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Explanation of the Code

Facts:

Symptoms: A comprehensive list of symptoms that can be used in diagnosing diseases.

Diseases: Each disease is linked to a list of its associated symptoms.

Rules:

has_disease/2: This rule checks if a user-provided list of symptoms corresponds to any disease.

subset/2: A helper rule that determines if all symptoms of a disease are included in the user-provided symptoms.

diagnose/0: This rule prompts the user to enter symptoms and provides potential diagnoses based on the input.

Queries:

You can use the following queries to test the system:

Check for a specific disease:

```
?- has_disease([fever, cough, fatigue], Disease).
```

Start the diagnosis process:

```
?- diagnose.
```

The Design of Your System

This Prolog program serves as a basic medical diagnosis system that identifies potential diseases based on user-reported symptoms. The system uses defined facts and rules to match symptoms with diseases, providing users with possible diagnoses.

How the Rules and Facts Work Together

- **Facts** are the foundation of this system. They define symptoms and diseases, establishing the relationships between them. For example, if a user reports "fever" and "cough," the system can check these against the disease facts to find potential matches.

- **Rules** are used to infer conclusions from the facts. The `has_disease/2` rule takes user symptoms and checks them against the disease facts, using the `subset/2` helper rule to verify if all symptoms of a disease are present in the user's input.

When the user inputs their symptoms via the `diagnose/0` rule, the system processes this input to find matching diseases and presents the results.

Challenges Faced During Development

- **Completeness of Knowledge Base:**

Ensuring that the list of symptoms and diseases is comprehensive was a significant challenge. It required thorough research and continuous updates based on new medical knowledge.

- **Ambiguity in Symptoms:**

Many symptoms overlap across different diseases. Designing the system to handle such ambiguities while providing accurate suggestions required careful consideration of symptom combinations.

- **User Input Variability:**

Users may input symptoms in various formats. Implementing a system to standardize and validate user input was necessary to ensure accurate diagnosis.

- **User Experience:**

Creating an interactive and user-friendly interface that guides users through the symptom input process posed design challenges, particularly in making the system intuitive.

- **Ethical Considerations:**

Addressing the ethical implications of providing medical information through a non-professional system was crucial. Clear disclaimers were needed to remind users to consult healthcare professionals for serious health issues.

Conclusion

This Prolog-based medical diagnosis system exemplifies how rules and facts can be effectively utilized to assist in identifying potential diseases based on user-reported symptoms. Despite the challenges encountered, the system provides a foundational tool for symptom analysis and disease suggestion, with opportunities for future enhancement and expansion.