COMP4418: Knowledge Representation and Reasoning
Prolog IV — Controlling Execution

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The Cut Operator (!)

- Sometimes we need a way of preventing Prolog finding all solutions
- The *cut* operator is a built-in predicate that prevents backtracking
- It violates the declarative reading of a Prolog program
- Use it VERY sparingly!!
Backtracking

lectures(adnan, Subject), studies(Student, Subject)?

Subject = 4418
Student = jane

Subject = 9518
Student = jack

lectures(adnan, Subject), studies(Student, Subject)?
Cut Prunes the Search

- Prevents backtracking to goals left of the cut by throwing away remaining choice points

\[
\text{lectures(adnan, Subject), !, studies(Student, Subject)?}
\]

- lectures(adnan, 9414)
- studies(jane, 9414)
- lectures(adnan, 9518)
- studies(jack, 9518)
overdue(Today, Title, CatNo, MemFamily) :-
    loan(CatNo, MemNo, _, DueDate),
    later(Today, DueDate), !,
    book(CatNo, Title, _),
    member(MemNo, name(MemFamily, _), _).
Controlling Execution

• Some methods for controlling execution in Prolog:
  ◦ Ordering of clauses (facts and rules)
  ◦ Ordering of subgoals within a rule
  ◦ Cut (!) operator

• Use each with care