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, nm,objdump** etc.

Basics:-

- Swapping of two no.s (with, without temporary, one line code with xor operator)
- 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.
- 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
- Reversing 4 digit no.
- Conversion of ip address in a.b.c.d format into 32 bit unsigned integer and vice versa
- 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
- Biggest of 3 no.s using conditional operator
- Using sizeof operator find no.of bytes required for different data types
- Find the max,min values supported by different data types with the constants defined in limits.h
- 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

- Go through the functions provided in math.h, ctype.h files
- Formatted I/O using printf, scanf (%5d, %05d,%-5d,%8.2f, %.2f etc.)
- Given a=10,b=20,c=30 evaluate the following

  d=++a,++b,++c,a+5;

  d=(++a,++b,++c,a+5);
- Justify the output of following code.

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

- Give the output of following code.

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

- 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;

Arrays:-

- Find sum & avg of elements in an array
- Find min & max element in an array
- Reversing an array in memory
- Addition of two arrays
- Addition, Subtraction of long integers
- No. conversions (decimal, binary, octal, hexadecimal)
- Polynomial evaluation where coefficients are stored in an array

  a0xn+a1xn-1+a2xn-3+...+an
- Addition, Subtraction, Multiplication of two matrices
- Transpose of a matrix
- Trace of a matrix
- Determinant for 2x2 , 3x3 matrices
- Solving linear equations

  a1x+b1y=c1; a2x+b2y=c2

  a1x+b1y+c1z=d1; a2x+b2y+c2z=d2; a3x+b3y+c3z=d3
- Generation of identity, null matrices
- Checking whether given matrix is identity or not?
- Checking whether given matrix is null or not?
- 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)