APC – PRACTICAL – PROBLEM STATEMENTS

*** There may be duplicate statements here.**

1. WAP to calculate area and perimeter of a rectangle by accepting length and breadth as input.
2. WAP to calculate area of a circle using math library method. Take radius of the circle as input.
3. WAP to accept diagonal of a square and calculate area, parimeter
4. WAP to calculate and display radius of a circle by taking the area as input.
5. WAP a program that accept number of days as input and represent it as years, months and days.
6. WAP that accept seconds as input and represent it an hours, minutes and seconds.
7. WAP that accept basic salary of an employee and display gross salary, net salary generated by below formula. DA = 25% of the basic salary. HRA = 12.5% of the basic salary. PF = 10% of the basic salary. gross salary = basic salary + da + hra net salary = gross salary - pf
8. WAP to multiply and divide a number by 4 without using multiplication and division operator.
9. WAP to swap two integer variable without using Third variable.
10. WAP to calculate and display the valve of the given expression : (1/a^3) + (1/(b+2)^3) + (1/(c^4 + root(2))) take a, b, c as input.
11. Write a program to input positive number and check whether the number is perfect square or not. If the number is negetive then display appropriate message
12. Write a program to input three integer and find out second largest
13. Write a program to input sum(p), rate of interest(r), time(t) and type of interest ('s' for simple interes, 'c' for compound interest), then calculate and display the earned interest
14. Write a program to calculate and display the maturity amount taking the sum and number of days as input.

```
No. of Days    Rate of Interest
=========      ===========
<= 180          5.57 %
181 - 364       7.75 %
365 - 500       9.25 %
> 500           9.15 %
```

15. Write a program to display all numbers between lb (lower bound) and up (upper bound) which ends with digit 7 or divisible by 7.
16. Write a program to check palindrome number.
17. Write a program to check perfect number.
18. Write a program to check Automorphic Number.
19. Write a program to find hcf of two numbers
20. Write a program to check if two number is co-prime or not
21. Write a program to check special number (sum of digit + product of digit = original number)
22. Write a program to accept a number and check whether the number is twisted prime or not
23. Pattern :
    (a) 1, -3, 5, -7, 9, -11, ... upto n times
    (b) 0, 3, 8, 15, ... upto n times
24. Pattern:

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

25. Pattern:

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

26. Pattern:

```
5
```

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

27. Pattern:

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

28. Pattern:

```
1
2    3
4    5    6
7    8    9    10
11   12   13   14   15
```

29. Pattern:

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

30. Pattern:

```
#
@  @
#  #  #
@  @  @  @
#  #  #  #  #
```

31. Pattern:

```
1    2    3    4    5
6    7    8    9
10   11   12
13   14
15
```

32. Pattern:

```
A
B    B
C    C    C
D    D    D    D
E    E    E    E    E
```

33. Print the factorial of the digits off a number
34. Take a Range as input from user and print the prime number between it.
35. Print all the 3 and 4 digit palindrome number.
36. Check krishnamurty number.
37. Show all the armstrong number between a range.
38. Print all combinations of two two-digit numbers such that the sum of digits of both numbers is equal. Example: 23 and 41 → (2+3) = 5, (4+1) = 5.
39. Write a C program to print all unique combinations of three numbers (a, b, c) such that: $1 \le a, b, c \le 30$ and $a^2 + b^2 = c^2$ (Pythagorean triplets)
40. Write a C program to count how many numbers between 100 and 999 have all distinct digits (e.g., 123, 709, 981).
41. Write a C program to find and print all twin prime pairs between 1 and n using nested loops. (Twin primes are prime numbers having a difference of 2, like 11 and 13)
42. Write a function to check whether a given string is a palindrome. Use this function to determine whether an entered string is Palindrome.
43. Write a function to print Fibonacci series upto n.

STUDENT – DEFINED – PROBLEM STATEMENT

*** There may be duplicate statements here.**

1. Write a C program that includes a user-defined function named isPrime with the signature int isPrime(int num); The function should take an integer as a parameter and return 1 if the number is prime and 0 otherwise.
2. Write a C program that includes a user-defined function named isArmstrong with the signature int isArmstrong(int num);. An Armstrong number is a number that is equal to the sum of its own digits each raised to the power of the number of digits. For example, 153 is an Armstrong number because 1^3 + 5^3 + 3^3 = 153
3. Write a C program that includes a user-defined function named isPerfect with the signature int isPerfect(int num);. A perfect number is a positive integer that is equal to the sum of its proper divisors, excluding itself. For example, 28 is a perfect number because the sum of its divisors (1, 2, 4, 7, 14) equals 28.
4. Write a C program that takes an integer input representing a month (1 to 12) and a year. Use a switch statement to display the number of days in that month, considering leap years.
5. Write a C program that defines an array of integers, and includes a user-defined function named reverseArray with the signature void reverseArray(int arr[], int size);. The functions hould reverse the elements of the array.
6. Write a C program that includes a user-defined function named findLargest with the signature int findLargest(int arr[], int size);. The function should take an array of integers and its size, and return the largest element in the array.
7. Write a C program that includes a user-defined function named binarySearch with the signature int binarySearch(int arr[], int size, int target);. The function should perform a binary search on a sorted array of integers and return the index of the target element if found, and -1 otherwise.
8. Write a C program that includes a user-defined function named countSetBits with the signature int countSetBits(int num);. The function should count and return the number of set bits (1s) in the binary representation of the given number.
9. Write a C program that includes a user-defined function named setBit with the signature int setBit(int num, int position);. The function should set the bit at the specified position (0-indexed) to 1 and return the modified number.
10. Write a program to compute the sum and product of digits of an integer using user defined functions.
11. Write a program to reverse a non-negative integer using a function.
12. Write a program to compute the sum of the first n terms of the series using a function: S=1−2+3−4+5−6+…
13. Write a function to check whether a number is prime or not. Use the same function to generate all prime numbers less than 100.
14. Write a function to check whether a given string is a palindrome. Use this function to determine whether an entered string is Palindrome.
15. Write a program using a function to compute and display all factors of a given number.
16. Write a program to swap two numbers using pointers (user-defined function).
17. Write a program that takes the radius of a circle as input, passes it to a function that computes area and circumference, and displays results in main().

Theory Class – Topics

1. Basic Chit Chat about How to write code, compile one and run.
2. Data types
3. Variable
4. Operators
5. Increment, Decrement
6. Ternary Operations
7. Switch Case
8. 3 Types of Loop
9. Jump Statement
10. 1d Array
11. 2d Array
12. String (Initial part, Ex: How to define and use one without any functions like strcat(), strcpy(), atoi(), strcmp(), strdup() etc.)
13. User-Defined Function
14. Recursion, Tail Recursion
15. Pointer
16. Dynamic Memory Allocation