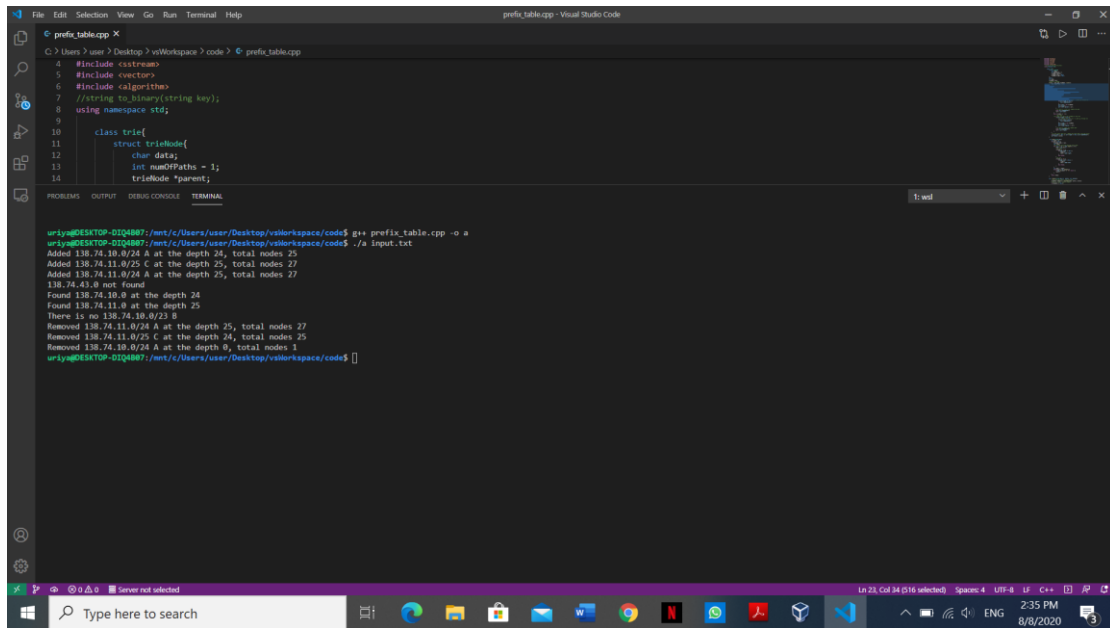


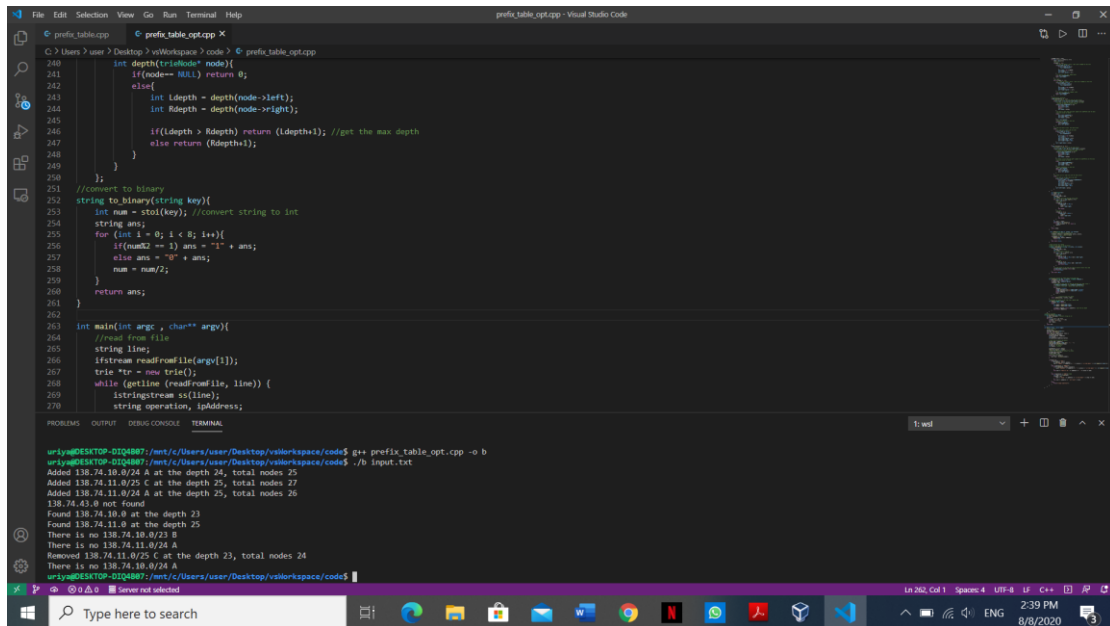
## Prefix table running example:



```
File Edit Selection View Go Run Terminal Help
prefix_table.cpp - Visual Studio Code

C:\Users\user\Desktop\vsWorkspace> code .
4 #include <stream>
5 #include <vector>
6 #include <algorithm>
7 //string to binary(string key);
8 using namespace std;
9
10 class trie{
11     struct trieNode{
12         char data;
13         int numOfPaths = 1;
14         trieNode *parent;
15     };
16
17     //convert to binary
18     string toBinary(string key){
19         int num = stoi(key); //convert string to int
20         string ans;
21         for(int i = 0; i < 32; i++){
22             if((num >> i) & 1) ans = "1" + ans;
23             else ans = "0" + ans;
24         }
25         num = num/2;
26         return ans;
27     }
28
29     int depth(trieNode* node){
30         if(!node->data) return 0;
31         else{
32             int lDepth = depth(node->left);
33             int rDepth = depth(node->right);
34             if(lDepth > rDepth) return (lDepth+1); //get the max depth
35             else return (rDepth+1);
36         }
37     }
38
39     //convert to binary
40     string toBinary(string key){
41         int num = stoi(key); //convert string to int
42         string ans;
43         for(int i = 0; i < 32; i++){
44             if((num >> i) & 1) ans = "1" + ans;
45             else ans = "0" + ans;
46         }
47         num = num/2;
48         return ans;
49     }
50
51     int main(int argc, char** argv){
52         //read from file
53         string line;
54         ifstream readFromFile(argv[1]);
55         trie *tr = new trie();
56         while(getline(readFromFile, line)){
57             stringstream ss(line);
58             string operation, ipAddress;
59
60             uriyah@DESKTOP-DIQ4867:/mnt/c/Users/user/Desktop/vsWorkspace/code$ g++ prefix_table.cpp -o a
61 uriyah@DESKTOP-DIQ4867:/mnt/c/Users/user/Desktop/vsWorkspace/code$ ./a input.txt
62 Added 138.74.10.0/24 A at the depth 24, total nodes 25
63 Added 138.74.11.0/25 C at the depth 25, total nodes 27
64 Added 138.74.11.0/24 A at the depth 25, total nodes 27
65 138.74.43.0 not found
66 Found 138.74.10.0 at the depth 24
67 Found 138.74.11.0 at the depth 25
68 There is no 138.74.10.0/23 B
69 Removed 138.74.11.0/24 A at the depth 25, total nodes 27
70 Removed 138.74.11.0/25 C at the depth 24, total nodes 25
71 Removed 138.74.10.0/24 A at the depth 0, total nodes 1
72 uriyah@DESKTOP-DIQ4867:/mnt/c/Users/user/Desktop/vsWorkspace/code$
```

## Prefix table optimal running example:



```
File Edit Selection View Go Run Terminal Help
prefix_table_opt.cpp - Visual Studio Code

C:\Users\user\Desktop\vsWorkspace> code .
240 int depth(trieNode* node){
241     if(!node->data) return 0;
242     else{
243         int lDepth = depth(node->left);
244         int rDepth = depth(node->right);
245         if(lDepth > rDepth) return (lDepth+1); //get the max depth
246         else return (rDepth+1);
247     }
248 }
249
250 //convert to binary
251 string toBinary(string key){
252     int num = stoi(key); //convert string to int
253     string ans;
254     for(int i = 0; i < 32; i++){
255         if((num >> i) & 1) ans = "1" + ans;
256         else ans = "0" + ans;
257     }
258     num = num/2;
259     return ans;
260 }
261
262 int main(int argc, char** argv){
263     //read from file
264     string line;
265     ifstream readFromFile(argv[1]);
266     trie *tr = new trie();
267     while(getline(readFromFile, line)){
268         stringstream ss(line);
269         string operation, ipAddress;
270
271         uriyah@DESKTOP-DIQ4867:/mnt/c/Users/user/Desktop/vsWorkspace/code$ g++ prefix_table_opt.cpp -o b
272 uriyah@DESKTOP-DIQ4867:/mnt/c/Users/user/Desktop/vsWorkspace/code$ ./b input.txt
273 Added 138.74.10.0/24 A at the depth 24, total nodes 25
274 Added 138.74.11.0/25 C at the depth 25, total nodes 27
275 Added 138.74.11.0/24 A at the depth 25, total nodes 26
276 138.74.43.0 not found
277 Found 138.74.10.0 at the depth 23
278 Found 138.74.11.0 at the depth 25
279 There is no 138.74.10.0/23 B
280 There is no 138.74.11.0/24 A
281 Removed 138.74.11.0/25 C at the depth 23, total nodes 24
282 There is no 138.74.10.0/24 A
283 uriyah@DESKTOP-DIQ4867:/mnt/c/Users/user/Desktop/vsWorkspace/code$
```