Case Study

1. Write a program to develop a diagnosis system that takes symptoms of a diseases as input and identifies category/categories   of disease. Your diagnostic systems must identify at least 20 different diseases. Display names of all diseases that have at least three common symptoms in c.

```cpp
#include <string.h>
#include <string>
#include <iostream>
#include <algorithm>
#include <vector>
using namespace std;

vector<vector<string>> symptoms;
vector<string> diseases;

void printvec(vector<string> s)
{
        for(int i = 0; i < s.size(); i++) cout<<s[i]<<" ";
        cout<<"\n";
}

void init()
{
        FILE* fp = fopen("symptoms.csv","r");

        if(!fp) printf("Error reading file");
        else
        {
        char buffer[1024];
        int column = 0;

        while (fgets(buffer, 1024, fp))
        {
        column = 0;
        char* value = strtok(buffer, ",");
        vector<string> temp;

        while (value)
        {

                if(column == 0) diseases.push_back(value);

                temp.push_back(value);
```

```cpp
                value = strtok(NULL, ",");
                column++;
            }
        symptoms.push_back(temp);
        }
        fclose(fp);
    }

    for(string &s : diseases)
    {
    transform(s.begin(), s.end(), s.begin(), [](char c){ return tolower(c); });
    }

    for(vector<string> &temp : symptoms)
    {
    for(string &s : temp)
    {
    transform(s.begin(), s.end(), s.begin(), [](char c){ return tolower(c); });
    }
    }

}


void finddiagnosis(vector<string> symp)
{
        vector<string> c;
        cout<<"Possible Diagnostics: \n";
        for(int i = 0; i < symptoms.size(); i++)
        {
        int count = 0;
        for(int j = 0; j < symp.size(); j++)
        {
        if(find(symptoms[i].begin(), symptoms[i].end(), symp[i]) != symptoms[i].end())
        {
                count++;
        }
        }
        if(count>=3)
        {
        c.push_back(symptoms[i][0]);
        }
        }
        printvec(c);
```

```cpp
        cout<<"\n";
    }

    int main()
    {
        init();

        vector<string> symp;
        string temp;
        cout<<"Enter symptoms(When you want to search press s and enter): \n";
        cout<<"Press enter after giving each symptom\n";
        for(int i = 0; i < 10 ; i++)
        {
        cin>>temp;
        if(temp == "s") break;
        symp.push_back(temp);
        }
        cout<<"Your symptoms are: ";
        printvec(symp);
        finddiagnosis(symp);

        return 0;
    }
```

My Data File:

To run the program please copy-paste the below data in form of a CSV file.
feveAppendicitis,Pain in lower abdomen,Fever,Constipation,Appetite Loss,Swelling in abdomen

Bird Flu,Cough,Fever,Sore throat,Fatigue,Nausea,Vomiting,Diarrhoea
Cholera,Vomiting,Increased Heart rate,Bluish Skin colour,Low Blood pressure,Thirst,Less urine frequency,Wrinkled Hands
Common cold,Runny nose,Sore throat,Cough,fever,Sneezing,Exhaustion
Covid 19,Fever,Cough,Shortness of breath,Vomiting,Sore throat,Lost of taste or smell,Fatigue
Diabetes,Fatigue,Increased thirst,Frequent urination,Blurred vision,Unexplained weight loss,Darkened skins areas
Jaundice,Change in skin colour,Change in color of stools,itching skin,Nausea,Loss of appetite,unexplained weight loss
Kidney stone,Sharp pain in the back side ,Buring sensation on urination,Foul smelling urine,Nausea,Vomiting,Frequent urination,Change in urine color
Leukemia,Fatigue,Fever,Frequent infections,Unexplained weight loss,Tiny red spotting on skin,Dizziness,Low Blood pressure,Nausea,Fatigue,Blurred Vision,Dizziness ,Feeling of confusion,"Rapid, shallow breathing",Pale skin color
Lung cancer,Consistent cough,Blood in cough,Shortness of breath,Unexplained weight loss,Chest pain,Chest congestion,Bone pain
Malaria,fever,Chills,Headache,Vomiting,Sweat,Impaired consciousness,Respiratory problems,
Irritable bowel syndrome,Cramps,Pain in lower abdomen,Flatulence,Hard,lumpy stools,Loss of appetite
Rheumatoid Arthritis,stiffness and swelling in joints,Limping,Joint tenderness,Joint pain,Fatigue,
Stroke,Face drooping,Weakness in the arm,Difficulty in speaking:,Loss of balance,Muscle stiffness,A throbbing headache
Swine flu,Fever,Headache,sneezing,Cough,Fatigue
Tuberculosis,Pain in chest,Coughing up blood,Fatigue,Shortness of breath,Chills,Coughing continuously,Pain while breathing and coughing
Ulcers,Pain iin abdomen,Belly pain after eating,Frequent burping,Bloating,Nausea
High blood pressure,headaches,nose bleeding,short breath,vision loss,Dizziness
Migraine,Nausea,Discomfort in bright light and loud sound,Stiffness in neck,Extreme hunger,Confusion

Output:

```
PS D:\Folders\Materials\SEM-4\Coding> g++ Diagnosis.cpp -o main.exe
PS D:\Folders\Materials\SEM-4\Coding> .\main.exe
Enter symptoms(When you want to search press s and enter):
Press enter after giving each symptom
fever
vomiting
sneezing
cough
s
Your symptoms are: fever vomiting sneezing cough
Possible Diagnostics:
appendicitis bird flu common cold
```