series till any entered number. For example the number entered id 50 then the series should be 0, 1, 1, 2, 3, 5, 8, 13, 21, 34, if the entered number is 200 then the series should be 0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144.

42. Write a program to print first N terms of Fibonacci series. For example the number entered id 7 then the series should be 0, 1, 1, 2, 3, 5, 8, if the entered number is 12 then the series should be 0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89.

43. Write a program to print the multiplication table of the number entered by the user. For example if the entered number is 29 The table should get displayed in the following from: Use formatted printf() function.

29 * 1 = 29
29 * 2 = 58
.
.
29 * 10 = 290

44. Write a program to enter the size of pattern and produce the following pattern for example if entered size is 5.

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

45. Write a program to enter the size of pattern and produce the following pattern for example if entered size is 5.

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

46. Write a program to enter the size of pattern and produce the following pattern for example if entered size is 5.

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

47. Write a program to enter the size of pattern and produce the following pattern for example if entered size is 5.

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

48. Write a program to enter the size of pattern and produce the following pattern for example if entered size is 5.

```
1
1 2 1
1 2 3 2 1
1 2 3 4 3 2 1
```

49. Write a program to enter the size of pattern and produce the following pattern for example if entered size is 5.

```
1
2 1
1 2 3
4 3 2 1
1 2 3 4 5
```

50. Write a program to enter the size of pattern and produce the following pattern for example if entered size is 5.

```
        1
      2 3 2
    3 4 5 4 3
  4 5 6 7 6 5 4
5 6 7 8 9 8 7 6 5
```

51. Write a program to enter the size of pattern and produce the following pattern for example if entered size is 5.

```
1
0 1
1 0 1
0 1 0 1
1 0 1 0 1
```

52. Write a program to enter the size of pattern and produce the following pattern using only two for loops for example if entered size is 5.

```
* * * * 1
* * * 1 2
* * 1 2 3
* 1 2 3 4
1 2 3 4 5
```

53. Write a program to draw a Fibonacci triangle as below for example if entered size is 7 it should produce following output.

```
0 1
0 1 1
0 1 1 2
0 1 1 2 3
0 1 1 2 3 5
0 1 1 2 3 5 8
0 1 1 2 3 5 8 13
```

54. Write a C program to display the following rhombus symbol structure, for example if entered size is 4 it should produce following output.

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

55. Write a C program to display the following number rhombus structure, for example if entered size is 4 it should produce following output.

```
   1
  212
 32123
4321234
 32123
  212
   1
```

56. Write a C program to display the following number rhombus structure, for example if entered size is 4 it should produce following output.

```
   1
  121
 12321
1234321
 12321
  121
   1
```

57. Write a C program to display the following character rhombus structure, for example if entered size is 4 it should produce following output.

```
    A
   ABA
  ABCBA
 ABCDCBA
  ABCBA
   ABA
    A
```

58. Write a program to produce the following output:

```
                1
            2       3
        4       5       6
    7       8       9       10
```

59. Write a program to produce the following output:

```
                1
            1       1
        1       2       1
    1       3       3       1
1       4       6       4       1
```

Chapter4: (The Case Control Structure)

60. Write a menu driven Program which has following options:
    1. Factorial of a number.
    2. Prime or not.
    3. Odd or even
    4. Exit

    Once a menu item is selected the appropriate action should be taken and once this action is finished, the menu should reappear. Unless the user selects the 'Exit' option the program should continue to work.

    Hint: Make use of an infinite while and a switch statement.

61. Write a program to find the grace marks for a student using switch. The user should enter the class obtained by the student and the number of subjects he has failed in. Use the following logic:

    - If the student gets first class and the number of subjects he failed in is greater than 3, then he does not get any grace. If the number of subjects he failed in is less than or equal to 3, then the grace is of 5

marks per subject.

- If the student gets second class and the number of subjects he failed in is greater than 2, then he does not get any grace. If the number of subjects he failed in is less than or equal to 2, then the grace is of 4 marks per subject.

- If the student gets third class and the number of subjects he failed in is greater than 1, then he does not get any grace. If the number of subjects he failed in is equal to 1, then the grace is of 5 marks per subject.

CHAPTER 5 (Functions & Pointers)

62. Write a function to calculate the factorial value of any integer entered through the keyboard.

63. Write a function power(a, b), to calculate the value of a raised to b.

64. Any year is entered through the keyboard. Write a function to determine whether the year is a leap year or not. Call this function from main() and print the results in main().

65. A positive integer is entered through the keyboard, write a function to calculate sum of digits of the number.

66. Write a program to calculate permutation nPr. nPr represents n permutation r and value of nPr is (n!) / (n-r)!. Use the following functions:

    void main();
    int factorial(int);
    Input and output should be in main function only.

    Test Case:
    Input: n = 3, r = 3
    Output: 6
    Explanation: 3!/(3-3)! = 3!/0! = 6/1 = 6.

67. Program to find if sum of digits of a given number is palindrome or not. Use the following functions
    void main();
    int sum_of_digits(int);
    int palindrome (int);
    Input and output should be in main function only.

Test Case1:
N=56
Output:
Palindrome
Explanation:
The digit sum of 56 is 5+6=11.
Since, 11 is a palindrome number, thus, answer is 1.

Test Case2:
N=66
Output:
Not Palindrome
Explanation:
The digit sum of 66 is 6+6=12
Since, 12 is not a palindrome number, thus, answer is 0.

68. Write a program that would print the number of days in a month given the month and year as two integers. Your program should take two integers for month (between 1 and 12) and year (between 1000 to 9999) and print the days in a line by itself. Sample input 2 2000 Expected output 29. Use the following function for same:
int isPrime(int);

69. Write a program to find out first **N** Armstrong numbers (Don't use any inbuilt power() function). Armstrong number is a number whose each digit when is raised to power the number of digits in that number and then added is equal to the number.
153 = $1^3 + 5^3 + 3^3$ = 1 + 125 + 27 = 153
1634 = $1^4 + 6^4 + 3^4 + 4^4$ = 1 + 1296 + 81 + 256 = 1634

70. Write a function that receives 5 integers and returns the sum, average and standard deviation of these numbers. Call this function from main() and print the results in main().
Hint: Use call by reference to return multiple values

71. Write a function that receives marks obtained by a student in 3 subjects and returns the average and percentage of these marks. Call this function from main( ) and print the results in main( ).
Hint: Use call by reference to return multiple values

72. A positive integer is entered through the keyboard, write a function to calculate sum of digits of the number using recursion.

73. A positive integer is entered though the keyboard, write a program to obtain factors of the number. Modify the function to obtain the prime factors recursively.

74. Write a recursive function to obtain the first **N** numbers of a Fibonacci sequence. In a Fibonacci sequence the sum of two successive terms gives the third term. Following are the first few terms of the Fibonacci sequence:
    1 1 2 3 5 8 13 21 23 55 89…..

75. A positive integer is entered through the keyboard, write a function to find the binary equivalent of this number using recursion.

76. Write a recursive function to obtain the running sum of first **N** natural numbers.

77. Given three variables x, y, z, write a function to circularly shift their values to right. In other words if x = 5, y = 8, z = 10 after circular shift y = 5, z = 8, x = 10 after circular shift y = 5, z = 8, and x = 10. Call the function with variables a, b, c to circularly shift values.

78. Given five variables num1, num2, num3, num4, num5 write a function to circularly shift their values to right **N** times.
    Example 1:
    num1 = 10, num2 = 20 , num3 = 30 , num 4 = 40, num5 = 50
    N=1 So we have to make 1 right sift and result will
    num1 = 50, num2 = 10 , num3 = 20 , num 4 = 30, num5 = 40
    Example 2:
    num1 = 10, num2 = 20 , num3 = 30 , num 4 = 40, num5 = 50
    N=3 So we have to make 3 right sift and result will
    num1 = 30, num2 = 40 , num3 = 50 , num 4 = 10, num5 = 20

79. Given three variables num1, num2, num3, num 4, num5 write a function to circularly shift their values to left or right **N** times (Input L for left shift and R for right sift.
    Example 1:
    num1 = 10, num2 = 20 , num3 = 30 , num 4 = 40, num5 = 50
    N=2 So we have to make 1 right sift and result will
    Shift = R
    num1 = 40, num2 = 50 , num3 = 10 , num 4 = 20, num5 = 30
    Example 2:
    num1 = 10, num2 = 20 , num3 = 30 , num 4 = 40, num5 = 50
    N=1 So we have to make 3 right sift and result will
    Shift = L
    num1 = 20, num2 = 30 , num3 = 40 , num 4 = 50, num5 = 10

80. Write a function to compute the greatest common divisor given by Euclid's algorithm, exemplified for j = 1980, K = 1617 as follows:-
    1980 / 1617 = 1 1980 – 1 * 1617 = 363

1617 / 363 = 4 1617 – 4 * 363 = 165
363 / 165 = 2 363 – 2 * 165 = 33
5 / 33 = 5 165 – 5 * 33 = 0
Thus, the greatest common divisor is 33.

CHAPTER 7 (The C Preprocessor)

81. If a macro is not getting expanded as per your expectation, how will you find out how is it being expanded by the preprocessor.

82. Write down macro definitions for the following:
    1. To test whether a character is a small case letter or not.
    2. To test whether a character is a upper case letter or not.
    3. To test whether a character is an alphabet or not. Make use of the macros you defined in 1 and 2 above.
    4. To obtain the bigger of two numbers.

83. Write macro definitions with arguments for calculation of area and perimeter of a triangle, a square and a circle. Store these macro definitions in a file called “areaperi.h”. Include this file in your program, and call the macro definitions for calculating area and perimeter for different squares, triangles and circles.

84. Write down macro definitions for the following:
    1. To find arithmetic mean of two numbers.
    2. To find absolute value of a number.
    3. To convert an uppercase alphabet to lowercase.
    4. To obtain the bigger of two numbers.

CHAPTER 8 (Arrays)

85. Write a program to find out largest element of an array.

86. Write a program to find out second largest element of an unsorted array.

87. Twenty-five number are entered from the keyboard into an array. Write a program to find out how many of them are positive, how many are negative, how many are odd and how many are even.

88. Write a c program for linear search.

89. Write a C program for binary search.

90. Write a c program for bubble sort.

91. Write a c program for insertion sort.

92. Write a c program which deletes the duplicate element of an array.

93. Implement the following procedure to generate prime numbers from 1 to 100 into a program. This procedure is called sieve of Eratosthenes.
    Step 1: Fill an array num[100] with numbers from 1 to 100
    Step 2: Starting with the second entry in the array, set all its multiples to zero.
    Step 3: Proceed to the next non-zero element and set all its multiples to zero.
    Step 4: Repeat step 3 till you have set up the multiples of all the non-zero elements to zero
    Step 5: At the conclusion of step 4, all the non-zero entries left in the array would be prime numbers, so print out these numbers.

94. Write a program to copy the contents of one array into another in the reverse order using pointers.\

95. Write a program in C to count the total number of duplicate elements in an array.
    Test Case:
    Input the number of elements to be stored in the array :3
    Input 3 elements in the array :
    element - 0 : 5
    element - 1 : 1
    element - 2 : 1
    Expected Output :
    Total number of duplicate elements found in the array is : 1

96. Write a program in C to insert a number in a sorted array.
    Test Case:
    Input number of elements you want to insert (max 100): 5
    Input 5 elements in the array in ascending order:
    element - 0 : 2
    element - 1 : 3
    element - 2 : 4
    element - 3 : 7
    element - 4 : 8
    Input the value to be inserted: 5
    The existing array list is:
    2 3 4 7 8
    After Insert the list is:
    2 3 4 5 7 8

97. Write a program in C to print all unique elements in an array.
    Test Case:
    Input the number of elements to be stored in the array: 4
    Input 4 elements in the array :
    element - 0 : 3
    element - 1 : 2
    element - 2 : 2
    element - 3 : 5
    Expected Output :
    The unique elements found in the array are:
    3 5

98. Write a program in C to count the frequency of each element of an array.
    Test Case:
    Input the number of elements to be stored in the array :3
    Input 3 elements in the array :
    element - 0 : 25
    element - 1 : 12
    element - 2 : 43
    Expected Output :
    The frequency of all elements of an array :
    25 occurs 1 times
    12 occurs 1 times
    43 occurs 1 times

99. Write a Program to Cyclically Rotate an Array by One
    Test Case 1:
    Input: arr[] = {1, 2, 3, 4, 5}
    Output: arr[] = {5, 1, 2, 3, 4}

    Test Case 2:
    Input: arr[] = {2, 3, 4, 5, 1}
    Output: {1, 2, 3, 4, 5}

100. Write a Program to Cyclically Rotate an Array by number N
    Test Case 1:
    Input: arr[] = {1, 2, 3, 4, 5}
    N=2
    Output: arr[] = {4, 5, 1, 2, 3}

    Test Case 2:
    Input: arr[] = {2, 3, 4, 5, 1}

N=3
Output: {4, 5, 1, 2, 3}

101. Remove duplicates elements from an array
Example :
Input: nums = [0,0,1,1,1,2,2,3,3,4]
Output: 5, nums = [0,1,2,3,4]

102. Find All Pairs With Given Sum
Given a 0 indexed array arr[] and a target value, the task is to find all possible indices (i, j) of pairs (arr[i], arr[j]) whose sum is equal to target and i != j.
Examples 1:
Input: arr[] = [10, 20, 30, 20, 10, 30], target = 50
Output: [[1, 2], [1, 5], [2, 3], [3, 5]]
Explanation: All pairs with sum = 50 are:
arr[1] + arr[2] = 20 + 30 = 50
arr[1] + arr[5] = 20 + 30 = 50
arr[2] + arr[3] = 30 + 20 = 50
arr[3] + arr[5] = 20 + 30 = 50

Examples 2:
Input: arr[] = [10, 20, 30, 20, 10, 30], target = 80
Output: []
Explanation: No pairs with sum = 80.

103. How will you initialize a three-dimensional array threed[3][2][3]? How will you refer the first and last element in this array?

104. Write a program to pick up the largest number from any 3 row by 3 column matrix.

105. Write a C program for addition of two matrices.

106. Write a program to obtain transpose of a 3 x 3 matrix. The transpose of a matrix is obtained by exchanging the elements of each row with the elements of the corresponding column.

107. Write a C program for multiplication of two matrices.

108. Write a C program to find out sum of diagonal element of a matrix.

CHAPTER 9 (Puppetting on Strings)

109. If the string "Alice in wonder land" is fed to the following scanf( ) statement, what will be the contents of the arrays str1, str2, str3 and str4? scanf ("%s%s%s%s%s", str1, str2, str3, str4) ;

110. Write a program that extracts part of the given string from the specified position. For example, if the sting is "Working with strings is fun", then if from position 4, 4 characters are to be extracted then the program should return string as "king". Moreover, if the position from where the string is to be extracted is given and the number of characters to be extracted is 0 then the program should extract entire string from the specified position.

111. Write a program that converts all lowercase characters in a given string to its equivalent uppercase character.
112. Write a program that converts a string like "124" to an integer 124.

113. Write a program that replaces two or more consecutive blanks in a string by a single blank. For example, if the input is
Grim return to the planet of apes!!
The output should be
Grim return to the planet of apes!!

114. Write a program that uses an array of pointers to strings str[ ]. Receive two strings str1 and str2 and check if str1 is embedded in any of the strings in str[ ]. If str1 is found, then replace it with str2.

```
char *str[ ] = {
        "We will teach you how to…",
        "Move a mountain",
        "Level a building",
        "Erase the past",
        "Make a million",
        "…..all through C!"
} ;
```

For example if str1 contains "mountain" and str2 contains "car", then the second string in str should get changed to "Move a car",

115. Write a program to sort a set of names stored in an array in alphabetical order.

116. Write a program to reverse the strings stored in the following array of pointers to strings :

```
char *s[ ] = {
                "To err is human….",
                "But to really mess things up…..",
                "One needs to know c!!"
        };
```

117. Develop a program that receives the month and year from the keyboard as integers and prints the calendar in the following format.

March 2006						
Mon	**Tue**	**Wed**	**Thu**	**Fri**	**Sat**	**Sun**
		1	**2**	**3**	**4**	**5**
6	**7**	**8**	**9**	**10**	**11**	**12**
13	**14**	**15**	**16**	**17**	**18**	**19**
20	**21**	**22**	**23**	**24**	**25**	**26**
27	**28**	**29**	**30**	**31**		

Note that according to the Gregorian calendar 01/01/1900 was Monday. With this as the base the calendar should be generated.

118. Modify the above program suitably so that once the calendar for a particular month and year has been displayed on the screen, then using arrow keys the user must be able to change the calendar in the following manner:

Up arrow key : Next year, same month
Down arrow key : Previous year, same month
Right arrow key : Same year, next month
Left arrow key : Same year, next month
If the escape key is hit then the procedure should stop.
Hint: Use the getkey( ) function discussed in Chapter 8.

119. Write a program to delete all vowels from a sentence. Assume that the sentence is not more than 80 characters long.

120. Write a program that will read a line and delete from it all occurrences of the word ‘the’.

121. Write a program that takes a set of names of individuals and abbreviates the first, middle and other names except the last name by their first letter.

122. Write a program to count the number of occurrences of any two vowels in succession in a line of text. For example, in the sentence
“Please read this application and give me gratuity”
such occurrences are ea, ea, ui.

CHAPTER 10 (Structures)

123. Create a structure to specify data on student given below:
Roll number, Name, Department, Course, Year of joining

Assume that there are not more than 450 students in the college.
(a) Write a function to print names of all students who joined in a particular year.
(b) Write a function to print the data of a student whose roll number is given.

124. Create a structure to specify data of customers in a bank. The data to be stored is: Account number, Name, Balance in account. Assume maximum of 200 customers in the bank.
   (a) Write a function to print the Account number and name of each customer with balance below Rs. 100.
   (b) If a customer request for withdrawal or deposit, it is given in the form:
      Acct. no, amount, code (1 for deposit, 0 for withdrawal)

   Write a function to complete the transaction and give a message, “The balance is insufficient for the specified withdrawal” in case amount in account is less than withdrawal amount.
125. Write a menu driven program that depicts the working of a library. The menu options should be:
   1. Add book information
   2. Display book information
   3. List all books of given author
   4. List the title of specified book
   5. List the count of books in the library
   6. List the books in the order of accession number
   7. Exit

   Create a structure called library to hold accession number, title of the book, author name, price of the book, and flag indicating whether book is issued or not.

126. Write a program that compares two given dates. To store date use structure say date that contains three members namely date, month and year. If the dates are equal then display message as "Equal" otherwise "Unequal".

127. Linked list is a very common data structure often used to store similar data in memory. While the elements of an array occupy contiguous memory locations, those of a linked list are not constrained to be stored in adjacent location. The individual elements are stored “somewhere” in memory, rather like a family dispersed, but still bound together. The order of the elements is maintained by explicit links between them. Thus, a linked list is a collection of elements called nodes, each of which stores two item of information—an element of the list, and a link, i.e., a pointer or an address that indicates explicitly the location of the node containing the successor of this list element. Write a program to build a linked list by adding new nodes at the beginning, at the end or in the middle of the linked list. Also write a function display( ) which display all the nodes present in the linked list.

128. A stack is a data structure in which addition of new element or deletion of existing element always takes place at the same end. This end is often known as ‘top’ of stack. This situation can be compared to a stack of plates in a cafeteria where every new plate taken off the stack is also from the ‘top’ of the stack. There are several application where stack can be put to use. For example, recursion, keeping

track of function calls, evaluation of expressions, etc. Write a program to implement a stack using a linked list.

129. Unlike a stack, in a queue the addition of new element takes place at the end (called 'rear' of queue) whereas deletion takes place at the other end (called 'front' of queue). Write a program to implement a queue using a linked list.

CHAPTER 11 (Console Input/Output)

130. Write down two functions xgets( ) and xputs( ) which work similar to the standard library functions gets( ) and puts( ).

131. Write down a function getint( ), which would receive a numeric string from the keyboard, convert it to an integer number and return the integer to the calling function. A sample usage of getint( ) is shown below:

```
main( )
{
   int a ;
   a = getint( ) ;
   printf ( "you entered %d", a )
}
```

CHAPTER 12 (File Input/Output)

132. Write a program to read a file and display contents with its line numbers.

133. Write a program to find the size of a text file without traversing it character by character.

134. Write a program to add the contents of one file at the end of another.

135. Suppose a file contains student's records with each record containing name and age of a student. Write a program to read these records and display them in sorted order by name.

136. Write a program to copy one file to another. While doing so replace all lowercase characters to their equivalent uppercase characters.

137. Write a program that merges lines alternately from two files and writes the results to new file. If one file has less number of lines than the other, the remaining lines from the larger file should be simply copied into the target file.

138. In the file 'CUSTOMER.DAT' there are 100 records with the following structure:

```
struct customer
{
        int accno ;
        char name[30] ;
        float balance ;
} ;
```

In another file 'TRANSACTIONS.DAT' there are several records with the following structure:

```
struct trans
{
        int accno ,
        char trans_type ;
        float amount ;
} ;
```

The parameter trans_type contains D/W indicating deposit or withdrawal of amount. Write a program to update 'CUSTOMER.DAT' file, i.e. if the trans_type is 'D' then update the balance of 'CUSTOMER.DAT' by adding amount to balance for the corresponding accno. Similarly, if trans_type is 'W' then subtract the amount from balance. However, while subtracting the amount make sure that the amount should not get overdrawn, i.e. at least 100 Rs. Should remain in the account.

139. There are 100 records present in a file with the following structure:

```
struct date
{
        int d, m, y ;
} ;
struct employee
{
        int empcode[6] ;
        char empname[20] ;
        struct date join_date ;
        float salary ;
} ;
```

Write a program to read these records, arrange them in ascending order of join_date and write them in to a target file.

140. Given a list of names of students in a class, write a program to store the names in a file on disk. Make a provision to display the n^{th} name in the list (n is data to be read) and to display all names starting with S.

141. In a small firm employee numbers are given in serial numerical order, that is 1, 2, 3, etc.

    − Create a file of employee data with following information: employee number, name, sex, gross salary.
    − If more employees join, append their data to the file.
    − If an employee with serial number 25 (say) leaves, delete the record by making gross salary 0.
    − If some employee's gross salary increases, retrieve the record and update the salary.
    Write a program to implement the above operations.

142. Given a text file, write a program to create another text file deleting the words "a", "the", "an" and replacing each one of them with a blank space.

CHAPTER 13 (More Issues in Input/Output)

143. Write a program using command line arguments to search for a word in a file and replace it with the specified word. The usage of the program is shown below.
    C:\> change <old word> <new word> <filename>

144. Write a program that can be used at command prompt as a calculating utility. The usage of the program is shown below.
    C:\> calc <switch> <n> <m>

Miscellaneous Programs

145. C program to print hello world without using semicolon.

146. Write a c program to add two numbers without using addition operator.

147. Program in C to print 1 to 100 without using loop.

148. Write a c program to swap two numbers without using third variable.

149. Calculate the length of array without using loop