



NATIONAL UNIVERSITY OF COMPUTER & EMERGING SCIENCES FAST - PESHAWAR CAMPUS

Subject: AL 2002 - Artificial Intelligence Lab

Instructor: Muhammad Saood Sarwar

Lab Task: Expert System in Prolog

Problem Statement

You are required to develop an **Expert System** using **Prolog** that can diagnose common health conditions based on user symptoms. The system should allow a user to input symptoms, and based on predefined rules, it should suggest possible diseases.

1 Tasks

1. Knowledge Representation

- Encode the given dataset into **facts** and **rules** in Prolog.
- Ensure that all symptoms and diseases are properly structured.

2. Inference Mechanism

- Write rules to determine possible diseases based on symptoms.
- Allow the system to answer user queries regarding potential illnesses.

3. Query Execution

- Implement and test queries like:

```
?- disease(ali, X).  
?- disease(ahmed, X).  
?- disease(saood, X).
```

- Verify if the system correctly identifies diseases.

2 Dataset (Convert to Prolog)

Below is a dataset containing information about different people and their symptoms. You are required to convert this data into Prolog **facts** and define **rules** to determine possible diseases.

Patient Symptoms

- Ali has a fever, cough, and headache.
- Ahmed has a sore throat, fever, and fatigue.
- Saood has sneezing, a runny nose, and itchy eyes.
- Saad has nausea, vomiting, and stomach pain.

Disease Conditions

- A person has **Flu** if they have fever, cough, and headache.
- A person has **Common Cold** if they have sneezing, runny nose, and itchy eyes.
- A person has **Strep Throat** if they have sore throat, fever, and fatigue.
- A person has **Food Poisoning** if they have nausea, vomiting, and stomach pain.

3 Instructions

- Implement the system using **Prolog**.
- Ensure your code is modular and well-commented.
- Draw a forward chaining and backward chaining representation of any query on paper and include the scanned image in your final PDF submission.
- Submit your Prolog file along with a report explaining your implementation and output of the query.