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Animal identification expert system using Prolog

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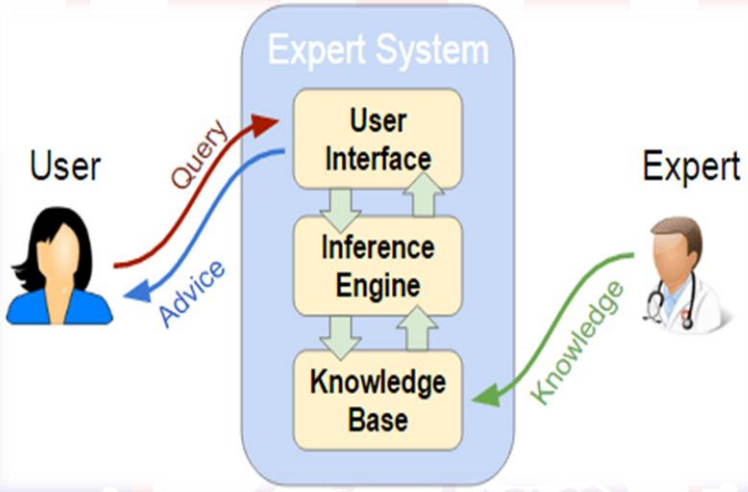
Introduction:

What is an Expert System?

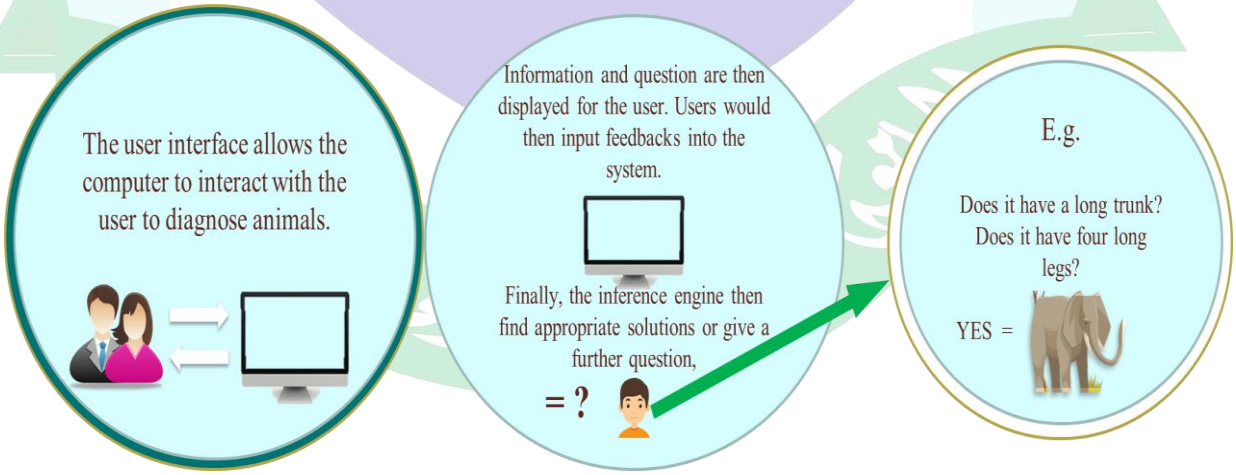
- Expert System is an interactive and reliable computer-based decision-making system which uses both facts and heuristics to solve complex decision-making problems. It is designed to provide intelligent solutions or advice in areas where human expertise is required.

How an Expert System works?



What is animal identification expert system?

- An animal identification expert system is an intensive effort of modern technology to be able to classify and differentiate animal better.



The Animal Identification Expert System project aims to develop a knowledge-based system using Prolog programming language for identifying different types of animals based on their characteristics. The system utilizes a knowledge base containing facts and rules about various animal species to make accurate identifications.

Motivation:

1. ***Climate change: -*** The motivation behind developing an animal identification expert system using a knowledge base stems from the urgency to mitigate the effects of climate change on biodiversity.

2. ***Veterinary purposes: -*** Manual animal identification methods can be time-consuming, error-prone, and inefficient, especially in large-scale veterinary practices. Developing an expert system that can automate animal identification based on a knowledge base can greatly improve the efficiency and effectiveness of veterinary processes.

3. ***Efficient Animal Identification: -*** An expert system can help automate the process of identifying animals based on their characteristics. By utilizing a knowledge base in Prolog, which is well-suited for representing and querying facts and relationships, the identification process can be made more efficient and accurate.

4. ***Reduction of human error: -*** Human error is inevitable when it comes to complex tasks like animal identification. By developing an expert system, the chances of human error can be minimized, leading to more reliable identification results.

5. ***Accessible knowledge: -*** By utilizing a Prolog knowledge base, the expert system can store and retrieve information about animals, such as their physical features, habitat, behavior, and other relevant characteristics. This knowledge can be easily accessed by users, providing a valuable resource for researchers, conservationists, and animal enthusiasts.

Objectives:

- To build an expert system that can identify and organize animals.
- To ensure the system can handle its domain well and can accept facts as well as produce an output.
- To reduce workload of researchers.
- To improve all biology missions that require, identifying species and counting individuals, including animal monitoring and management examining biodiversity.

Methodology:

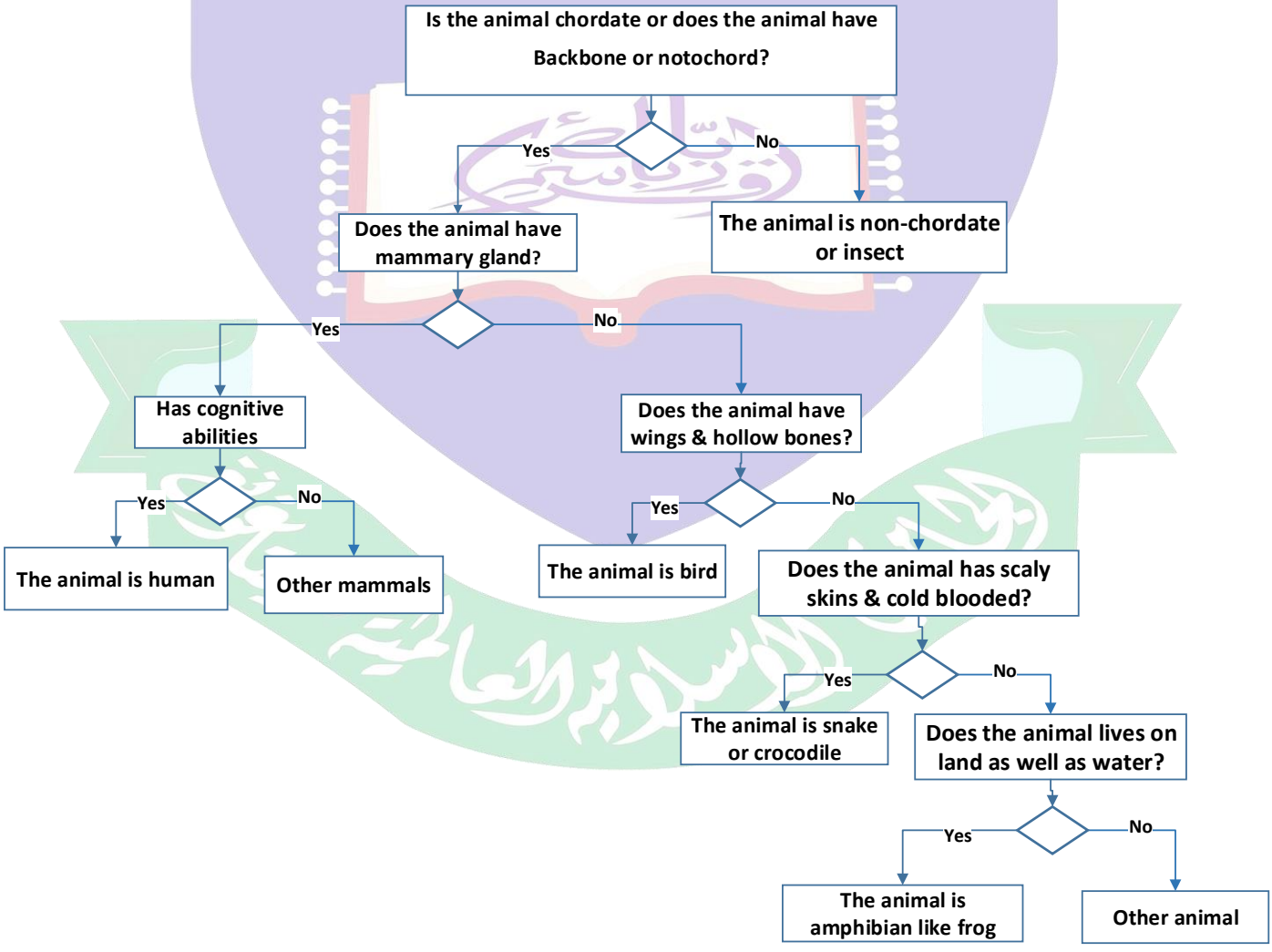
1. For making an expert system for animal identification at first we need to know about animals. So we did research on phylum and classification of animal and gathered knowledge about different characteristics of animal.

2. As per the knowledge we made a decision tree to decide how our expert system will work.

3. Then we decided to develop the expert system using prolog programming language. We have learned how to built an expert system using prolog.

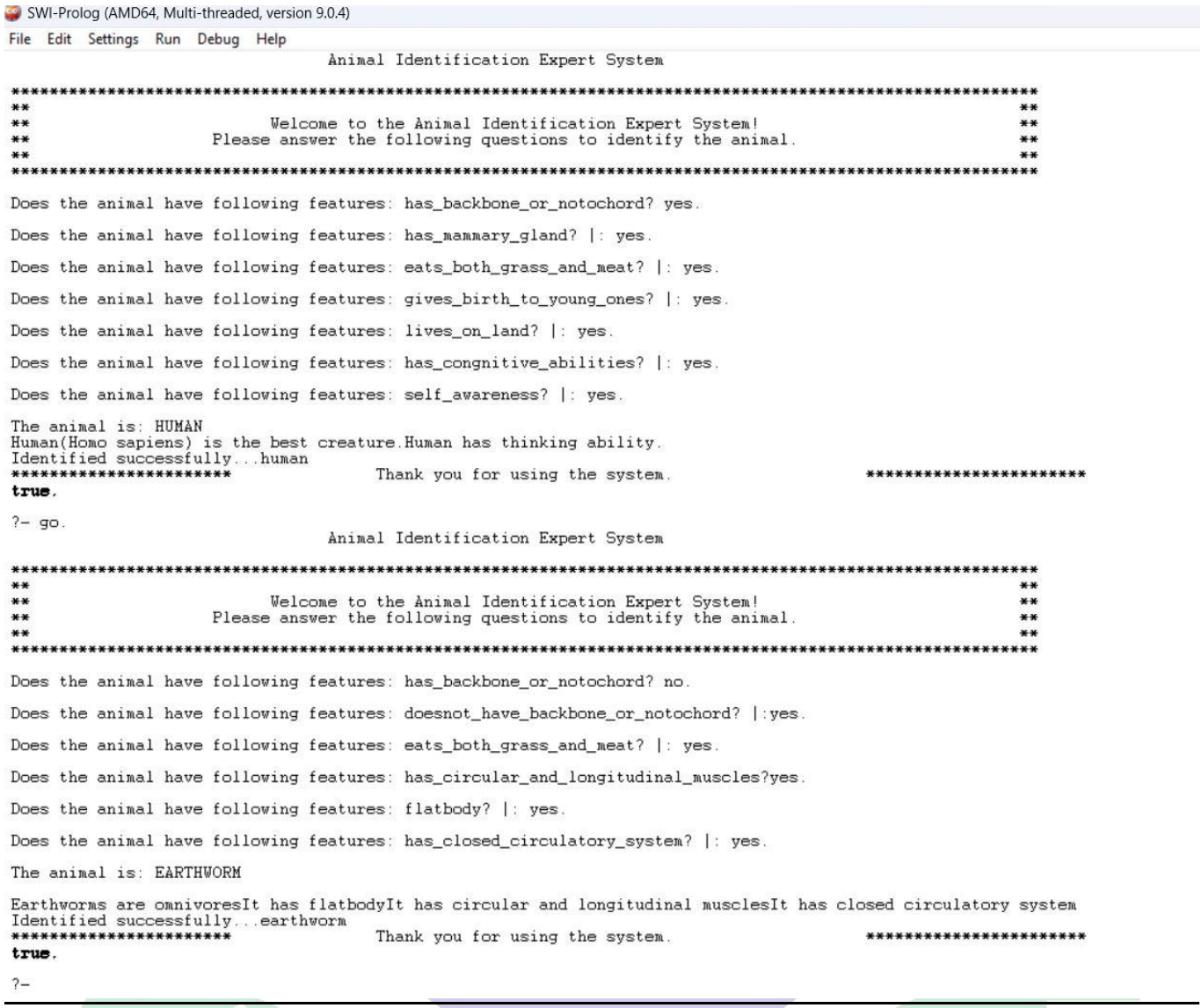
4. According to decision tree we have developed our expert system using prolog.

Flow Chart:



Result:

Here is the output of our project :-



```
SWI-Prolog (AMD64, Multi-threaded, version 9.0.4)
File  Edit  Settings  Run  Debug  Help
                                Animal Identification Expert System

**********************************************************************************************************
**                                                                                                      **
**                          Welcome to the Animal Identification Expert System!                         **
**                     Please answer the following questions to identify the animal.                    **
**                                                                                                      **
**********************************************************************************************************

Does the animal have following features: has_backbone_or_notochord? yes.

Does the animal have following features: has_mammary_gland? |: yes.

Does the animal have following features: eats_both_grass_and_meat? |: yes.

Does the animal have following features: gives_birth_to_young_ones? |: yes.

Does the animal have following features: lives_on_land? |: yes.

Does the animal have following features: has_congnitive_abilities? |: yes.

Does the animal have following features: self_awareness? |: yes.

The animal is: HUMAN
Human(Homo sapiens) is the best creature.Human has thinking ability.
Identified successfully...human
**********************          Thank you for using the system.          **********************
true.

?- go.
                                Animal Identification Expert System

**********************************************************************************************************
**                                                                                                      **
**                          Welcome to the Animal Identification Expert System!                         **
**                     Please answer the following questions to identify the animal.                    **
**                                                                                                      **
**********************************************************************************************************

Does the animal have following features: has_backbone_or_notochord? no.

Does the animal have following features: doesnot_have_backbone_or_notochord? |:yes.

Does the animal have following features: eats_both_grass_and_meat? |: yes.

Does the animal have following features: has_circular_and_longitudinal_muscles?yes.

Does the animal have following features: flatbody? |: yes.

Does the animal have following features: has_closed_circulatory_system? |: yes.

The animal is: EARTHWORM

Earthworms are omnivoresIt has flatbodyIt has circular and longitudinal musclesIt has closed circulatory system
Identified successfully...earthworm
**********************          Thank you for using the system.          **********************
true.

?-
```