Lecture 2 - Datalog

- Decidable: "Yes" ∨ "No", in finite amount of time
  - e.g.: checking if fact is consequence of KB is decidable
  - Datalog DOESN'T allow you to write contradictory statements in the knowledge base
    ☹ a datalog KB CAN'T be INCONSISTENT
    ↑ ∃ fact to be derived from KB
- Queries: (True ∨ False), i.e Ground queries
  - Facts, possibly containing variables
  - $ans(q) = \{\sigma \mid KB \vdash \sigma(q)\}$ (substitution)
    ↑ finite consequences ☺ THIS is also finite

    q = query, ans = answer
    e.g. set of substitutions, which make a ground fact that is a consequence of KB when applied to q
  - $F_i = F_{i-1} \cup \{\sigma(head) \mid body \Rightarrow head \in R \cup \sigma(body) \in F_{i-1}\}$
    - reaches a fixed point where $F_j = F_{j+1}$

    ] Finding Consequences
- Fact is ground if ∄ variables in it
  - $\exists (f_1, f_2)$, f_2 MATCHES f_1 if $\exists \sigma \mid f_2 = \sigma(f_1)$ (f_2: ground)
- How to compute matching substitutions with facts

match($F_A = name_A(args_A)$, $F_B = name_B(args_B)$, σ) :

return $\perp$ if different($name_A$, $name_B$)

for $i = 0$ to $args_A$.length

if $args_A[i]$ is a variable && $args_A[i] \notin \sigma$ then