Assignment-1: Input and output in C Language

1. Write a program to print **Hello** Students on the screen.
2. Write a program to print **Hello** in the first line and **Students** in the second line.
3. Write a program to print **"MySirG"** on the screen. (Remember to print in double quotes)
4. Write a program to print **\n** on the screen.
5. Write a program to print **\r** on the screen.
6. Write a program to print **"Teacher's Day"** on the screen. (Remember to print double and single quotes)
7. Write a program to calculate sum of two integers. Numbers are taken from user through keyboard.
8. Write a program to calculate square of a given number. Number is entered by the user.
9. Write a program to calculate area of a rectangle. Input appropriate data from the user.
10. WAP to find the area of the circle. Take radius of circle from user as input and print the result in below given format.

Expected output format – "Area of circle is A having the radius R". Replace A with area & R with radius.

Assignment-2: More on printf and scanf

1. Write a program to calculate average of three integers. Numbers are given by the user.
2. Write a program to calculate circumference of a circle.
3. Write a program to calculate simple interest.
4. Write a program to calculate volume of a cuboid.
5. Write a program to ask user about the cost price and selling price banana per dozen. Calculate the profit or loss earned upon selling 25 bananas.
6. Write a program to input a character from the user and print its ASCII code.
7. Write a program to input an ASCII code from the user and print its corresponding character.
8. Write a program to input three characters from the user and display characters with their corresponding ASCII codes.
9. WAP to take date as an input in below given format and convert the date format and display the result as given below.
   User Input date format – "DD/MM/YYYY" (27/11/2022)
   Output format – "Day – DD , Month – MM , Year – YYYY" (Day – 27 ,Month – 07 , Year – 2022)
10. WAP to take time as an input in below given format and convert the time format and display the result as given below.
    User Input date format – "HH:MM"

    Output format – "HH hour and MM Minute"

Assignment-3: Operators in C Language

1. Write a program to calculate size of a character constant.
2. Write a program to calculate size of a real constant.
3. Write a program with one char type variable. Assign ‘A’ in the variable. Now change the value of variable from ‘A’ to ‘B’ using increment operator.
4. Write a program to print unit digit of a given number
5. Write a program to print a given number without its last digit.
6. Write a program to swap values of two int variables
7. Write a program to swap values of two int variables without using a third variable.
8. Write a program to swap values of two int variables without using third variable and without using +, - operators.
9. Write a program to swap values of two int variables without using third variable and arithmetic operators.
10. Write a program to swap values of two int variables in single line arithmetic expression.

Assignment-4: More on Operators in C Language

1. Write a program to input a three digit number and display the sum of the digits.
2. Write a program to find ASCII code of the character '+.
3. Write a program to print size of an int, a float, a char and a double type variable
4. Write a program to make the last digit of a number stored in a variable as zero. (Example - if x=2345 then make it x=2340)
5. Write a program to input a number from the user and also input a digit. Append a digit in the number and print the resulting number. (Example - number=234 and digit=9 then the resulting number is 2349)
6. Assume price of 1 USD is INR 84.23. Write a program to take the amount in INR and convert it into USD.
7. Write a program to take a three digit number from the user and rotate its digits by one position towards the right.
8. What will be the value stored in the variable x after executing following statement:
   x=10>8>4;
9. What will be the value stored in the variable x after executing following statement:
   x=!2>-2;
10. What will be the value stored in the variable x after executing following statement:
    x=3<0&&5>0;

Assignment-5: Decision Control Statements

1. Write a program to check whether a given number is positive or non positive.
2. Write a program to check whether a given number is divisible by 5 or not
3. Write a program to check whether a given number is an even number or an odd number.
4. Write a program to check whether a given number is an even number or an odd number without using % operator.
5. Write a program to check whether the given number is even or odd using a bitwise operator.
6. Write a program to check whether a given number is a three digit number or not.
7. Write a program to print greater between two numbers. Print one number if both are the same.
8. Write a program to check whether roots of a given quadratic equation are real & distinct, real & equal or imaginary roots
9. Write a program to check whether a given year is a leap year or not.
10. Write a program to find the greatest among three given numbers. Print number once if the greatest number appears two or three times.

Assignment-6: More on Decision Control Statements

1. Write a program to check whether a given number is a three digit number or not.
2. Write a program which takes the cost price and selling price of a product from the user. Now calculate and print profit or loss percentage.
3. Write a program to take marks of 5 subjects from the user. Assume marks are given out of 100 and passing marks is 33. Now display whether the candidate passed the examination or failed.
4. Write a program to check whether a given alphabet is in uppercase or lowercase.
5. Write a program to check whether a given number is divisible by 3 and divisible by 2.
6. Write a program to check whether a given number is divisible by 7 or divisible by 3.
7. Write a program to check whether a given number is positive, negative or zero.
8. Write a program to check whether a given character is an alphabet (uppercase), an alphabet (lower case), a digit or a special character.
9. Write a program which takes the length of the sides of a triangle as an input. Display whether the triangle is valid or not.
10. Write a program which takes the month number as an input and display number of days in that month.

Assignment-8: More on Iterative Control Statements

1. Write a program to print MySirG N times on the screen
2. Write a program to print the first N natural numbers.
3. Write a program to print the first N natural numbers in reverse order
4. Write a program to print the first N odd natural numbers
5. Write a program to print the first N odd natural numbers in reverse order.
6. Write a program to print the first N even natural numbers
7. Write a program to print the first N even natural numbers in reverse order
8. Write a program to print squares of the first N natural numbers
9. Write a program to print cubes of the first N natural numbers
10. Write a program to print a table of N.

Assignment-9: Use any loop

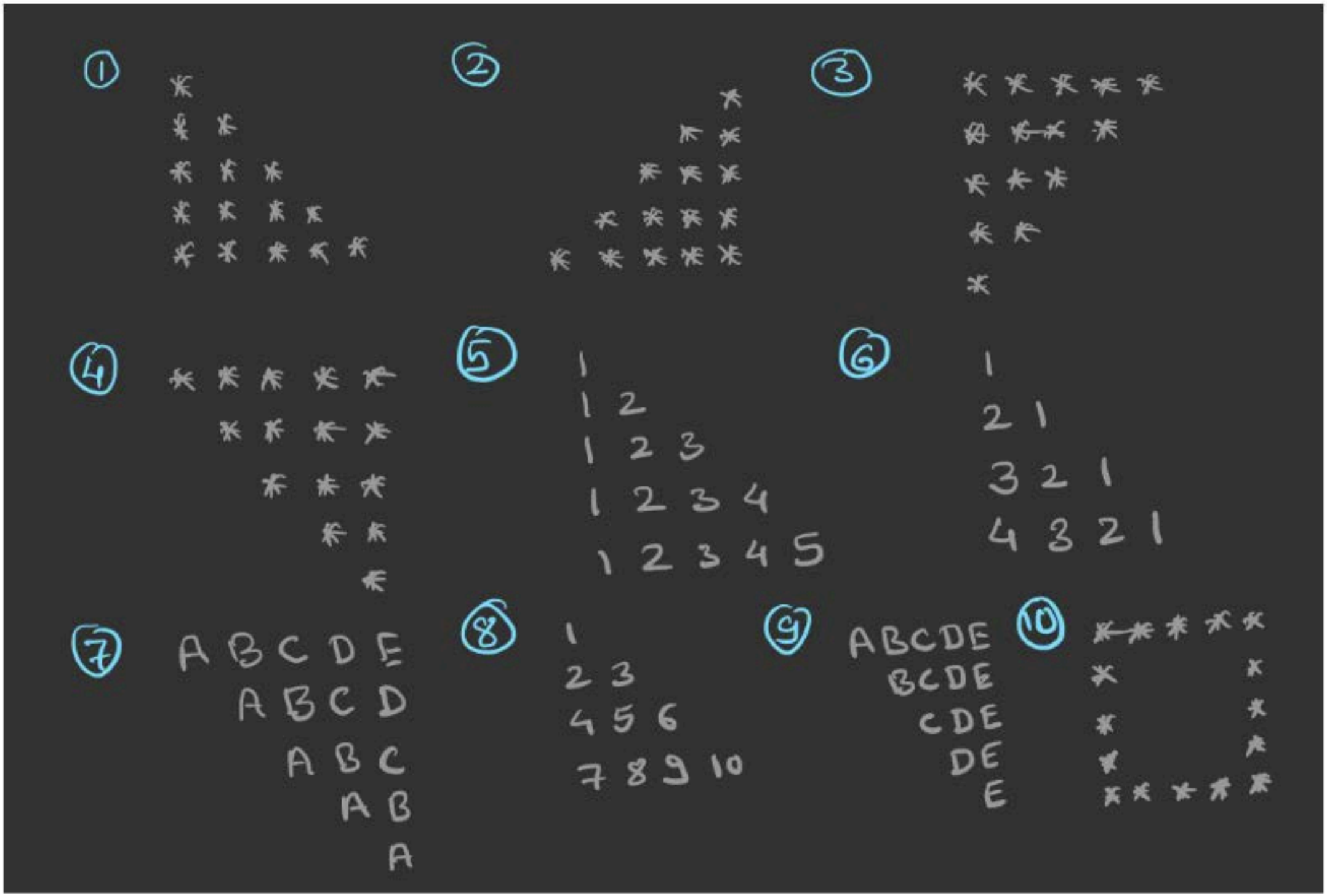
1. Write a program to calculate sum of first N natural numbers
2. Write a program to calculate sum of first N even natural numbers
3. Write a program to calculate sum of first N odd natural numbers
4. Write a program to calculate sum of squares of first N natural numbers
5. Write a program to calculate sum of cubes of first N natural numbers
6. Write a program to calculate factorial of a number
7. Write a program to count digits in a given number
8. Write a program to check whether a given number is a Prime number or not
9. Write a program to calculate LCM of two numbers
10. Write a program to reverse a given number

Assignment-10: Level up with loops

1. Write a program to find the Nth term of the Fibonacci series.
2. Write a program to print first N terms of Fibonacci series
3. Write a program to check whether a given number is there in the Fibonacci series or not.
4. Write a program to calculate HCF of two numbers
5. Write a program to check whether two given numbers are co-prime numbers or not
6. Write a program to print all Prime numbers under 100
7. Write a program to print all Prime numbers between two given numbers
8. Write a program to find next Prime number of a given number
9. Write a program to check whether a given number is an Armstrong number or not
10. Write a program to print all Armstrong numbers under 1000

Assignment-11: Star Pattern Problems

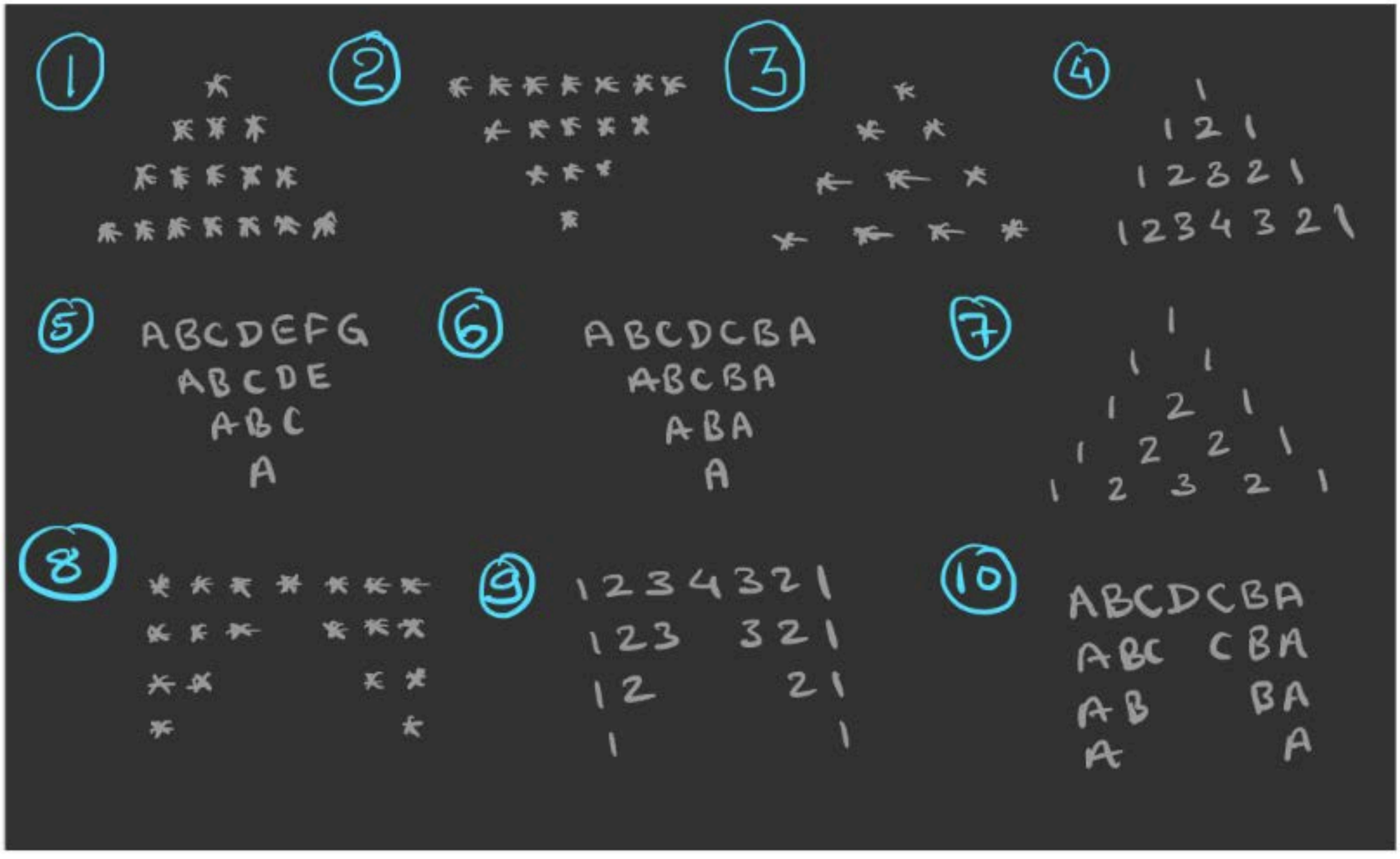
Write a program to draw the following patterns:



C, C++ DSA in Depth

Assignment-12: Star Pattern Problems

Write a program to draw the following patterns:



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Assignment-14: Functions

1. Write a function to calculate the area of a circle. (TSRS)
2. Write a function to calculate simple interest. (TSRS)
3. Write a function to check whether a given number is even or odd. Return 1 if the number is even, otherwise return 0. (TSRS)
4. Write a function to print first N natural numbers (TSRN)
5. Write a function to print first N odd natural numbers. (TSRN)
6. Write a function to calculate the factorial of a number.(TSRS)
7. Write a function to calculate the number of combinations one can make from n items and r selected at a time. (TSRS)
8. Write a function to calculate the number of arrangements one can make from n items and r selected at a time. (TSRS)
9. Write a function to check whether a given number contains a given digit or not. (TSRS)
10. Write a function to print all prime factors of a given number. For example, if the number is 36 then your result should be 2, 2, 3, 3. (TSRN)

C, C++ and DSA in Depth

Assignment-15: More on Functions

1. Write a function to calculate LCM of two numbers. (TSRS)
2. Write a function to calculate HCF of two numbers. (TSRS)
3. Write a function to check whether a given number is Prime or not. (TSRS)
4. Write a function to find the next prime number of a given number. (TSRS)
5. Write a function to print first N prime numbers (TSRN)
6. Write a function to print all Prime numbers between two given numbers. (TSRN)
7. Write a function to print first N terms of Fibonacci series (TSRN)
8. Write a function to print PASCAL Triangle. (TSRN)
9. Write a function to print all Armstrong numbers between two given numbers. (TSRN)
10. Write a function to find the sum of first N terms of the series 1!/1+2!/2+3!/3+4!/4+5!/5… n!/n (TSRS)

Assignment-16: Recursion

1. Write a recursive function to print first N natural numbers
2. Write a recursive function to print first N natural numbers in reverse order
3. Write a recursive function to print first N odd natural numbers
4. Write a recursive function to print first N odd natural numbers in reverse order
5. Write a recursive function to print first N even natural numbers
6. Write a recursive function to print first N even natural numbers in reverse order
7. Write a recursive function to print squares of first N natural numbers
8. Write a recursive function to print binary of a given decimal number
9. Write a recursive function to print octal of a given decimal number
10. Write a recursive function to print reverse of a given number

Assignment-17: More on Recursion

1. Write a recursive function to calculate sum of first N natural numbers
2. Write a recursive function to calculate sum of first N odd natural numbers
3. Write a recursive function to calculate sum of first N even natural numbers
4. Write a recursive function to calculate sum of squares of first n natural numbers
5. Write a recursive function to calculate sum of digits of a given number
6. Write a recursive function to calculate factorial of a given number
7. Write a recursive function to calculate HCF of two numbers
8. Write a recursive function to print first N terms of Fibonacci series
9. Write a program in C to count the digits of a given number using recursion.
10. Write a program in C to calculate the power of any number using recursion.

Assignment-18: Arrays

1. Write a program to calculate the sum of numbers stored in an array of size 10. Take array values from the user.
2. Write a program to calculate the average of numbers stored in an array of size 10. Take array values from the user.
3. Write a program to calculate the sum of all even numbers and sum of all odd numbers, which are stored in an array of size 10. Take array values from the user.
4. Write a program to find the greatest number stored in an array of size 10. Take array values from the user.
5. Write a program to find the smallest number stored in an array of size 10. Take array values from the user.
6. Write a program to sort elements of an array of size 10. Take array values from the user.
7. Write a program to find second largest in an array.Take array values from the user.
8. Write a program to find the second smallest number in an array.Take array values from the user.
9. Write a program to sort an array of 10 elements in descending order.
10. Write a program in C to copy the elements of one array into another array.Take array values from the user.

Assignment-19: Arrays and Functions

1. Write a function to find the greatest number from the given array of any size. (TSRS)
2. Write a function to find the smallest number from the given array of any size. (TSRS)
3. Write a function to sort an array of any size. (TSRN)
4. Write a function to rotate an array by n position in d direction. The d is an indicative value for left or right. (For example, if array of size 5 is [32, 29, 40, 12, 70]; n is 2 and d is left, then the resulting array after left rotation 2 times is [40, 12, 70, 32, 29])
5. Write a function to find the first occurrence of adjacent duplicate values in the array. Function has to return the value of the element.
6. Write a function to swap two elements of given array with specified indices.
7. Write a function to count a total number of duplicate elements in an array.(Means elements that occurs 2 times in an array)
8. Write a function to print all unique elements in an array.
9. Write a function to merge two arrays of the same size sorted in descending order.
10. Write a function to count the frequency of each element of an array.

Assignment-20: Multi Dimensional Arrays

1. Write a program to calculate the sum of two matrices each of order 3x3.
2. Write a program to calculate the product of two matrices each of order 3x3.
3. Write a program to print the transpose of a given matrix.
4. Four players are playing a tournament of Chess with round robin method (each player will play with every other player). Each win has 2 points, draw has 1 point and loose has 0 points. Declare a score_board two dimensional array to store the scores of the players agains each player.
5. For que-4, define a function to update score_board after each match result.
6. For que-4, define a function to display score_board.
7. For que-4, define a function which returns the score of a specific player
8. For que-4, define a function to find the winner of the tournament.
9. For que-4, define a function to display rank of the players.
10. For que-4, define a function to run tournament, in which user has to enter result of each game and update score board using score_board function.

Assignment-21: String Basics

1. Write a program to calculate the length of the string. (without using builtin method)
2. Write a program to count the occurrence of a given character in a given string.
3. Write a program to count vowels in a given string
4. Write a program to count spaces in a given string.
5. Write a program to convert a given string into uppercase
6. Write a program to convert a given string into lowercase
7. Write a program to reverse a string.
8. Write a program in C to count the total number of alphabets, digits and special characters in a string.
9. Write a program in C to copy one string to another char array.
10. Write a program to find first occurrence of a given character in a given string.

Assignment-22: Strings and Functions

1. Write a function to calculate length of the string
2. Write a function to reverse a string.
3. Write a function to compare two strings.
4. Write a function to transform string into uppercase
5. Write a function to transform a string into lowercase
6. Write a function to count vowels in a given string.
7. Write a function to find a character in a given string. Return index of first occurrence of given character. Return -1 if character not found.
8. Write a function to find character in a given string between specified indices (start index (inclusive) and end index(exclusive) .
9. Write a function to swap two characters of a given string with specified indices.
10. Write a function to check whether a given string is an alphanumeric string or not. (Alphanumeric string must contain at least one alphabet and one digit)

Assignment-23: Strings and Functions

1. Write a function to check whether a given string is palindrome or not.
2. Write a function to trim a string (removing leading spaces from both the ends).
3. Write a function to count words in a given string
4. Write a function to reverse a string word wise. (For example if the given string is "Mysirg Education Services" then the resulting string should be "Services Education Mysirg")
5. Write a function to do case insensitive comparison of two strings.
6. Write a function to count frequency of each character of the given string.
7. Write a function to find a word in a given string.
8. Write a function to make first character of each word of the string capital.
9. Write a function to make acronym name from a given name. For example, "Ramesh Chand Tiwari" becomes "R C Tiwari", "Bhavesh Gupta" becomes "B Gupta"
10. Write a function to concatenate two strings.

Assignment-24: Handling multiple strings

1. Write a function to store strings, taken from user, to the given 2d char array.
2. Write a program to find the number of vowels in each of the 5 strings stored in two dimensional arrays, taken from the user.
3. Write a program to sort 10 city names stored in two dimensional arrays, taken from the user.
4. Write a function to store each word a string in a 2 dimensional char array.
5. Write a function to remove duplicate names stored in the list of names stored in a 2d char array.
6. Write a program to find words ending with a letter 's' and store each such word in a 2d char array.
7. Write a function to return the most repeating character in a list of strings.
8. Write a function to check whether a pair of strings are anagram or not. Both the strings are stored in a 2d char array.
9. Write a function to store all the words in a given string which are starting from 'a', in a two dimensional char array.
10. A 2d array is full with 10 email ids. Write a function to find how many of them belongs to gmail.com

Assignment-25: Pointers

1. Write a function to swap values of two int variables (TSRN).
2. Write a function to search all occurrences of a given character in a given string. Result of search is a list of indices to be stored in the given array. [void search_all_occurrences(char *str, char ch, int *arr);]
3. Write a function to convert a given string into uppercase.
4. Write a function to convert a given string into lowercase.
5. Write a function to extract a substring from a given string with specified start index (inclusive) and end index (exclusive), and store the extracted string in another char array. [void extract_string(char *str, int start_index, int end_index, char *result);]
6. Write a function to swap strings of two char arrays.
7. Write a function to sort an array of int type values. [void sort(int *ptr,int size);]
8. Write a function to merge two arrays in a given array. [void merge(int *arr1, int size1, int *arr2, int size2, int *arr3);]
9. Write a function to move first value of the array to the position where all smaller values will be in the left and greater values will be in the right.
10. There are five classes with different number of students in them. Five arrays containing marks of students of each class. Write a function to receive an address of an array of pointers to access marks of all the students. The job of function is to find the highest marks among all the classes.

Assignment-26: Structure

1. Define a structure Employee with member variables id, name, salary
2. Write a function to take input employee data from the user. [Refer structure from question 1]
3. Write a function to display employee data. [Refer structure from question 1]
4. Write a function to find the highest salary employee from a given array of 10 employees. [Refer structure from question 1]
5. Write a function to sort employees according to their salaries [refer structure from question 1]
6. Write a function to sort employees according to their names [refer structure from question 1]
7. Write a program to calculate the difference between two time periods.
8. Write a program to store information of 10 students and display them using structure.
9. Write a program to store information of n students and display them using structure
10. Write a program to enter the marks of 5 students in Chemistry, Mathematics and Physics (each out of 100) using a structure named Marks having elements roll no., name, chem_marks, maths_marks and phy_marks and then display the percentage of each student.

Assignment-27: DMA

1. Define a function to input variable length string and store it in an array without memory wastage.
2. Write a program to ask the user to input a number of data values he would like to enter then create an array dynamically to accommodate the data values. Now take the input from the user and display the average of data values.
3. Write a program to calculate the sum of n numbers entered by the user using malloc and free.
4. Write a function to merge two array elements and store it in dynamically created array. Return address of this dynamically created array.
5. Define a structure Student with name, roll number and college name as members. Define another structure Team with two Student type variables as members.
6. In question 5, define a method to dynamically create a Student type variable and initialise with the values received in the arguments. Return address of Student type variable.
7. In question 5, define a method to dynamically create Team variable, initialise it with the received arguments. Return address of the Team variable.
8. In question 5, define a method to display data of Student type, also define a method to display data of Team type.
9. In question 5, define a method to dynamically create an array of pointers of type Student. Array size is received as an argument. Return the address of array.
10. In question 5, define a method to dynamically create an array of pointers of type Team. Array size is received as an argument. Return the address of array.
11. In question 5, define a driver function to create 6 Students and 3 Teams. Form teams by assigning two students in each team. At last display the list of teams with students in them.

Assignment-28: Mixed C language

1. Define a function to produce all the combinations of strings that can be made out of characters of a given string, selecting r at a time. Return a dynamically created array of strings holding all combinations.
2. Write a function to print all distinct pattern of 0s and 1s of a given length.
3. Write a program to print system date.
4. Write a program to print system time
5. Given an array of size n, reverse it. Input format - The first line contains an integer n denoting the size of the array. The next line contains n space separated integers denoting the elements of the array. The output should print the array in the desired order, elements separated by spaces.
6. There is a series S, where the next term is the sum of previous three terms. Given the first three terms of the series, a, b and c, You have to output the nth term of the series using recursion. Input format - the first line contains a single integer, n. The next line contains three space separated integers a, b and c. The output format - print the nth term of the series.
7. Define a structure triangle which can contain lengths of the sides of a triangle. Sort a list of triangles according to their areas. Input format - first line contains a number n which is number of triangles. Subsequent n lines, each contains three space separated numbers (sides of the triangle). Output format - display the tuples (side1, side2, side3) of triangle in sorted order (according to area of triangle).
8. Define a function to remove duplicate numbers from an array. Return the resulting array.
9. Define a function to find the maximum frequency element in the given array.
10. Define a function to create an array of size N and store first N prime numbers in it. Return the resulting array.