# C Programming Exercises

1. Given three variables of integer type, exchange their values without using a temporary variable.

2. Write a program in C that reads a list of numbers and makes a count of the number of negatives and the number of non-negative members in the set.

3. Write a program in C to compute the average of n numbers.

4. Write a program in C to compute the sum of the squares of n numbers. That is, $S = \sum (a_i)^2$

5. Develop an algorithm to compute the sums for the first n terms of the following series: a) S = 1 + 2 + 3 + ….. b) S = 1 + 3 + 5 + ….. c) S = ½ + ¼ + 1/6 + ….

6. Write a program that prints out n values of the sequence: 1 -1 1 -1 1 -1 1 …

7. Write a program to compute the sum of the first n terms of the series S = 1 – 3 + 5 – 7 + 9 – 11 + ……

8. Given a number n, compute n factorial (written as n!) where $n \geq 0$.

9. For a given n, write a program in C to compute 1/n!

10. For given x and a given n, write a program in C to compute x^n / n!

11. Write a program in C to simulate multiplication by addition. Your program should accept as input two integers.

12. Write a function to determine if a character is alphabetic or not.

13. Write a function to find the sum and difference of two numbers.

14. Write a function to find the sum of the individual digits of a number.

15. Write a program to rearrange the elements of an array so that they appear in reverse order.

16. Write a program in C to find the number of times the maximum occurs in an array of n elements.

17. Write a program in C to find the second largest value in an array of n elements.

18. Find the position of a number x (if it occurs) in an array of n elements.

19. Write a program in C to read a line and find out the number of vowels and consonants present in the given line.

20. Write a program in C to find a given string in a line of text using pointers.

21. Write a program in C to compare two given strings using a pointer.

22. Write a program in C to check whether a given string is a palindrome or not using the pointer method.

23. Write a program in C to concatenate two given strings into one string.

24. Write a program in C to display the contents and the address of a pointer variable using different types of incrementation.

25. Write a program in C to generate a series of Fibonacci numbers.

26. Write a program in C to check whether a given number is prime or not.

27. Write a program in C to check whether a given number is a palindrome or not.

28. Write a program in C to check whether a given number is Armstrong or not.

29. Write a program in C to convert binary numbers to decimal.

30. Write a program in C to produce a list of all exact divisors of a given positive integer n.

31. Write a program in C to perform the following arithmetic operations on a complex number using a structure: b) Addition of two complex numbers c) Subtraction of two complex numbers d) Multiplication of two complex numbers e) Division of two complex numbers

32. Declare a structure called student with members: Name - char[10] RollNo - int Address - structure containing DoorNo, Street, Place, PIN Write a program that accepts and displays these values for 10 students.

33. Write a program to compare two files, printing the first line where they differ.

34. Write a program that, given two files exam1.dat and exam2.dat, appends the second file to the first.

35. Write a program that displays the contents of a file in reverse order.

36. Design a file emp.txt and write a program in C to make all possible manipulations on the file.

37. Write a program to sort a set of names stored in an array in alphabetical order using pointers.

38. Write a program to delete all vowels from a sentence using pointers (sentence $\leq$ 80 characters).

39. Write a program that reads a line and deletes from it all occurrences of the word "the" using pointers.

40. Write a program to count the number of occurrences of any two vowels in succession using pointers.

41. Implement the following built-in functions as user-defined functions: strlen() $\rightarrow$ mystrlen() strcat() $\rightarrow$ mystrcat() strcpy() $\rightarrow$ mystrcpy() substr() $\rightarrow$ mysubstr() strcmp() $\rightarrow$ mystrcmp()

42. Write a program to find whether a string is a palindrome or not.

43. Write a program to display the contents of a file in uppercase letters.

44. Write a program to count characters, spaces, tabs and new lines in a file.

45. Write a program to copy the contents of one file to another file.

46. Write a program to receive strings from the keyboard and write them to a file.

47. Write a program to read strings from a file and display them on the screen.

48. Write a program to store data corresponding to a book (title, price and number of pages) using a structure and display the entire information.

49. Write a program to store day, month and year using a structure and determine tomorrow's date.

50. Write a program to display students list in ascending order.

51. Write a program to display the mark sheet of students using a structure.

52. Write a program to display the shopping bill of a customer using a structure.

53. Write a program to shift an unsigned integer left if the count of 1s is positive and right if it's negative (create functions).

54. Write a program to copy the contents of one file to another file using command-line arguments.