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TE Comps Batch – C

Experiment-7

Aim: To design and implement an expert system, incorporating the match algorithm and the rule language and to answer the queries, in the given problem statement.

Problem statements:

Read the below passage carefully and answer the questions:
Five cities all got more rain than usual this year. The five cities are Last Stand, Mile City, New Town, Olliopolis, and Polberg. The cities are located in five different areas of the country: the mountains, the forest, the coast, the desert, and in a valley.
The rainfall amounts were: 12 inches, 27 inches, 32 inches, 44 inches, and 65 inches.
* The city in the desert got the least rain; the city in the forest got the most rain.
* New Town is in the mountains.
* Last Stand got more rain than Olliopolis.
* Mile City got more rain than Polberg, but less rain than New Town.
* Olliopolis got 44 inches of rain.
* The city in the mountains got 32 inches of rain; the city on the coast got 27 inches of rain.

1. Which city got the most rain?

2. How much rain did Mile City get?

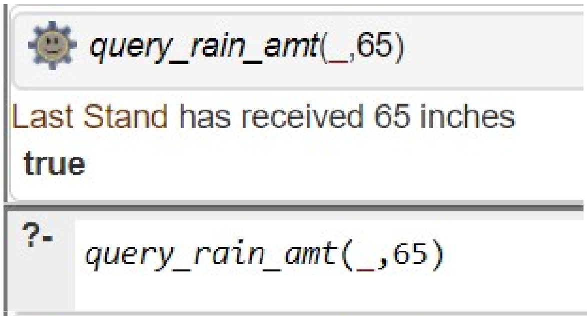
3. Which city is in the desert?

4. Where is Olliopolis located?

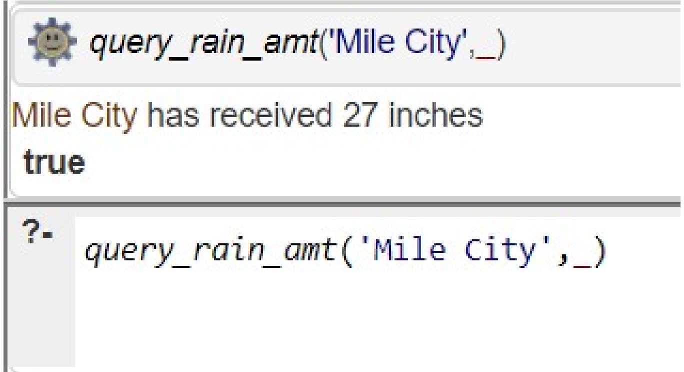
Code:

```
city(C) :-

   length(C,5),
   % CITY NAMES
   member(h('Last Stand',_,_),C),
   member(h('Mile City',_,_),C),
   member(h('New Town',_,_),C),
   member(h('Olliopolis',_,_),C),
   member(h('Polberg',_,_),C),

   % CITY AREAS
   member(h(_,'mountains',_),C),
   member(h(_,'forest',_),C),
   member(h(_,'coast',_),C),
   member(h(_,'desert',_),C),
   member(h(_,'valley',_),C),

   % RAINFALL AMOUNTS
   member(h(_,_,12),C),
   member(h(_,_,27),C),
   member(h(_,_,32),C),
   member(h(_,_,44),C),
   member(h(_,_,65),C),

   % HINTS

   % The city in the desert got the least rain;
   % the city in the forest got the most rain.
   member(h(_,'desert',12),C),
   member(h(_, forest, 65), C),

   % New Town is in the mountains.
   member(h('New Town','mountains',_),C),

   % Last Stand got more rain than Olliopolis.
   member(h('Last Stand',_,A),C),
   member(h('Olliopolis',_,B),C),
   A>B,

   % Mile City got more rain than Polberg,
   % but less rain than New Town.
   member(h('Mile City',_,D),C),
   member(h('Polberg',_,E),C),
   member(h('New Town',_,F),C),
   D>E,
   D<F,

   % Olliopolis got 44 inches of rain.
   member(h('Olliopolis',_,44),C),

   % The city in the mountains got 32 inches of rain;
   % The city on the coast got 27 inches of rain.
   member(h(_,'mountains',32),C),
   member(h(_,'coast',27),C).

query_rain_amt(CityName, RainfallAmt):-
   city(C),
   member(h(CityName,_,RainfallAmt),C),
   write(CityName),write(" has received "),write(RainfallAmt),write(" inches"),nl.

query_city_region(CityName, Region):-
   city(C),
   member(h(CityName,Region,_),C),
   write(CityName),write(" is in "),write(Region),write(" region"),nl.
```

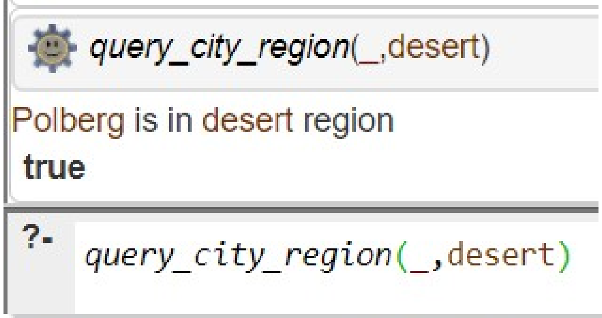
Output:

1. 

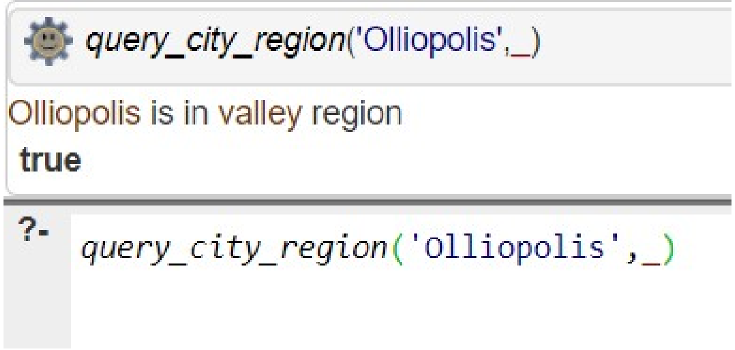
```
query_rain_amt(_,65)
Last Stand has received 65 inches
true
?- query_rain_amt(_,65)
```

2. 

```
query_rain_amt('Mile City',_)
Mile City has received 27 inches
true
?- query_rain_amt('Mile City',_)
```

3. 

```
query_city_region(_,desert)
Polberg is in desert region
true
?- query_city_region(_,desert)
```

4. 

```
query_city_region('Olliopolis',_)
Olliopolis is in valley region
true
?- query_city_region('Olliopolis',_)
```

Conclusion:

The presented problem statement in this experiment contains information regarding the amount of rainfall in a city and the region in which the city is located. All of the names of cities and areas listed in the problem statement were first stored in the above code, followed by the facts. Then, using the query in the preceding code, we can obtain the city name from the rainfall quantity and vice versa, as well as the region from the city name and vice versa. Once the facts have been saved, Prolog makes it easier to find answers to these queries by leveraging these facts to find the solution. Because of various factors, Prolog is an excellent choice for creating expert systems.