



Vivekanand Education Society's Institute Of Technology  
Department Of Information Technology

DSA mini Project  
A.Y. 2025-26

Title: Health Checker

Sustainability Goal : Advancing Health Awareness and Accessible  
Medical Guidance

Domain: Data Structures & Algorithms  
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**1** NO  
POVERTY



**2** ZERO  
HUNGER



**3** GOOD HEALTH  
AND WELL-BEING



**4** QUALITY  
EDUCATION



**5** GENDER  
EQUALITY



**6** CLEAN WATER  
AND SANITATION



**7** AFFORDABLE AND  
CLEAN ENERGY



**8** DECENT WORK AND  
ECONOMIC GROWTH



**9** INDUSTRY, INNOVATION  
AND INFRASTRUCTURE



**10** REDUCED  
INEQUALITIES



**11** SUSTAINABLE CITIES  
AND COMMUNITIES



# THE GLOBAL GOALS

For Sustainable Development

**12** RESPONSIBLE  
CONSUMPTION  
AND PRODUCTION



**13** CLIMATE  
ACTION



**14** LIFE BELOW  
WATER



**15** LIFE  
ON LAND



**16** PEACE AND JUSTICE  
STRONG INSTITUTIONS



**17** PARTNERSHIPS  
FOR THE GOALS





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# Introduction to Project

**Health Checker** is a healthcare technology project developed using C programming with a binary decision tree architecture. This system serves as a medical assistant that conducts preliminary health assessments through intelligent symptom analysis.

By guiding users through an interactive question-and-answer process, Health Checker evaluates symptoms for over fifteen common medical conditions while providing reliable medication recommendations and implementing a crucial severity-based triage system to support informed healthcare decisions.



# Problem Statement

In today's healthcare landscape, several critical issues exist like

- 1) Limited Access to Healthcare
- 2) Information Overload
- 3) Delayed Care

There is a need for a systematic, tree-based diagnostic tool that provides reliable preliminary assessment, clear recommendations, and guidance on when professional medical care is necessary.



# Objectives of the project

- Implement binary tree for symptom assessment
- Provide preliminary health evaluation
- Offer treatment guidance (meds + home remedies)
- Determine urgency levels
- Health education & prevention tips
- Integrate maps using OpenStreetMaps API



# Scope of the project

## Target Users:

- General public seeking preliminary health guidance
- Students learning about common health conditions
- Individuals in remote areas with limited healthcare access
- People wanting to assess symptom severity before doctor visits



# Requirements of the system (Hardware, software)

## Hardware:

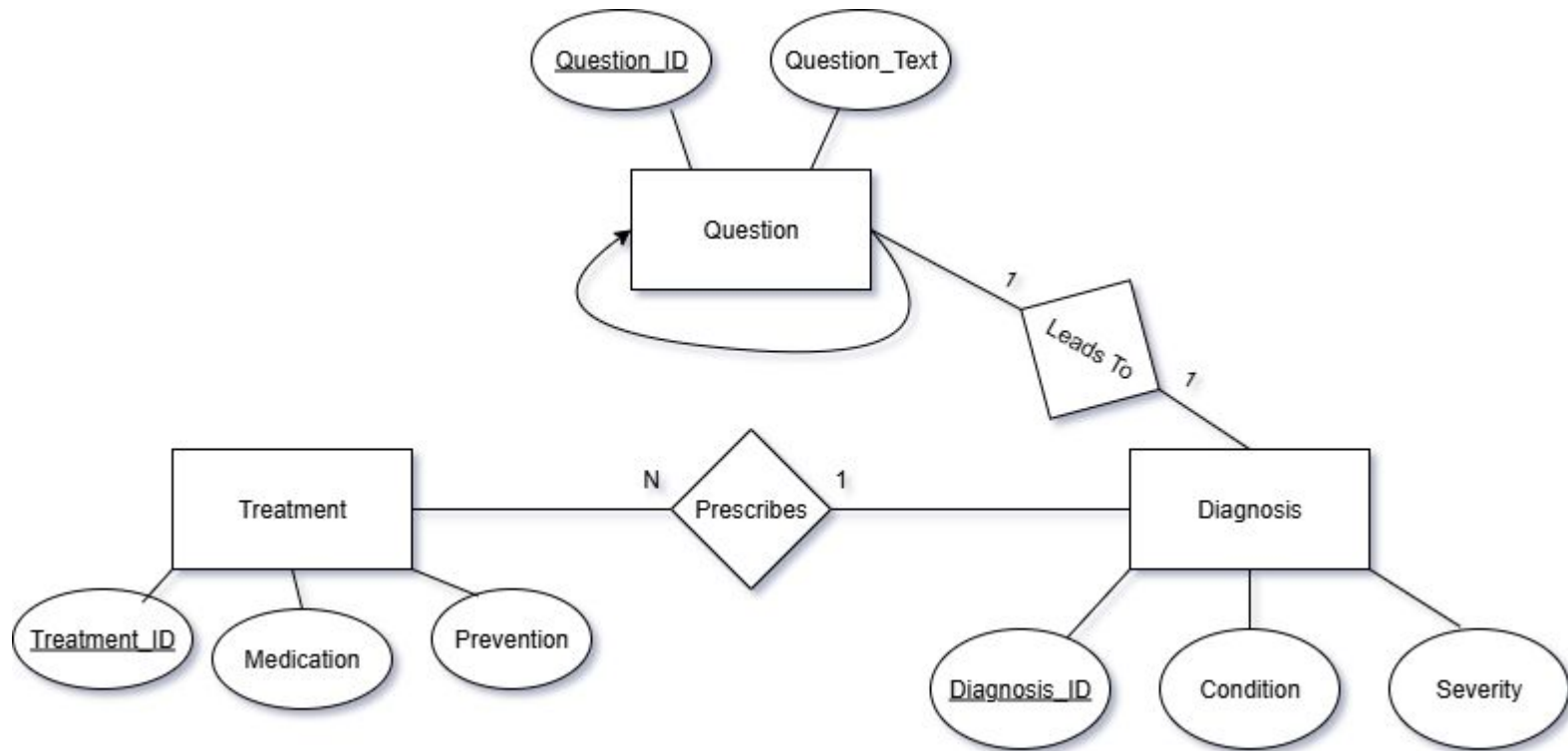
- Processor: Intel i3 or higher (Any modern processor)
- RAM: Minimum 2GB (4GB recommended)
- Storage: 50MB free disk space

## Software:

- OS: Windows 10/11
- Compiler: GCC (GNU Compiler Collection) - MinGW/TDM-GCC for Windows
- Terminal: CMD/PowerShell



# ER Diagram of the Proposed System





# Data Structures and Concepts used

## ➤ Binary Tree

Each node represents either:

- ❑ QUESTION\_NODE: A symptom-related question
- ❑ DIAGNOSIS\_NODE: Final diagnosis (leaf node)



# Time and Space Complexity

## 1) Time Complexity:

Each of the  $n$  nodes is created once during tree building.

Hence the time complexity is  $O(n)$  .

## 2) Space complexity:

We need to store all  $n$  nodes in memory simultaneously.

Hence the space Complexity is  $O(n)$  .



# Front End

- **Interactive Q&A Flow** - Guided yes/no questions about symptoms
- **Severity Levels** - Emergency, Urgent, Moderate and Mild
- **Comprehensive Diagnosis Reports including:**
  - Condition description and severity assessment
  - Home remedies.
  - Specific medication guidance with dosages
- **Multiple Health Categories covering:** Respiratory issues, Digestive problems, Headaches and pain, General wellness, etc



# Implementation

- Uses **binary decision tree** to navigate symptom assessment in C language.
- **Tree nodes contain:**
  - Question nodes for symptom interrogation
  - Diagnosis nodes for final condition assessment
- **Tree Architecture:**
  - **Root Node**: . Question nodes that branch based on Yes/No responses
  - **Leaf Nodes**: Diagnosis nodes that provide final assessment



# Gantt Chart

Task	Week 1	Week 2	Week 3	Week 4
Project Planning	✓			
Data Structure Design	✓			
Core Logic (Tree)		✓		
Traversal Algorithm		✓		
UI/CLI Implementation			✓	
Testing & Debugging			✓	✓
Documentation & Report				✓



# Test Cases

Test Case ID	Input Path	Expected Output	Status
TC-01	Severe chest pain = YES	EMERGENCY: Potential Medical Emergency	✓ Pass
TC-02	Fever >3 days + body aches + cough	Influenza (MODERATE)	✓ Pass
TC-03	Fever <3 days + mild symptoms	Common Viral Infection (MILD)	✓ Pass



# Future Scope

- Develop Desktop application
- Develop mobile application (Android/IOS)
- Expand diagnosis database to 50+ conditions .
- Voice interface for hands-free operation
- Multi-language support
- Connect with wearable devices for vital signs





# Code

## Diagnosis Structure

```
typedef struct {  
    char condition[MAX_TEXT];  
    Severity severity;  
    char description[MAX_TEXT];  
    char remedies[MAX_TEXT];  
    char medications[MAX_TEXT];  
    char when_to_see_doctor[MAX_TEXT];  
    char prevention[MAX_TEXT];  
} Diagnosis;
```

## TreeNode Structure

```
typedef struct TreeNode {  
    NodeType type;  
    char text[MAX_TEXT];  
    struct TreeNode *yes_branch;  
    struct TreeNode *no_branch;  
    Diagnosis *diagnosis;  
} TreeNode;
```



# Code

Overpass API :

```
async function searchNearbyMedicalFacilities(lat, lng) {
  try {
    const radius = 10000;
    const query = `
      [out:json][timeout:25];
      (
        node["amenity"="hospital"](around:${radius},${lat},${lng});
        way["amenity"="hospital"](around:${radius},${lat},${lng});
        node["amenity"="clinic"](around:${radius},${lat},${lng});
        way["amenity"="clinic"](around:${radius},${lat},${lng});
        node["amenity"="doctors"](around:${radius},${lat},${lng});
        way["amenity"="doctors"](around:${radius},${lat},${lng});
      );
      out body;
      >;
      out skel qt;
    `;
    const response = await fetch("https://overpass-api.de/api/interpreter", {
      method: "POST",
      body: query,
    });
  }
```



# Output Screenshots

## HEALTH CHECKER

Your Personal Health Assistant



Identify your potential health condition



Provide specific medication recommendations



Suggest home remedies and self-care tips



Tell you when professional care is needed



Daily health tips for better wellness



Find nearest hospitals and clinics



Save and review your previous assessments



Modern dark/light mode toggle

## HOW IT WORKS:

1. Answer simple YES/NO questions about your symptoms
2. Get a detailed diagnosis with treatment options
3. Follow the recommendations or seek professional help

## DAILY HEALTH TIP:

Loading health tip...



## IMPORTANT DISCLAIMER:

This tool provides **general guidance** based on common conditions. It is **NOT** a replacement for professional medical advice. If experiencing emergency symptoms, call 112 immediately!



Begin Assessment



View History



# Output Screenshots

Question 4 of 6

## QUESTION:

Are you experiencing stomach pain, nausea, or digestive issues?

✓ Yes

✗ No



# Output Screenshots

## INFLUENZA (FLU)

[!] MODERATE

### SEVERITY LEVEL:

MODERATE

### WHAT IS THIS?

You likely have the flu, a viral infection affecting the respiratory system. Most people recover within 1-2 weeks.

### HOME REMEDIES & SELF-CARE:

Rest, drink plenty of fluids (water, warm soups), use a humidifier, gargle with salt water

### RECOMMENDED MEDICATIONS:

Acetaminophen (Tylenol) 500-1000mg every 6 hours OR Ibuprofen (Advil) 400mg every 6 hours for fever/pain. Antiviral medications (Tamiflu) if prescribed within 48 hours of symptom onset

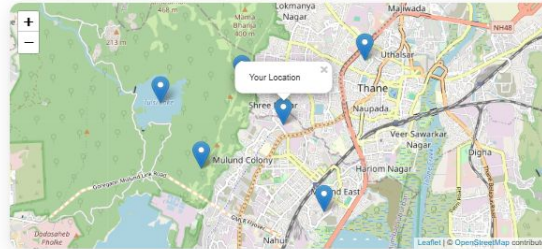
### WHEN TO SEE A DOCTOR:

If fever persists beyond 5 days, difficulty breathing develops, or symptoms worsen

### PREVENTION TIPS:

Annual flu vaccination, frequent handwashing, avoid close contact with sick individuals

### NEAREST HOSPITALS & CLINICS:



#### Nearby Medical Facilities:

##### General Hospital

123 Main St, City Center  
1.2 km

##### City Medical Center

456 Health Ave, Downtown  
2.5 km

##### Community Clinic

789 Wellness Blvd, Suburb  
3.1 km



# Conclusion

## ➤ Impacts:

- Provides preliminary health assessment without immediate doctor visit
- Helps users make informed decisions about seeking medical care
- Reduces unnecessary emergency room visits for minor conditions
- Educates users about common health conditions



# References

- The C Programming Language - Brian W. Kernighan & Dennis M. Ritchie
- C Programming: A Modern Approach - K. N. King
- Data Structures Using C - Aaron M. Tenenbaum
- Programming in ANSI C - E. Balagurusamy
- C Programming Tutorial - GeeksForGeeks