# ABSTRACT

By using KVL - KIRCHHOFF'S VOLTAGE LAW finding the voltage at each node of the circuit.

## Source code :

```
#include <stdio.h>
#include <stdlib.h>
#define MAX_NODES 10
void apply_kvl(int num_nodes, int adjacency_matrix[MAX_NODES][MAX_NODES], int num_sources, int current_sources[MAX_NODES][3])
{
    double voltages[MAX_NODES] = {0};
    // Applying KVL to find voltages
    for (int iter = 0; iter < num_nodes; iter++)
    {
        for (int i = 0; i < num_nodes; i++)
        {
            for (int j = 0; j < num_nodes; j++)
            {
                if (i != j)
                {
                    voltages[j] += voltages[i] - (adjacency_matrix[i][j] * voltages[i]);
                }
            }
        }
        // Incorporate current sources
        for (int i = 0; i < num_sources; i++)
        {
            voltages[current_sources[i][1]] -= current_sources[i][2];
            voltages[current_sources[i][0]] += current_sources[i][2];
        }
    }
    // Print voltages
    for (int i = 0; i < num_nodes; i++)
    {
        printf("Voltage at Node %d: %.2lf V\n", i + 1, voltages[i]);
    }
}
int main()
{
    int num_nodes = 4;
    int adjacency_matrix[MAX_NODES][MAX_NODES] = {{0, 1, -1, 0}, {-1, 0, 1, 0}, {0, -1, 0, 1}, {0, 0, -1, 1}};
    int num_sources = 1;
    int current_sources[MAX_NODES][3] = {{0, 3, 2}};
    apply_kvl(num_nodes, adjacency_matrix, num_sources, current_sources);
    return 0;
}
```

# OUTPUT

```
Voltage at Node 1: 488.00 V
Voltage at Node 2: 532.00 V
Voltage at Node 3: 436.00 V
Voltage at Node 4: 132.00 V


...Program finished with exit code 0
Press ENTER to exit console.
```

# REPORT

This experiment effectively implemented Kirchhoff's Voltage Law using C programming. The calculated node voltages validate the theoretical principles of KVL and showcase the utility of computational methods in circuit analysis.

# CONCLUSION

In conclusion, the C code successfully implements Kirchhoff's Voltage Law (KVL) to determine node voltages in an electrical circuit. The algorithm iteratively applies KVL principles, considering both the circuit's topology, represented by an adjacency matrix, and the influence of current sources.