Assignment-1: -

Work with known programs and debug them with **gdb** wherever necessary. Use various options of gcc like **-E, -c, -S, -g, -O0, -O1, -O2, -O3** etc. to understand various development phases, optimizations. Also explore other tools like **cpp,as, ld** etc.

Basics:-

1. Swapping of two no.s (with, without temporary, one line code with xor operator)
2. Write a program to find area, perimeter of the circle
   a) consider PI as symbolic constant
   b) consider pi as constant double variable

   Check the preprocessed output for above program using **-E option of gcc** or with the tool **cpp** in both the cases, which is preferred among these two alternatives,justify.
3. Differentiate between post, pre decrement operators
   a) k=i++, k=++i
   b) y=x++*10, y=++x*10
   c) q=p--/3, q=--p/3
4. Reversing 4 digit no.
5. Conversion of ip address in a.b.c.d format into 32 bit unsigned integer and vice versa
6. Using bitwise operators for the expressions for
   a) set k^{th} bit
   b) reset k^{th} bit
   c) flip k^{th} bit
   d) query the k^{th} bit
7. Biggest of 3 no.s using conditional operator
8. Using sizeof operator find no.of bytes required for different data types
9. Find the max,min values supported by different data types with the constants defined in limits.h
10. Write a program to convert time between hh:mm:ss format and total no.of seconds(note:- you may take the input hh,mm,ss separately, need not be in string form)
    for eg:- 1:2:30 ==> 3750
    8000 ==> 2:13:20
11. Go through the functions provided in math.h, ctype.h files

12. Formatted I/O using printf (%5d, %05d,%-5d,%8.2f, %.2f etc.)
13. Given a=10,b=20,c=30 evaluate the following

```
d=++a,++b,++c,a+5;
d=(++a,++b,++c,a+5);
```

14. Justify the output of following code.

```
int a=10,b;
b=sizeof(++a)
printf("a=%d,b=%d\n",a,b);
```

15. Give the output of following code.

```
char c1='A';
printf("%d,%d\n",sizeof(c1), sizeof('A'));
```

16. Evaluate following expressions,find x,y,z values in each case assuming x=1,y=5 initially, what do you observe

    a) z=++x && ++y;
    b) z=--x && --y;
    c) z=++x || ++y;
    d) z=--x || --y;

17. Find sum & avg of elements in an array
18. Find min & max element in an array
19. Reversing an array in memory
20. Addition of two arrays
21. Addition, Subtraction of long integers
22. No. conversions (decimal, binary, octal, hexadecimal)
23. Polynomial evaluation where coefficients are stored in an array
    a0xn+a1xn-1+a2xn-3+...+an
24. Addition, Subtraction, Multiplication of two matrices
25. Transpose of a matrix
26. Trace of a matrix
27. Determinant for 2x2 , 3x3 matrices

28. Solving linear equations

    a1x+b1y=c1; a2x+b2y=c2

    a1x+b1y+c1z=d1; a2x+b2y+c2z=d2; a3x+b3y+c3z=d3

29. Generation of identity, null matrices

30. Checking whether given matrix is identity or not?

31. Checking whether given matrix is null or not?

32. Finding day of week based on reference date, say 1st January 1970 which is thursday.

    (Hint:- calculate no.of days elapsed from reference date to given date)