1."Find the values of a and b for which the parabola ax2 = ax 4by + 3 passes through the points (3, -1) and (-3, -2.5)."

2.A cube has an edge length of 10 cm. Inside the cube, a right circular cylinder is placed such that the base of the cylinder exactly coincides with one fade of the cube, and the height of the cylinder is equal to the edge length of the cube.

Find the volume of the remaining part of the cube after removing the cylinder.

3.A FAT (File Allocation Table) based file system is being used on a disk with total size 100 x 10 bytes. The data block (cluster) size is 10 bytes, and each entry in the FAT occupies 4 bytes of overhead. What is the maximum size of a single file that dan be stored on this disk (in units of 10" bytes) 7

4.A body of mass 0.5 kg is dropped from a height of 2 m above the ground and collides with another body of mass 1.5 kg that is initially at rest. After the collision, both bodies move together with the same velocity. Assuming the acceleration due to gravity to be 9.8 m/s and neglecting air resistance, find the loss of kinetic energy during

5.A priority queue is implemented as a Max-Heap. Initially, it has 5 elements. The level-order traversal of the heap is: 10 8 5 3 2 Two new elements 11 and 7 are inserted into the heap in that order. The level-order traversal of the heap after the insertion of the elements is:

6.

Three processes A, B and C each execute a loop of 100 iterations. In each iteration of the loop, a process performs a single computation that requires t_c CPU milliseconds and then initiates a single I/O operation that lasts for t_{io} milliseconds. It is assumed that the computer where the processes execute has sufficient number of I/O devices and the OS of the computer assigns different I/O devices to each process. Also, the scheduling overhead of the OS is negligible. The processes have the following characteristics:

Process id	t_c	t_{io}
A	100 ms	500 ms
B	350 ms	500 ms
C	200 ms	500 ms

The processes A, B, and C are started at times 0, 5 and 10 milliseconds respectively, in a pure time sharing system (round robin scheduling) that uses a time slice of 50 milliseconds. The time in milliseconds at which process C would *complete* its first I/O operation is _____.
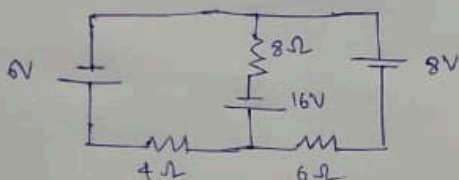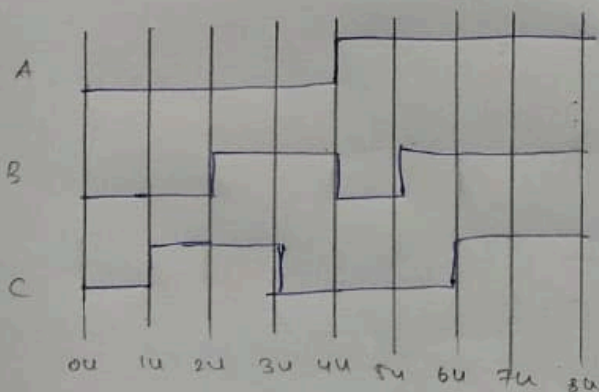
①
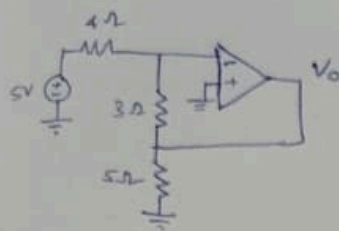
Assuming op-amp is an ideal, find the V_o

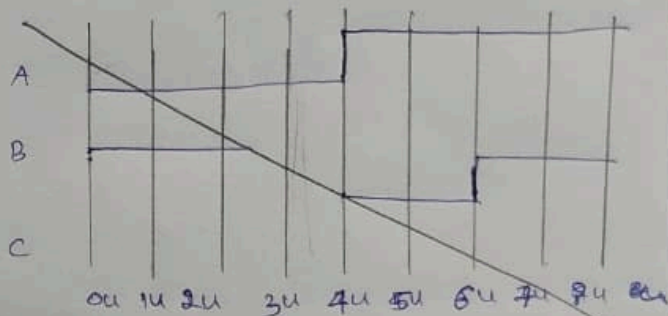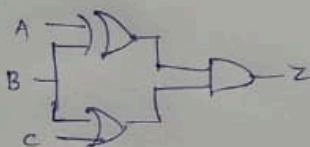② Two bulbs B_1 and B_2 has rating of 20W/220V and 100W/220V respectively are connected in series. An input voltage of 440V is supplied. Find which bulb will fuse out first and find the voltage drop across the bulb which causes to fuse.

③

Find the current across 4Ω resistor?

④

8.
```c
#include <stdio.h>
int fun(int n)
{
    static int x = 0;

    if (n == 0)
        return x;

    x += n;
    return fun(n - 1);
}
int main()
{
    printf("%d\n", fun(3));
    printf("%d\n", fun(2));
    return 0;
}
```

9.
```c
#include <stdio.h>
void Fun(int *arr, int n)
{
    *(arr + 1) = arr[0] + n;
    arr[2] = (*(arr + 2))++;
}
int main()
{
    int arr[3] = {4, 5, 10};
    int *ptr = arr;
    int X, Y, Z;
    Fun(arr, *(arr + 1));
    X = *ptr++;
    Y = (*ptr)++;
    Z = ++(*ptr);
    printf("%d %d %d %d %d %d", X, Y, Z, arr[0], arr[1], arr[2]);
}
```

Soliton Programming round 1 :

1. Add two Binary numbers without converting to decimal.
Sample test case :
Line1 : 11
Line 2: 1

Output : 100

2. Find largest number smaller than N with same set of digits

Given a number N in the form of string. The task is to find the greatest number that has same set of digits as N and is smaller than N. If it is not possible to find any such number, then print "not possible".

Examples:

Input: N = "218765"
Output: 218756

Input: N = "1234"
Output: Not Possible

Input: N = "262345"
Output: 256432

3. Numerical Standard Conversion (Indian, US, German)
Different regions represent large numbers using different separators.
The numeric value remains the same, only the placement of , and . changes.

1 Indian Standard
Comma after 3 digits from right
Then commas after every 2 digits
Decimal separator: .

Example
12345678.9 → 1,23,45,678.9

2 US (International) Standard
Comma after every 3 digits from right
Decimal separator: .

Example
12345678.9 → 12,345,678.9

3 German (European) Standard
Dot (.) as thousands separator
Comma (,) as decimal separator

Example
12345678.9 → 12.345.678,9

📝 CODING ROUND PROBLEM STATEMENT

You are given a number as a string formatted according to a specific numerical standard —
Indian, US, or German.
Your task is to convert this number into another given numerical standard without changing its
numeric value.
The output must strictly follow the separator rules (. and ,) of the target standard.
Input Format
A string N representing the number
A string T representing the target standard

Output Format
Print the number formatted according to the target numerical standard

Constrain
Sample Input
N = 12,345,678.75
T = Indian

Sample Output
1,23,45,678.75

Sample Input
N = 1,23,45,678.5
T = German

Sample Output
12.345.678,5

Sample Input
N = 12.345.678,25
T = US

Sample Output
12,345,678.25