

# DETECTIVE Prolog

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# Overview

## Detective Prolog

murder mystery game based on using logic-based deduction programming.

### Idea:

Who the murderer is based on a list of facts and rules.



# PROJECT DESCRIPTION

- Prolog uses the provided clues to infer which suspect is the murderer.
- The Player is assumed to be a detective
  - Tries to solve the puzzle by entering the correct answers.



## Facts

Victim	Suspect	Weapon	Location	Motive	Weekday
Mr. Snoop	Mrs. Scarlett	Knife	Kitchen	Revenge	Friday
Mrs. Rihanna	Mr. Mustard	Wrench	Library	Heritage	Saturday
	Mr. Green	Rope	Dining room	Money	Sunday
	Mrs. Peacock	Pistol	Garden	Passion	
	Mr. Plum	Candlestick	Garage	Hatred	
	Miss Peach	Poison	Pool		



# Facts

```
1 % Declare the victims
2 victim(snoop).
3 victim(rihanna).
4
5 % Declare the men
6 man(snoop).
7 man(mustard).
8 man(green).
9 man(plum).
10 man(brunette).
11
12 % Declare the women
13 woman(rihanna).
14 woman(scarlett).
15 woman(peacock).
16 woman(peach).
```

```
18 % Declare the possible murder weapons
19 weapon(knife).
20 weapon(wrench).
21 weapon(rope).
22 weapon(pistol).
23 weapon(candlestick).
24 weapon(poison).
25
26 % Declare the possible days
27 day(friday).
28 day(saturday).
29 day(sunday).
```



\+

- Which is used for negation in Prolog.
- It allows for non-monotonic reasoning.
- Prolog can reason with incomplete or uncertain information.



# Level.1

## Clue 1:

"Body found in the house on Saturday morning; crime occurred 12 hours prior, says doctor."

## Facts:

```
27 day(friday).  
28 day(saturday).  
29 day(sunday).
```

## Rule:

```
58 date(X) :- day(X), \+ X = saturday, \+ X = sunday.
```





# Level.1

## Clue 2:

"Neighbors heard that victim was arguing with a man last night."

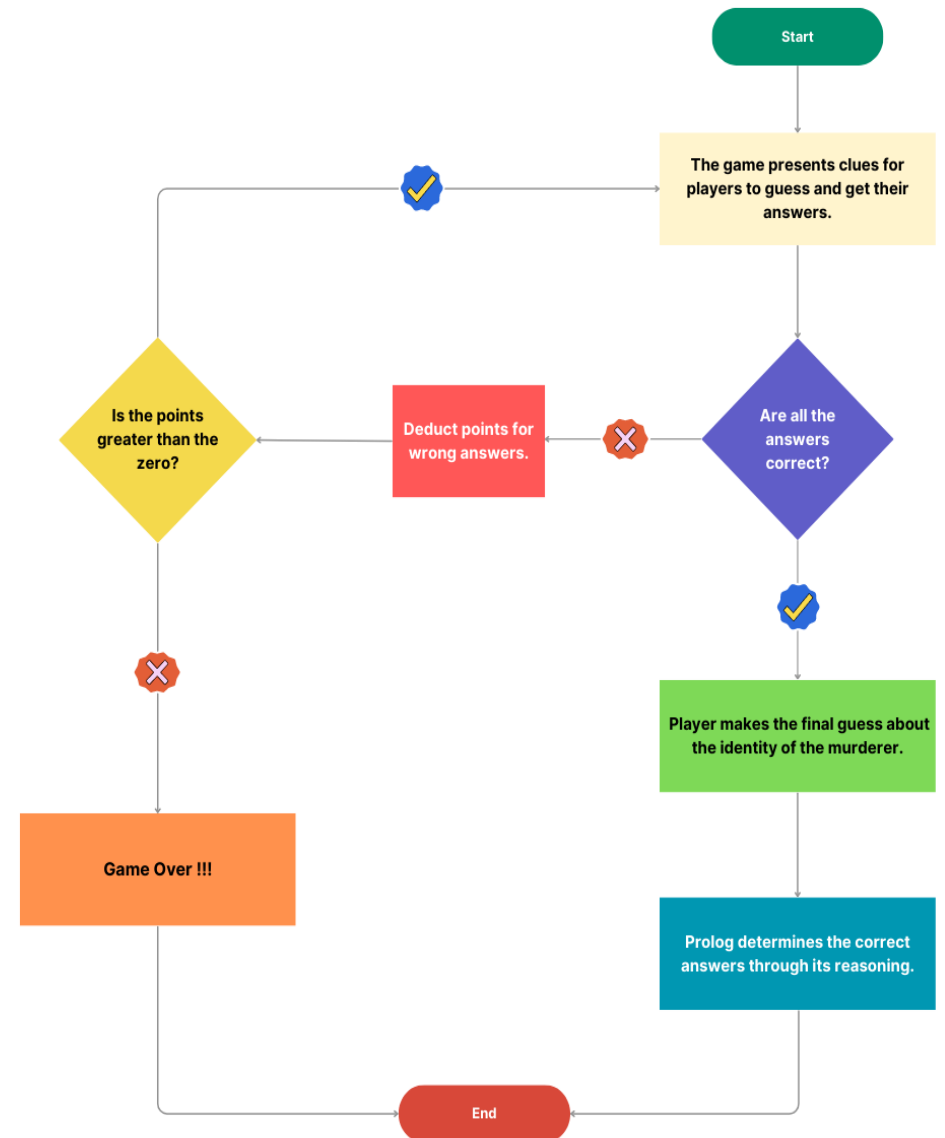
## Rule:

```
66 has_argue(X, Y, Z) :- murdered(X), suspect(Y), man(Y), X \= Y, date(Z).
```



# Interact with players

1. Initialize maximum points = 100
2. Present all the facts to the player
3. Player make guesses based on clues
4. Check the answers
  - a) Deduct 5 points for wrong answer
  - b) If points < 0 → Game Over !!!
  - c) If all answers are correct → go next
5. Final guess of the murderer's identity
6. Display:
  - a) Final score
  - b) correct answers provided by Prolog



# Interact with players

## Clue:

"On Tuesday morning, Mr. Snoop's body was found by his maid. Considering that the maid only has access to the outdoor area, can you guess the location of the murder?"

Place that crime happened? [garden, library, bedroom, kitchen, garage, pool]

garden

# Loop in Prolog using "repeat" operand

A ***repeat*** predicate is used to create an infinite loop. allowing you to create a loop that continues indefinitely until a specific condition is met or until the program is interrupted.

```
initialize_p,  
  repeat,  
    initialize_u,  
    % Get the inputs A, B, C, D, E  
    ...  
    check(A, B, C, D, E),  
    u(U),  
    p(P),  
    write('Your point = '), write(P), nl, nl,  
    (P =< 0, write(" >>> Game over! <<< "),nl ; U > 0), !,
```

# Differences between Levels

## Level 1:

- ❑ Correctly guess **4** clues to have the final guess for the murderer's identity.
- ❑ Player receives hints indicating **which answers are correct**.

## Level 2:

- ❑ Correctly guess **5** clues to have the final guess for the murderer's identity.
- ❑ Player receives hints indicating **which answers are correct**.

## Level 3:

- ❑ Correctly guess **5** clues to have the final guess for the murderer's identity.
- ❑ Player receives hints indicating **which answer is correct** and **which one is wrong**.  
(for instance, if the player has two correct answers, they will be informed about one answer being correct and one answer being wrong.)

# Two Types of Hints

## Type 1:

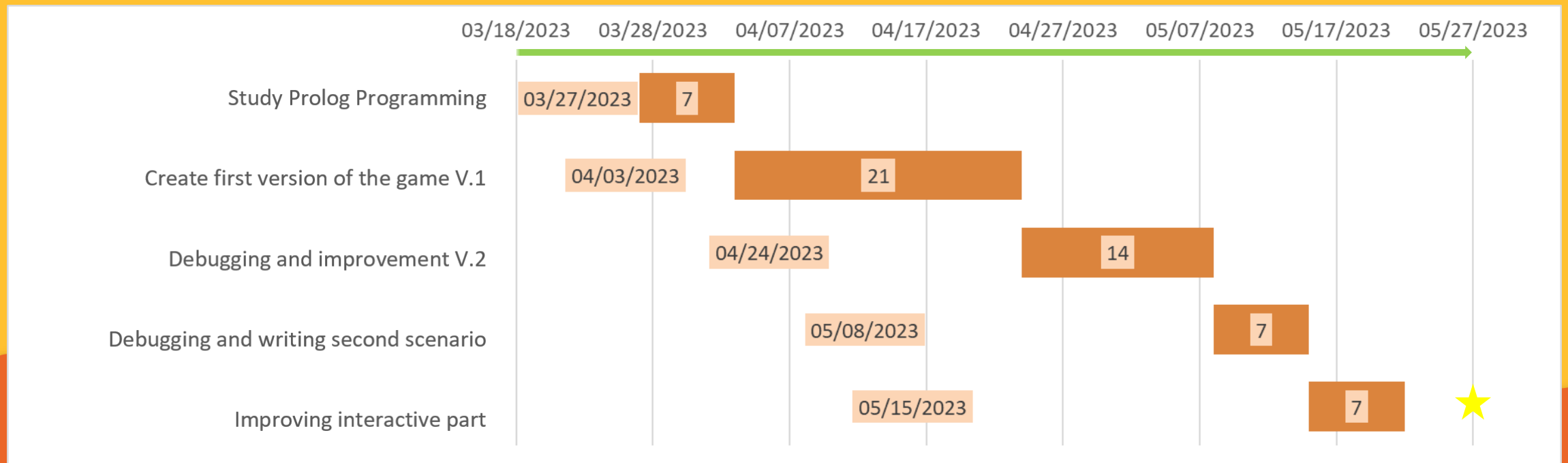
- Only display the correct answers
  - ❖ Place and Date are correct.

## Type 2:

- Display the correct answers + Prolog codes
  - ❖ Place and Date are correct. Here are the codes in the Prolog:  
`crime_place(X, S) :- suspect(X), kills_in(X, S), \+ S = garden, \+ S = garage, \+ S = pool.`  
`date(X) :- day(X), \+ X = saturday, \+ X = sunday.`

**Let's try the game...**

# Project Timeline





# THANKS

Does anyone have any questions?

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