

Programming languages (TC-2006)

Midterm Exam - Prolog

Date: November 28, 2020

This exam contains six problems. You are requested to solve all of them. Please note that this time, there is no template for the solution. This is on purpose since you should have the flexibility to solve these problems to best fit your needs. Please note that you must submit only working code. If your code does not run, your final grade will be zero. Then, comment out any piece of code that does not work. However, feel free to include comments to explain your rationale, particularly when the code is commented out because it does not work as requested.

1 swimmer (15%)

Isabel is worse swimmer than Julia. Felicitas swims better than Julia. Elena is worse swimmer than Isabel. Who is the best swimmer? Write a program in Prolog to answer this question.

2 letters (15%)

If A is after B and C; and D is before C but after B, what is the order of these letters? Write a program in Prolog to answer this question.

3 race (15%)

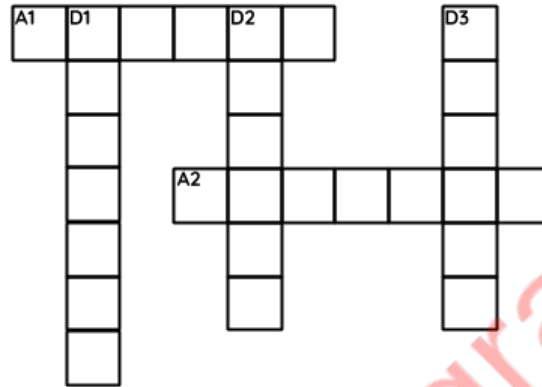
Eight horses run in a competition. Lino arrived three places after Rubi but one before Sam. Mac overcame Chato but was not able to arrive before Rubi. Lulo arrived three places before Chato. We also know that Curcho came in one of the three last places and that Toto arrived after Sam. In what order did the horses cross the goal line? Write a program in Prolog to answer this question.

4 friends (15%)

John, Lucy, and Fernando are three friends. These friends they all have different ages, and all of them are older than 12. At this moment, their ages sum up 46 years old. In how many years will their ages sum up 85 years old and Fernando's age will double John's age at this moment? The ages (in years) are always natural numbers. Write a program in Prolog that solves this problem.

5 crossword (20%)

Write a program in Prolog that places the five words: **RACKET**, **HASKELL**, **ERLANG**, **PROLOG** and **AWESOME** on the crossword depicted below:

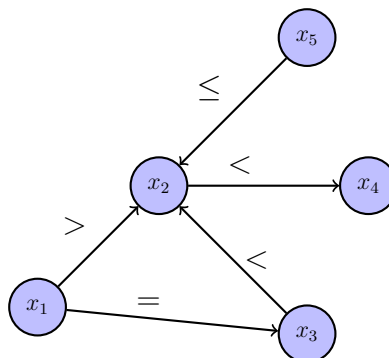


6 csp (20%)

A constraint satisfaction problem (CSP) is a problem where variables must be assigned values (from a set of available ones) in such a way that a set of constraints are satisfied. A binary CSP contains constraints that involve at most two variables at a time. Binary CSPs are usually represented as directed graphs where nodes represent variables and edges represent the constraints to satisfy. For example, the following set of constraints:

- The value assigned to x_1 must always be greater than the value assigned to x_2 .
- The value assigned to x_1 must always be equal to the value assigned to x_3 .
- The value assigned to x_3 must always be greater than the value assigned to x_2 .
- The value assigned to x_5 must always be smaller or equal than the value assigned to x_2 .
- The value assigned to x_2 must always be smaller than the value assigned to x_4 .

Can be represented in a graph as follows:



If the available values for x_1 and x_3 are 1, 3, 4 and the available values for the remaining variables are 1, 2 and 3. Write a program in prolog that solves this CSP.

Deliverables



Prepare a PL file that contains the functions requested and submit it to Canvas.
Please, do not submit other formats but PL.



I promise to apply my knowledge, strive for its development, and not use unauthorized or illegal means to complete this activity, following the Tecnológico de Monterrey Student Code of Honor.