Vivekanand Education Society's Institute Of Technology
Department Of Information Technology
DSA mini Project
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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
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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 command-line based 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:

- **Limited Access to Healthcare:**
  - Long waiting times at clinics for non-emergency cases
  - Healthcare costs for routine consultations
- **Information Overload:**
  - Difficulty distinguishing between reliable and unreliable sources
  - Lack of structured guidance for symptom assessment
- **Delayed Care:**
  - People often delay seeking medical help due to uncertainty about severity

Solution: 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
- Create user-friendly CLI interface

Requirements of the system (Hardware, software)

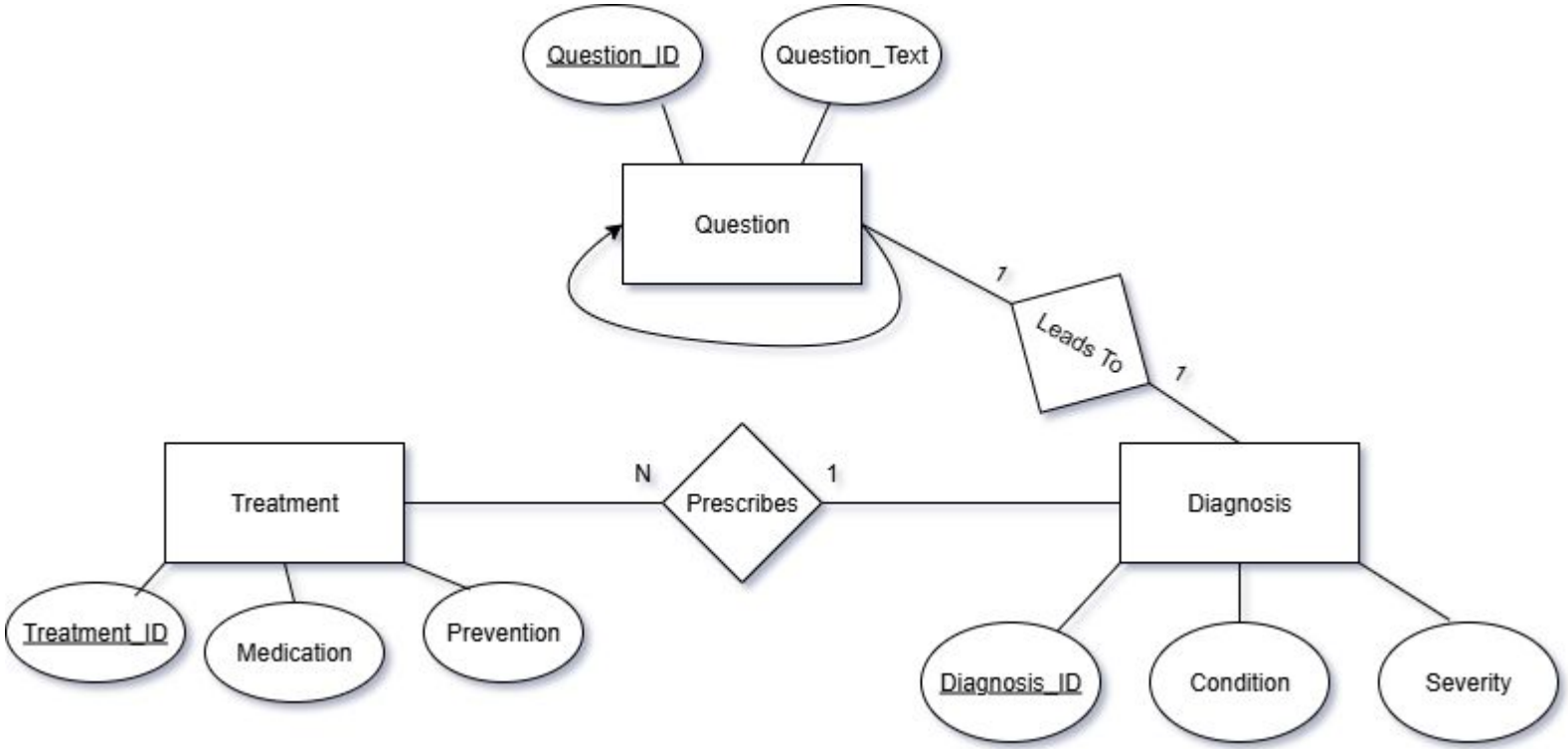
Hardware:

- 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



Front End

Health Checker provides a simple, user-friendly and intuitive CLI interface which features:

- **Interactive Q&A Flow** - Guided yes/no questions about symptoms
- **Color-coded Severity Levels** - Emergency (red), Urgent (yellow), Moderate (cyan), Mild (green)
- **Comprehensive Diagnosis Reports including:**
  - Condition description and severity assessment
  - Home remedies.
  - Specific medication guidance with dosages
  - When to seek professional medical help
- **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: Starts with emergency symptom detection (chest pain, breathing difficulty)
  - Internal Nodes: Question nodes that branch based on Yes/No responses
  - Leaf Nodes: Diagnosis nodes that provide final assessment
- **Dynamic memory allocation** using malloc and free functions in tree management.

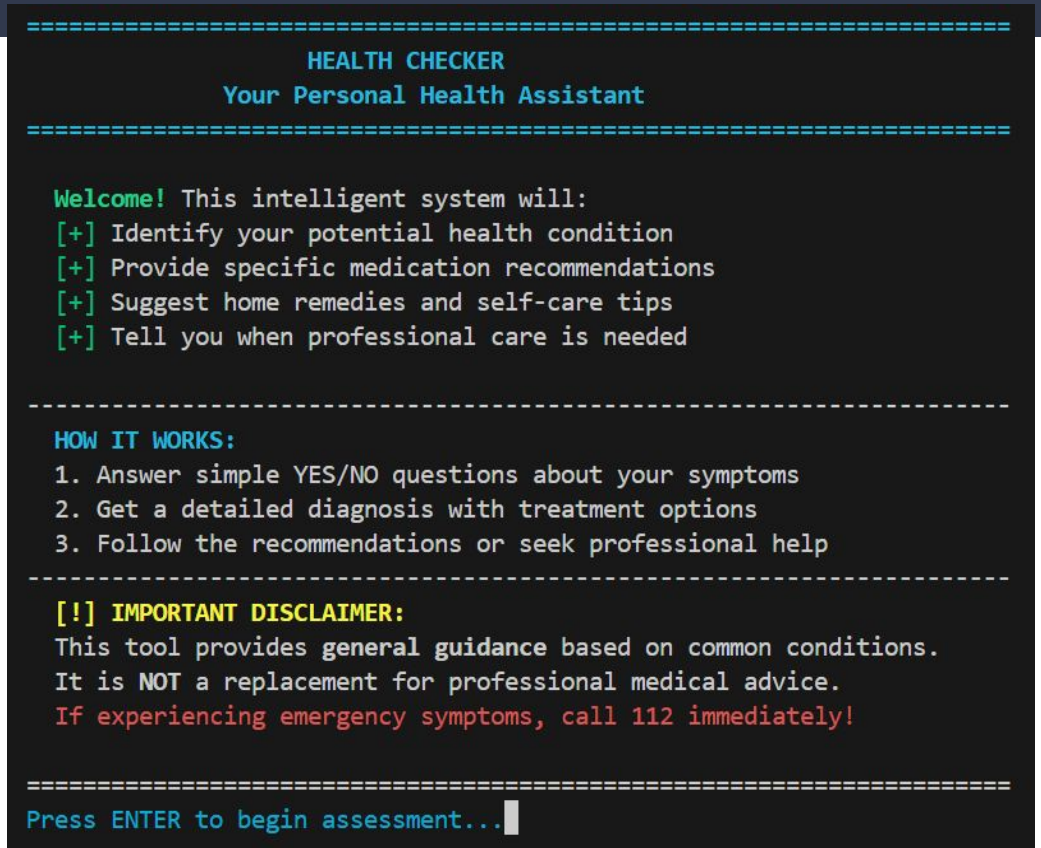
Gantt Chart

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

Output Screenshots



Output Screenshots

```
Initializing symptom checker...

----------------------------------------------------------------------
QUESTION: Are you experiencing severe chest pain, difficulty breathing, or loss of consciousness?
----------------------------------------------------------------------
Answer (Y)es or (N)o: N

----------------------------------------------------------------------
QUESTION: Do you have a fever (temperature above 38C)?
----------------------------------------------------------------------
Answer (Y)es or (N)o: Y

----------------------------------------------------------------------
QUESTION: Is your fever accompanied by severe headache, stiff neck, or sensitivity to light?
----------------------------------------------------------------------
Answer (Y)es or (N)o: N

----------------------------------------------------------------------
QUESTION: Have you had the fever for more than 3 days?
----------------------------------------------------------------------
Answer (Y)es or (N)o: Y

----------------------------------------------------------------------
QUESTION: Do you also have body aches, fatigue, and cough?
----------------------------------------------------------------------
Answer (Y)es or (N)o: Y


Analyzing your symptoms...
```

Output Screenshots

```
======================================================================
  [!] DIAGNOSIS: INFLUENZA (FLU)
======================================================================

  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

======================================================================
  IMPORTANT DISCLAIMER:
  This is for informational purposes only and not a substitute
  for professional medical advice. Always consult a healthcare
  provider for proper diagnosis and treatment.
======================================================================


======================================================================
Would you like to check another condition? (Y/N):
```

Output Screenshots

```
================================================================
                          Thank You
================================================================

  * Thank you for using the HEALTH CHECKER!
  * Remember: This is for informational purposes only
  * Always consult healthcare professionals for medical advice

================================================================
```

Conclusion

- Successfully implemented a binary tree-based health diagnostic system
- Provided specific medication recommendations with dosages
- Applied DSA concepts to solve real-world healthcare problems
- **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