1. Write a C program that compute sum of two short integers and display the result.

2. Write a C program that perform the addition of an unsigned integer constant and a long
integer constant and stored the result in a long integer variable.

3. Write a program that calculates the area of a circle by taking radius as an input from keyboard.

4. Let Principal = P, Rate = R% per annum and Time = T years. Then simple interest = (PxRxT)/100. Write a C program that compute the simple interest with user given input of P, R, and T.

5. Print the following:
   "Hello",'How are you?’

6. Perform summation, subtraction, multiplication and division with integer numbers only.

7. Repeat question 2 with floating point numbers.

8. Print octal and hexadecimal values of an integer.

9. Provide an input of a string and display.

10. Print size of the data types using sizeof operator.

11. Take any two integers and perform all the following operators as used: OR, NOT, AND, XOR, >>, <<

12. Add two short integers and store the result in a long variable. Print the results case 1: by shifting 8 positions right and case 2: by shifting 8 positions left.
13. Use scanf ("%[^\n]%*c", name); take the following input:
Hey how are you? and print the same.
where the [] is the scanset character, [^\n] tells that while the input is not a newline ('\n') take input and the %*c reads till the newline character from the input buffer.

14. Use the following format specifiers:
%3.2f, %-4d, %1s, %15.8s, %+6d, %#x, %#f

15. Take any interger and check whether its prime.

16. Take suitable value for each of the following data types: short integer, long integer, unsigned long integer, signed long integer, double, char, long double. Display and justify the output of each with the sizeof(value) operator.
e.g.,   printf("%d\t",sizeof(99999)); //for unsigned int

18. Write a program to differentiate %d and %u output for a any integer variable.

19. Write a program using ternary operator for condition checking.

20. Take any integer i and justify the results of:
i++, ++i, ++i, i++, --i, i--, i--, --i in the given order.

// Justify how not(~) operator works.
21. Find the summation of an series for the first 30 numbers: 2.n^2 + 3.n + 5.
(Print the same thing three times using while, do-while, for loop in the same program)

22. Print all the numbers between 1001 to 2001 that are divisible by 7. (Print the same thing three times using while, do-while, for loop in the same program)
23. Print all the leap years between 1901 to 1999.

24. Write any program using loop showing the use of break and continue statement.

25. The outstanding balance on a home loan Rs. 8,00000. Each month a payment of Rs 30000 is made which includes both interest and principal repayment of the car loan. The yearly interest is calculated as 11% of the outstanding balance of the loan for the first year and 14% for the rest. After the interest is deducted the remaining part of the payment is used to payoff the loan. Using this information, write a C program that produces a table indicating the beginning monthly balance, the interest payment, the principal payment, and the remaining loan balance after each payment is made. Your output should resemble and complete the entries in the following table until the outstanding loan balance is zero.

26. Write a program to check whether a given number is an Armstrong number or not. An Armstrong number is the one in which the sum of cubes of its digit is equal to the number itself. Your program should take a number as input and output whether the given number is an Armstrong number or not. For example:
Input: 371
Output: Armstrong Number (27+343+1=371)

27. Write a program to assign a grade according to the marks received in an exam. Make use of the switch statement. Your program should take the marks as input from the user and print the appropriate grade.
More than 80 receives A grade
More than 65 receives B grade
More than 50 receives C grade
More than 30 receives D grade
Less than 30 receives Failed

28. Take two numbers a and b as input from the user and print the sum of the squares of all the odd numbers between a and b (including a and b)

29. There are 100 students in a class. There is a event A: a student knows C programming, event B: a student knows Fortran programming. Take suitable inputs for P(A or B), P(A and B) and another variable of your choice. Write a program to find the outputs of P(B|A), P(A|B), P(not B| not A), P(not A| not B) using Bayes theorem.

30. Input a range from user and print all the narcissistic number in that range. (A number is called narcissistic if each of its digits raised to the power of the number of digits
equals the number.)
153 is a narcissistic number since 1^3 + 5^3 + 3^3
= 1 + 125 + 27 = 153.

31. Print the following (You may use a single nested loop if you can't do it one loop):

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

32. Store your name in a one dimensional array and print it from the array character-wise using a loop.

33. Using 2 dimensional array, develop a playable tic-tac-toe. Print the result after every move. Declare a winner or draw as the game ends.
34. Write a program that takes any two pairs of input for x- and y-coordinate in cartesian coordinate system and suggests the output as the third coordinate that makes the triangle an equilateral triangle.

Ex. input: (x1,y1) and (x2,y2)
output: The third coordinate to form an equilateral triangle is (x3,y3).

35. Write a program that takes three numbers as input from the user and checks whether any combination of these form a Pythagorean triplet or not. A Pythagorean triplet is the one in which the sum of squares of two numbers is equal to the square of the third number.
36. Write a program using the function getchar() that inputs a rational numbers and operators and then does that operation on them and prints it using putchar(). scanf or printf should not be used. ASCII values may be used to convert characters to integers.
37. Write a program to display the fibonacci series upto a number that is taken as input and passed to the user-defined function.
e.g., input x, declare fibo(x) to display the the series.

38. Write a user-defined funtion to evaluate factorial of a number taken as input.

39. Take any two pairs of coordinates as input which form two different circles of the same radius 10 units. Find whether the two circles intersect; if they do, find the area of intersection; otherwise, display "doesn't intersect".

40. Take any two 4 x 4 matrices such as A and B, multiply them and store the resultant matrix in matrix C. Display C. Take user input as A or B to perform addition of C and A or B. Show the result of addition again. Follow matrix multiplication rules.

41. Take any continuous function f(x) and input two coordinates for the upper and lower limit. Take another input coordinate to check whether it satsfies the Lagrange's mean value theorem or not. f(x) and all the input should be taken in such a manner so that the theorem is once satisfied and once not satisfied.

Write the following programs:
42. Program to create, initialize, assign and access a pointer variable.

43. Program to swap two numbers using pointers.

44. Program to change the value of constant integer using pointers.

45. Program to print a string using pointer.

46. Program to count vowels and consonants in a string using pointer.

47. Program to read array elements and print with addresses.

48. Program to read and print student details using structure pointer, demonstrate example of structure with pointer.

49. Program to print size of different types of pointer variables.

50. Program to demonstrate example of double pointer (pointer to pointer).

51. Program to demonstrate example of array of pointers.
52. Write a program using enum to design a calendar.
53. Write a program using structure to prepare record maintainance system of all the students in the batch. Also use Union in the same program somewhere. Enter the student records and process them later.
54. Write the same program as given in question 52 using file programming. Take a file with given roll numbers and names of the students of your batch. Use all the file operations that are possible to be done.

class test 2
CSE and ECE.
Marks: 20

1. Write a program which shows the usage of all the followings: (2 marks)
    fopen, fclose, feof, fscanf, fprintf, fgets, fputs, fgetc, fputc

2. Use malloc() to allocate space for any three variables of any datatype. Print the contents and addresses of the variables. Use free() to free the memory locations. Print the contents of the variables again. (marks: 3)

3. Allocate space for an array using calloc(). (marks: 1)

4. Write a simple program to differentiate call by value and call by references. (marks: 1)

5. Write a program to show any three string operations using strings.h. (marks: 1)

6. Write a program to create two blank files, write your name in one, copy it's contents to another blank flie and delete the first file. Each operation should be performed after any user input. (marks: 2)

7. Use file pointer to search a sub-string within a large string. (marks: 2)

8. Run a system command of Operating system and store the result of the command in a file (Use argc, *argv[] and any other necessary operations). (marks: 2)

9. Write a program to use strerror() and perror() and show some error messages. (marks: 1)

10. Write a simple strcuture with typedef to display your name and roll number. (marks: 1)

11. Write a program to use any two functions from the following C libraries: (marks: 3)
    C Library - <ctype.h>
    C Library - <errno.h>
    C Library - <float.h>
    C Library - <limits.h>
    C Library - <locale.h>
    C Library - <math.h>
    C Library - <setjmp.h>
    C Library - <signal.h>
    C Library - <stdarg.h>
    C Library - <stddef.h>
    C Library - <stdio.h>
    C Library - <stdlib.h>
    C Library - <string.h>
    C Library - <time.h>

12. Write to program to use all the following storage classes: (marks: 1)
    auto
    register
    static
    extern

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