Group 7 : **Murder in the Mansion**

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Clue / Cluedo

- Characters
- Tools (Weapons)
- Rooms

- We add:
  - Relationships
  - Moods
  - Alibis
  - Access
 - Known vs True
  - Proving alibis T/F

We used ~~Companion~~ P.D.D.L.

```
215            ?o - object
216            ?c - clue)
217        :precondition (and
218            (clueOn ?c ?o)
219            (not (fingerprintOn ?o)))
220        :effect (
221            fingerprintOn ?o)
222    )
223
224    (:action aWildKeyAppeared
225        :parameters (
226            ?d - detective
227            ?k - key
228            ?r - room)
229        :precondition (and
230            (detectiveInRoom ?d ?r)
231            (searchedRoom ?r)
232            (keyInRoom ?k ?r)
233            (not (hasKey ?d ?k)))
234        :effect (
235            hasKey ?d ?k)
236    )
237
238    ;; INTERROGATE PEOPLE ;;;;;;;;;;;;;;;;;;;;;;
239
240    (:action interrogate
241        :parameters (
242            ?d - detective
243            ?r - room
244            ?p - person)
245        :precondition (and
246            (not (interrogatedPerson ?p))
247            (detectiveInRoom ?d ?r)
248            (personInRoom ?p ?r))
249        :effect (
250            interrogatedPerson ?p)
251    )
252
253    (:action alibiFound
254        :parameters (
255            ?p - person
256            ?a - alibi)
257        :precondition (and
258            (interrogatedPerson ?p)
259            (not (hasAlibi ?p ?a)))
```

```
7            Detective - detective
8            Videofootage1 Videofootage2 Knife Revolver - object
9            masterKey - key
10           clue1 clue2 clue3 clue4 - clue
11           Kitchen GreatHall Bedroom Yard MasterRoom - room
12           Alibi1 Alibi2 Alibi3 Alibi4 - alibi
13       )
14
15       (:init
16           ; persons
17           (dead Willie)
18           (personHiddenIn Chef Kitchen)
19           (personHiddenIn Butler GreatHall)
20           (personHiddenIn Maid Bedroom)
21           (personHiddenIn Gardener Yard)
22           (detectiveInRoom Detective GreatHall)
23           (not (detectiveInRoom Detective Kitchen))
24           (not (detectiveInRoom Detective Bedroom))
25           (not (detectiveInRoom Detective Yard))
26           (not (detectiveInRoom Detective MasterRoom))
27           (not (hasKey Detective masterKey))
28
29           (not (interrogatedPerson Chef))
30           (not (interrogatedPerson Butler))
31           (not (interrogatedPerson Maid))
32           (not (interrogatedPerson Gardener))
33
34           ; locations
35           (connected GreatHall Kitchen)
36           (connected GreatHall Bedroom)
37           (connected GreatHall Yard)
38           (connected Kitchen GreatHall)
39           (connected Bedroom GreatHall)
40           (connected Yard GreatHall)
41           (connected MasterRoom Bedroom)
42           (connected Bedroom MasterRoom)
43           (requiresKey MasterRoom)
44
45           (accessToRoom Butler Bedroom)
46           (accessToRoom Butler MasterRoom)
47
48           ; objects
49           (ownershipOf Chef Knife)
50           (ownershipOf Butler Revolver)
```

We used ~~Companion~~ P.D.D.L.
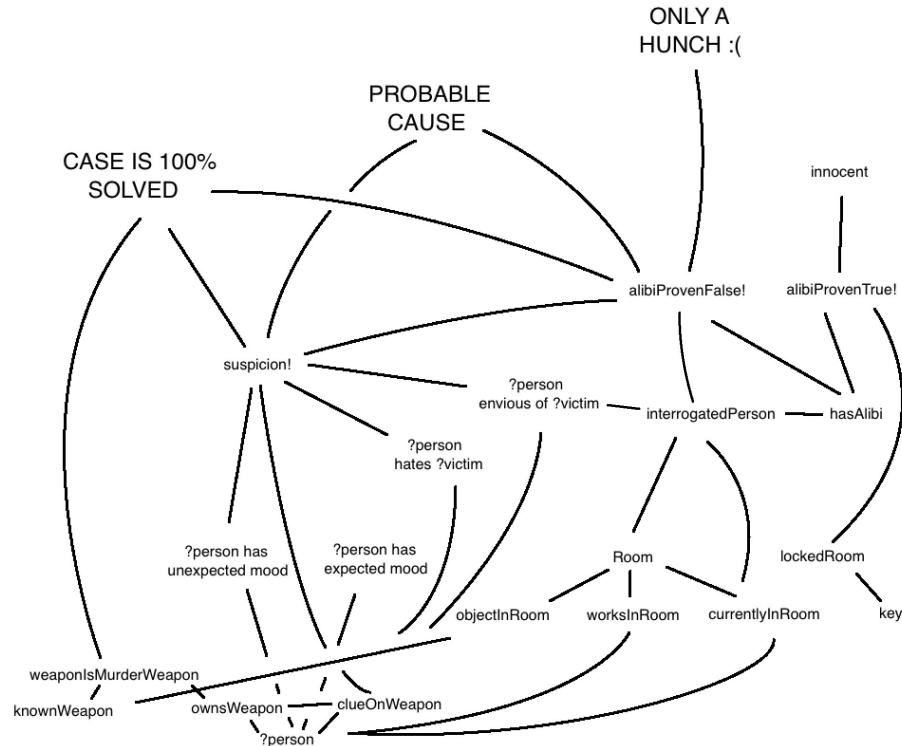
How we represented our Mansion-CW

- types —factors of our Mansion-CW:

  weapon, person, room, key.

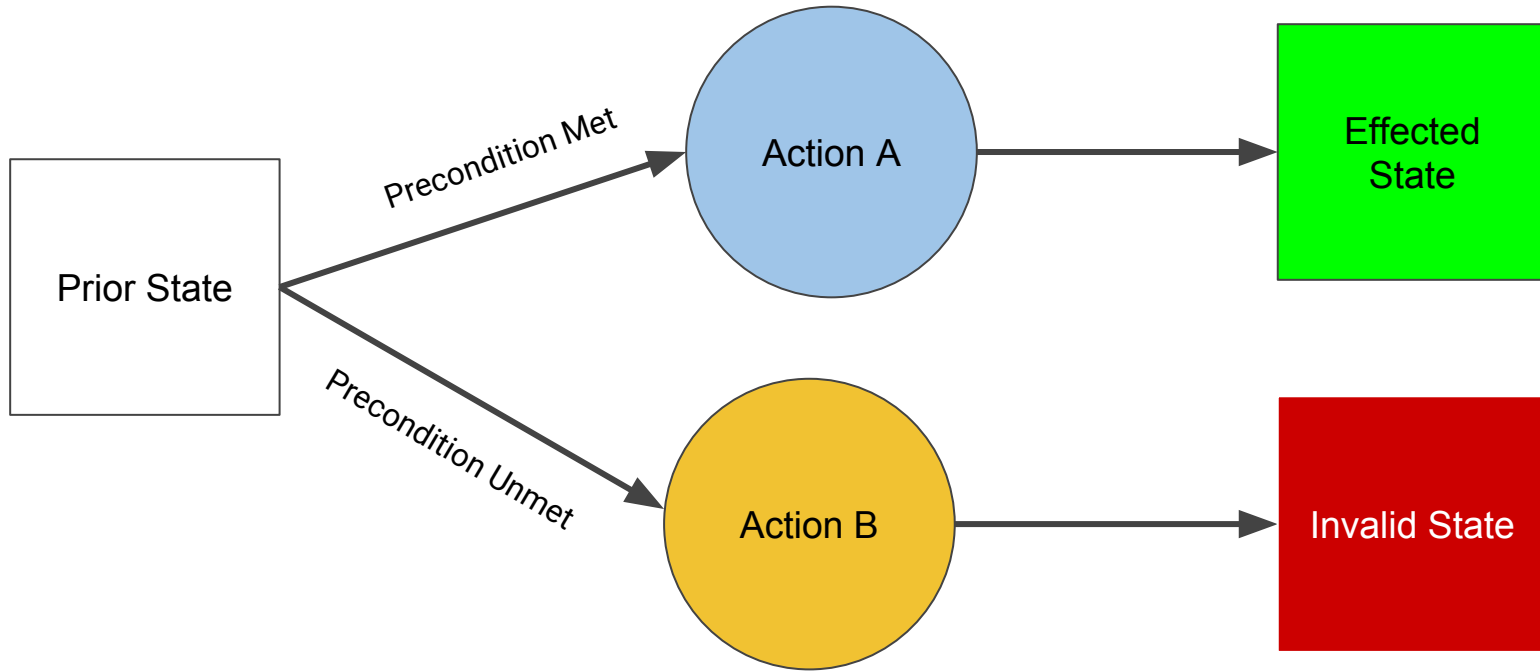- predicates — description of our Mansion-CW:
  - Victim and Suspect:
  - Weapon
  - Exploring the mansion
  - Interrogating the suspects
  - Motivation
  - Ending status

Our goal is to find a plan
to go from an initial state
to a goal state

Actions allow us to specify
how to get there

Physical Actions

- Moving through space
    - Change the detective's location from one room to another
- Investigating objects
    - Become aware of details and locations of objects
- Speak to suspects
   - Learn about a suspect's alibi and personal relationships

Logical Actions

- Determining Motives
  - Hating the victim, being jealous of the victim, or being involved in a romantic rivalry with the victim all give motives for a murder
- Falsifying alibis
  - If a person's alibi is uncorroborated or shaky, consider them to be suspicious
- Weapons
  - Someone with access to the weapon used for the murder had the ability to commit it

Goal Transitions

Motive

Suspicious Behavior

Hunch

Probable

Hunch

Solved

Probable

Probable

Hunch

Means
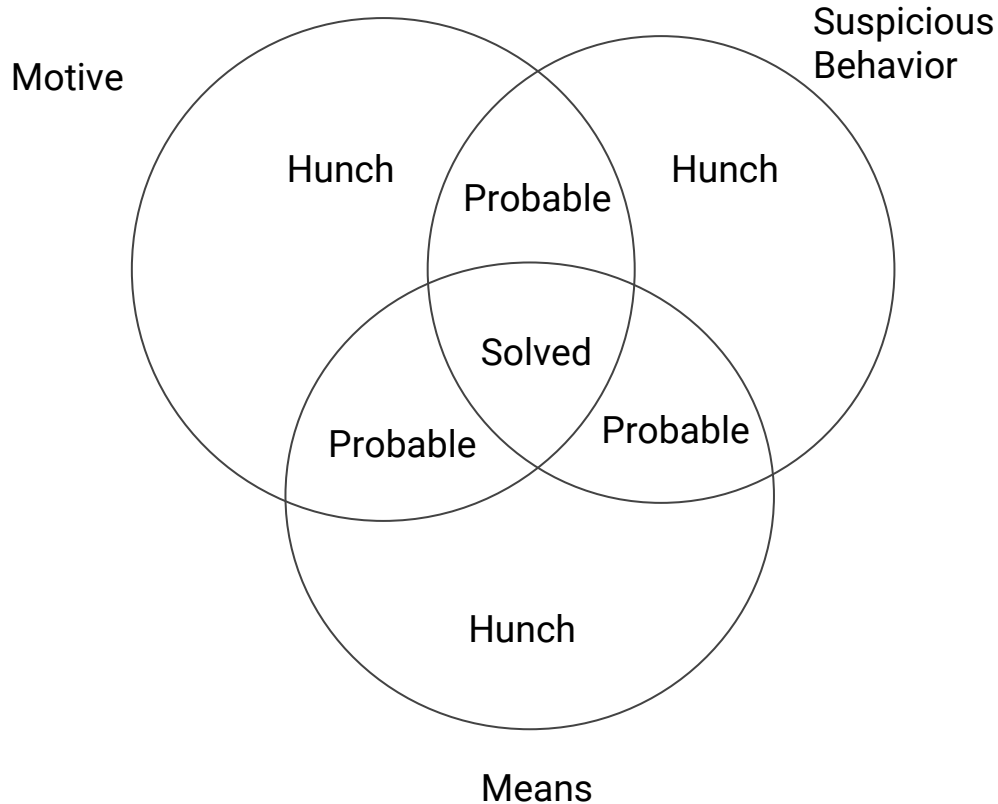
An action can also establish a goal state

Each goal represents a different burden of proof to establish

One action is necessary for each section of the diagram

Reasoning

Initial States and Actions

(dead person)
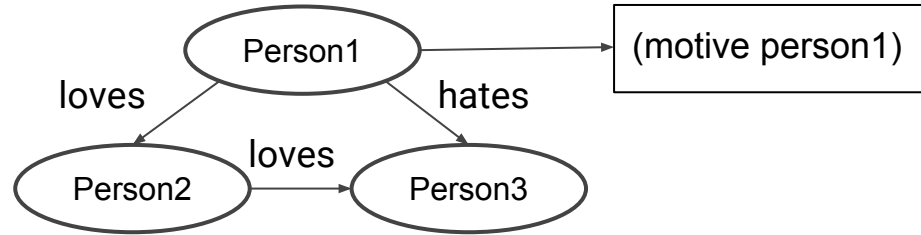
> Person3 died in Room1

(suspicious person)

> (interrogatedPerson p)
> **and (** (noAlibi p) or
> (scared p))

(alibi person)

> Person not in the murder room

> Person is with other ones

Emotional Relations

(motive person1)

Person1 — loves → Person2
Person1 — hates → Person3
Person2 — loves → Person3

(means person)

> (IsMurderWeap w) **and**
> (FingerprintsOnWeapon w p)

> (IsMurderWeap w) **and** (ownsWeapon w p)

Solving

Actions

| If (means person) **and** (motive person) **and** (suspicious person) | If (means person) **and** (motive person) | If (means person) **or** (motive person) **or** (suspicious person) |

Goals

| **(solved** murder**)** | **(probable** murder**)** | **(hunch** murder**)** |

DEMO

Example 1: Solved "love triangle problem"

Example 2: Probable "love triangle problem"

Example 3: Probable "locked room problem"

Thanks for your attention!