



## **Department of Computer Science & Engineering**

### **University of Asia Pacific**

**Course Title : Artificial Intelligence and Expert Systems Lab**

**Course Code : CSE 404**

**Assignment No : 01**

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## i) Problem Title:

Ecosystem Food Chain Knowledge Base using Prolog.

## ii) Problem Description:

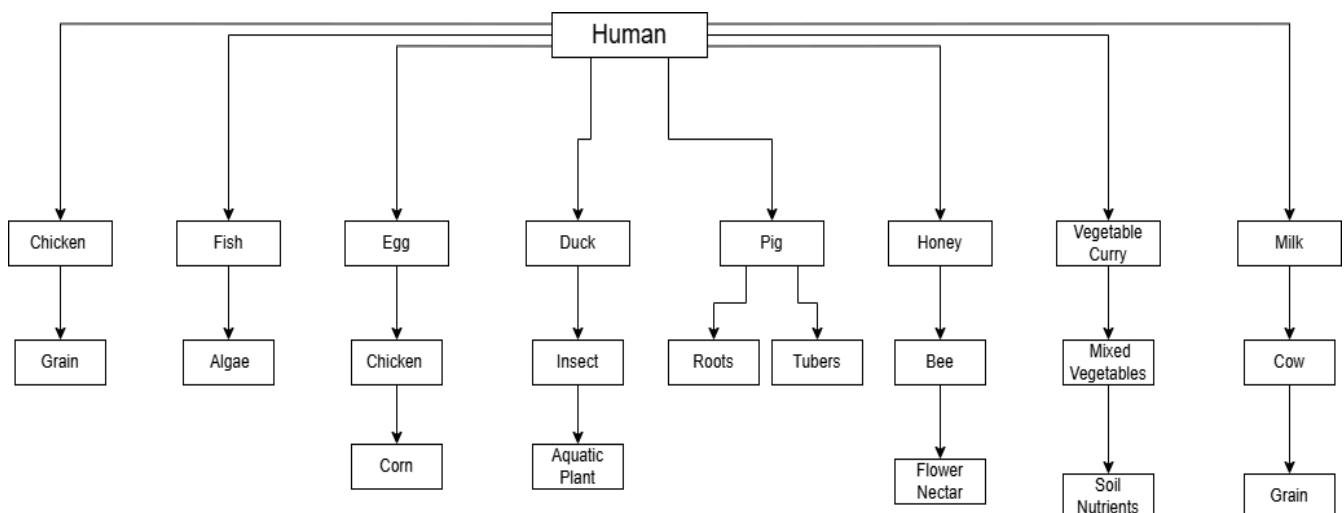
The purpose of this project is to model and explore the human food chain within the ecosystem using Prolog. The knowledge base represents various subsets of the human food chain, detailing the relationships between producers, primary consumers, and secondary consumers. Through this system, we can query hierarchical relationships in the food chain, identify producers and consumers, trace food sources, and apply recursive rules to analyze the structure of the ecosystem.

## iii) Tools and Languages Used:

- **Programming Language:** Prolog (SWI-Prolog)
- **Diagram Tool:** draw.io
- **Editor:** SWI-Prolog IDE

## iv) Diagram/Figure:

### Designed Map:



## v) Sample Input/Output:

### Input:

```
eats(human, chicken).
eats(human, fish).
eats(human, egg).
eats(human, duck).
eats(human, pig).
eats(human, honey).
eats(human, vegetable_curry).
eats(human, milk).

eats(chicken, grain).
eats(fish, algae).
eats(egg, chicken).
eats(chicken, corn).
eats(duck, insect).
eats(insect, aquatic_plant).
eats(pig, roots).
eats(pig, tubers).
eats(honey, bee).
eats(bee, flower_nectar).
eats(vegetable_curry, mixed_vegetables).
eats(mixed_vegetables, soil_nutrients).
eats(milk, cow).
eats(cow, grain).

in_food_chain(X, Y) :- eats(X, Y).
in_food_chain(X, Y) :- eats(X, Z), in_food_chain(Z, Y).

producer(X) :- \+ eats(X, _).

consumer(X) :- eats(X, _).
prey(X) :- eats(_, X).

top_of_chain(X) :- eats(X, _), \+ prey(X).
all_under(X, List) :- setof(Y, in_food_chain(X, Y), List).
```

### Output:

\*\*\* Github Link: [Link](#)

**vi) Conclusion:** In this project, we successfully implemented an Ecosystem Food Chain Knowledge Base in Prolog, focusing on the human food chain. The knowledge base models hierarchical food relationships using facts and recursive rules. It enables complex queries like tracing food sources and identifying producers. This demonstrates how logic programming can effectively represent real-world ecological systems.