Projet Logique
2014/15
Troisième partie

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This project consists of several puzzles to be solved in Prolog. As for the evaluation, see the conditions laid out in the first project.

1 Whodunnit

A bank has been robbed, and the police are interviewing several subjects. Here are their statements:

> Adrian: "It wasn't Barry. It was Cedric."
> Barry: "It wasn't Adrian. It was Derek."
> Cedric: "It wasn't Derek. It wasn't Barry."
> Derek: "It wasn't Eric. It was Adrian."
> Eric: "It wasn't Cedric. It was Derek."

After further investigation, the police find that exactly five of these ten statements were true. Who is the robber?

Write a Prolog program that responds with the name of the robber to the query `who(X).`

2 Numbers

Two secret numbers x, y are chosen between 2 and 200. Person P is told the result of the product $x \cdot y$, and person S is told the sum $x + y$. They have the following dialogue:

> P: "I do not know the values of x and y."
> S: "I knew that."
> P: "Now I know them."
> S: "Now I know them too."

Write a predicate $numbers(X, Y)$ that finds the two numbers.

3 Shortest-path algorithm

(This section is waived for those who work alone. For groups of three, the shortest-path algorithm should work analogously to Dijkstra, i.e. consider every edge at most once. Groups of two can choose any algorithm they like.)

Consider a given predicate that specifies a list of directed edges labelled with a distance, of the following form:

```
arcs([[a,b,5], [a,c,3], [b,d,2], [c,d,5], [d,e,2]]).
```

(i.e., there is an edge from node a to node b with distance 5, from a to c with distance 3, etc). All distances can be assumed to be non-negative integers.

Write a Prolog program that finds the shortest path and the distance between two nodes for the graph given by the contents of the `arcs` predicate. At your choice, your program can either:

- give back distance and path as a result of the query, e.g. the query `path(a,e,D,P)` succeeds with $D = 9$ and $P = [a, b, d, e]$;
- or `write` the result to the console as a result of the query `path(a,e)`.

Important Dates

Deadline for handing in program and report: May 20 until midnight.
Soutenance: During the session of May 22.