Bridge

Set #9

Basic

1. **Fibonacci Series:** Develop a program to generate the Fibonacci series up to a specified number of terms. The number of terms should be taken as input, and the series should be the output. Optional - develop this is a function where input argument is number of terms return is Fibonacci array.
   Example:
   I/P: 6
   O/P: [0, 1, 1, 2, 3, 5]
2. **String Reversal:** Write a program to reverse a given string. The string should be taken as input, and the reversed string should be the output.
   Example:
   I/P: "programming"
   O/P: "gnimmargorp"

Intermediate

1. **Binary to Decimal :**Write a function to **convert a binary string to decimal integer number.**
   Example:
   I/P -> "1011"
   O/P -> 11
2. **Prime Factorization:** Write a function that takes a positive integer as input and returns its prime factorization as a list /array
   Example:
   I/P: 24
   O/P: [2, 2, 2, 3] # Prime factorization of 24

Advance

1. **Linked List operations:** Write a program to perform the following singly linked list operations
   a. **Insert the node** at a particular position in linked list
   b. **Display the elements** of the linked list

Bridge Labs

Set #9A

Basic

1. **Fibonacci Series:** Develop a program to generate the Fibonacci series up to a specified number of terms. The number of terms should be taken as input, and the series should be the output. Optional - develop this is a function where input argument is number of terms return is Fibonacci array.
   Example:.
   I/P: 6
   O/P: [0, 1, 1, 2, 3, 5]
2. **Anagram Checker**: Develop a program that takes two strings as input and checks whether they are anagrams (contain the same characters in any order) or not
   Example : "listen", "silent" are anagrams

Intermediate

1. **Binary to Decimal** :Write a function to **convert a binary string to decimal integer number.**
   Example:
   I/P -> "1011"
   O/P -> 11
2. **Prime Factorization:** Write a function that takes a positive integer as input and returns its prime factorization as a list /array
   Example:
   I/P: 24
   O/P: [2, 2, 2, 3] # Prime factorization of 24

Advance

1. **Linked List operations:** Write a program to perform the following singly linked list operations
   a. **Insert the node** at a particular position in linked list
   b. **Display the elements** of the linked list

Bridge
Labs

Set #10

Basic

1. **Array Intersection:** Develop a program that takes two arrays as input and returns a new array containing elements common to both input arrays.
   Example:
   I/P: [1, 2, 3, 4, 5], [3, 5, 7, 9]
   O/P: [3, 5]

2. **Word Frequency Counter:** Create a program that takes a sentence as input and the frequency of each word in the sentence. Output the word frequencies.
   Example:
   I/P: "the quick brown fox jumps over the lazy dog"
   O/P: {'the': 2, 'quick': 1, 'brown': 1, 'fox': 1, 'jumps': 1, 'over': 1, 'lazy': 1, 'dog': 1}

Intermediate

1. **Matrix Transposition:** Create a program that transposes a given matrix. The matrix should be taken as input, and the transposed matrix should be the output.
   Example:
   `I/P: [[1, 2, 3], [4, 5, 6], [7, 8, 9]]`
   `O/P: [[1, 4, 7], [2, 5, 8], [3, 6, 9]]`

2. **Stack Implementation:** Implement a basic stack data structure with functions for push, pop, and checking if the stack is empty. Test the implementation with a sequence of operations.

Advance

1. **Write a program to perform the following operations on a linked list.**
   a. Find the duplicate number in a linked list and delete it.

Name :- MADH
Mob no :- 9
mail :- m

Basic

1

Set 23B

Basic

1. Write a ***TemperatureConversion*** program, given the temperature in Fahrenheit as input outputs the temperature in Celsius or vice versa using the formula

   Celsius to Fahrenheit: (°C × 9/5) + 32 = °F
   Fahrenheit to Celsius: (°F − 32) x 5/9 = °C

   Program prompts first to get the unit of temperature and then temperature value. Based on the unit entered, it uses one of the above formulae.

   eg.

   I/P -> Enter the unit of temperature (C/F) : F

   Enter temperature in (F) : 96.4

   O/P -> 35.778 C

2. **Write a program to check the presence of a character in a given word**

   eg. I/P ->"Enter the word ": Cheque
   -> "Enter the character to search" : k

   O/P : Character k is not present in the word Cheque

3. **Develop a program to find minimum in a given set of numbers**

   eg I/P → [18, 8, 21, 15, 12, 6, 18, 37, 23]
   O/P → 6

   P.S. Do not use any library/std function

4. **From a given set of numbers, pick up the odd numbers and form an array/list.**

   e.g I/P : [20, 10, 21, 45, 12, 8, 19, 37, 44]
   O/P: [21, 45, 19, 19, 37]

Intermediate

5. **Write a program /logic/ pseudo code to perform the following singly linked list operations**

   a. Insert the node at a particular position in linked list
   b. Delete the node at a particular position in linked list
   c. Print the elements of the linked list

Bridge Labs

Set 23C

Basic

1. Write a program to compute ***Euclidean Distance*** between two points. x & y coordinates of 2 points are the input.
   Program takes 4 numbers(x1, y2, x2, y2) as input

   Euclidean Distance : $\sqrt{(x2 - x1)2 + (y2 - y1)2}$
   For square root computation, plan using std function.

   Optional part: Try to develop a method/ function for the above computation where x & y coordinates of both the points are passed as an argument and it returns the Euclidean Distance.

2. Compute the **average (arithmetic mean)** for an array /list of integer numbers.

   Arithmetic Mean = $(\sum x(i)/n$, *where n is number of integer numbers /size of array*

   eg. I/P : 8, 6 4, 4, 5, 6, 3, 5, 9
   O/P : 5.5

3. Write a program to **check the presence of a character in a given word.** Ignore the case of characters in the word entered.

   eg. I/P ->"Enter the word ": Knight
   -> "Enter the character to search" : k

   O/P : Character k is not present in the word knight

4. From a given list/ array of numbers, **pick up the even numbers and form an array/list.**

   e.g I/P : [20, 10, 21, 45, 12, 8, 19, 37, 44]
   O/P: [21, 45, 19, 19, 37]

Intermediate

5. **Write a program /pseudo code to perform the following in circular linked list**

   a. Search an element
   b. Delete an element

Bridge
Labs

Set 23D

Basic

1. **User Input and Replace String Template "Hello <<UserName>>, How are you?"**

   a. **I/P** -> Take User Name as Input. *Ensure UserName has min 3 char*
   b. **Logic** -> Replace <<UserName>> with the proper name
   c. **O/P** -> Print the String with User Name as specified above

2. **Compute the sum of even numbers for a given array /list of integer numbers.**

   eg. I/P : 8, 6 4, 4, 5, 6, 3, 5, 9
   O/P : 28

3. Write a program to **convert a decimal number in binary.** Check the entered number is between 0 to 255. If not entered correctly generate an error with an appropriate message.

   eg. I/P -> 11
   O/P -> 1011

   optional - develop this as a method/ function where i/p is decimal number return is binary number.

4. Write a program to **compute the factorial (!)** of a number .

   e.g 4! = 4 * 3 * 2 * 1 = 24

Intermediate

5. **Merge a linked list into another linked list at alternate positions**

   I/P-->first list is 5->7->17->13->11 and second is 12->10->2->4->6

   O/P-->first list should become 5->12->7->10->17->2->13->4->11->6 and second list should become empty.

Bridge
Labz

Set 23E

Basic

1. **Write a program which takes the coordinate of a point (x,y) and checks in w quadrant number lies.**

   a. **I/P** -> Takes x , y as user input
   b. **Logic** ->
      - Both x & y positive -> First Quadrant
      - x negative & y positive -> Second Quadrant
      - x negative & y negative -> Third Quadrant
      - x positive & y negative > Fourth Quadrant
      - x & y both 0 -> Origin
   c. **eg**

      Input : x =10, y = -5 ,
      Output : Point with coordinate (10, -5) is at Fourth Quadrant

2. **Develop a program which reverse the digits of a number. Number is taker user input. At the end of the program it prints input number and reversed di number.**

   eg. I/P : 789
   O/P : Reverse of number 789 is : 987

3. **Write a program which compares characters in two strings and creates a new string with characters which are common in both.**

   eg. I/P -> "cat", "rat"
   O/P -> "at"

4. **Write a program to which swaps every 2 elements of an array if it is an even sized array and creates a new array. For an odd sized array, it ignores the last element.**

   e.g. I/P -> [4, 8, 9, 5, 6, 7, 9]
   O/P -> [8, 4, 5, 9, 7, 7, 9]

   optional : have swap as function /method

Intermediate

5. **For a linked list, reverse the list using stack**

Labz

Set 23F

Basic

1. **Compute Total, Overall Percentage and Grade of a student's Physics, Chemistry & Maths marks.**

   a. **I/P** -> Name, Phy Marks, Chem Marks, Maths Marks

   b. **Logic** ->

   - Based on overall percentage: Grade A - 80% +, Grade B - 60%+, Grade C - 50%+ , Grade D - 40%+, Grade E-30%+, Grade F < 30%

2. **Develop Program to Check for Anagrams -** whether two strings are anagrams or not? Description of anagram is a word or a phrase that can be created by rearranging the letters of another given word or phrase. We ignore white spaces and letter cases. The all letters of "Desperation" can be rearranged to the phrase "A Rope Ends It".

3. **Develop a program which creates a running average (also called rolling average or moving average) of every 3 elements of an array.**

   Logic : take the first 3 elements of the array, compute the average, then starting from the 2nd element take 3 elements and compute the average.
   Optional : Have the average computation as function
   eg.
   I/P: [36.5, 36.2, 35, 32, 32.5, 33.8, 28.2, 29.1, 28.6]
   O/P: [35.9, 34.4, 33.17, 32.77, 31.5, 30.37, 28.6, 28.5]

4. **Write a program to generate a Fibonacci series of size 20**

   Fibonacci Series: a set of integers (the Fibonacci numbers) that starts with a zero, followed by a one, then by another one, and then by a series of steadily increasing numbers. The sequence follows the rule that each number is equal to the sum of the preceding two number
   optional : Try this as recursion

Intermediate

5. **Write a program to Find the duplicate number in a linked list and then delete it.**

Bridge Labz

Set 23G

Basic

1. Write a program to compute monthly EMI payment amount of a personal loan.Program takes user input like Principal amount (P), Number of Years (Y) and percent interest Rate (R). Interest is compounded monthly.

   The formula is

$$payment = \frac{P\ r}{1\ -\ (1\ +\ r)^{(-n)}}, \quad \text{where } n = 12 * Y,\ r = R\ /\ (12 * 100)$$

2. Write a function or method to compute ***PowerOf2*** that takes one argument n and returns 2^n. Call this function or method from the main program . In the main program n is taken as user input

3. Write a program to check whether an input string is **Palindrome** or not. Based on logic it prints out Palindrome: Yes /No

   eg.

   I/P: JATIN O/P: Palindrome : No

   I/P: KANAK O/p: Palindrome : Yes

4. Create a program to find **duplicate numbers in an array of numbers.** Develop a program which finds out duplicate numbers from an array and create a new array with duplicate numbers.

   eg. Input :
   Array : [10, 20, 12, 18, 14, 14, 17, 18, 19, 15, 20, 17]
   Output: [14, 17, 18, 20]

Intermediate

5. Write a program to sort an array of floating point numbers using any algorithm.

Bridge
Labz

Set 23H

Basic

1. **Character coding with shift by 1:** Write a program where a word is taken as input and each character of that word is replaced with the next character as p alphabetical order. That means the character 'd' will be replaced by 'f' , 'p' by ' by 'a'.
   For simplicity - one can convert all characters as lower case.

   eg. input : test
   output : uftu

2. Write a program ***RollDie*** that generates the result of rolling a fair six-sided die (integer between 1 and 6 randomly as one rolls the die each time).
   Repeat the Die Roll 20 times and suggest which number came up maximum nur of times. Compute the percentage also.

   eg If a die is rolled 7 times and numbers received are [1, 3, 6 , 6, 5, 6, 2], #6 max ti

3. **Create a unique array from two different arrays of numbers.** Develop a program which takes two arrays as input and creates a new array where each element is uniq

   eg. Input :
   Array 1: [10, 20, 12, 18, 14]
   Array 2: [12, 10, 16, 22, 12]
   Output: [10, 20, 12, 18, 14, 16, 22]

4. **Harmonic Number** - Develop a program to compute Harmonic number

   Nth harmonic number: 1/1 + 1/2 + ... + 1/n
   n is a user input . *n can not be zero*

Intermediate

5. **Write a program to Find the duplicate number in a linked list and then delete it.**