

CSEN403: Concepts of Programming Languages

Logic Programming VI

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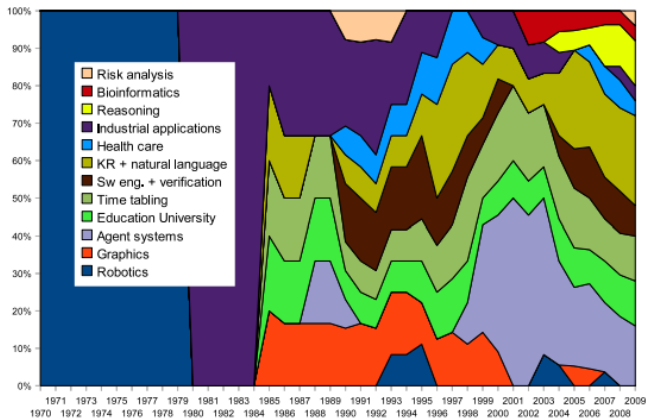
Spring Semester 2021

- OMAR: an interactive scheduler for predictive and reactive routing of the Alitalia fleet(s)
- IDEA: an intelligent data retrieval system
- SECRets expert system: used by banks for the analysis of client-specific data

Logic Programming to Solve Famous Real-Life Problems

- Optimizing space for shoe industry
- Nurse Scheduling

Evolution of Applications



- Amazon AWS

Constraint Programming

- Model for the problem should contain
 - ▶ Variables
 - ▶ Domains
 - ▶ Constraints
- Examples
 - ▶ `X #< 4`
 - ▶ `X in 1..10`
 - ▶ `[X,Y] ins 1..5`

- `all_different(L)` and `all_distinct(L)` makes sure that all elements of `L` has a different value
 - ▶ Example:
`?- L=[A,B,C], L ins 1..2, all_distinct(L).
false.`
- `labeling([],L)` performs a search on the domains of the variables in `L`.

Our First Example

Given the following dinner problem: We are going out to dinner taking 1-6 grandparents, 1-10 parents and/or 1-40 children. Grandparents cost 3 dollars for dinner, parents 2 dollars and children 0.50 dollars. There must be 20 total people at dinner and it must cost 20 dollars. The problem to be solved is to find how many grandparents, parents and children are going to dinner. Model the problem as a constraint problem in CLPFD

```
dinner(L):-  
    L=[GP,P,CH],  
    GP in 1..6,  
    P in 1..10,  
    CH in 1..40,  
    20 #= GP + P + CH,  
    40 #= (GP*6) + (P*4) + (CH),  
    labeling([],L).
```

- You can model the problem as a list of variables each having a specific domain.
- Use the constraints: `all_different(L)` or `all_distinct(L)`

Thank you