

E1.

[amusement_parks] : {[amusement_name:string, city:string, opening_year:int, mid:int]}

[attractions] : {[aid:int, name:string, construction]_year:int, amusement_name:string}

[guests] : {[gid:int, birth_year:int, name:string]}

[machanics] : {[mid:int, birth_year:int, name:string, company:string]}

[entrepreneurs] : {[eid:int, birth_year:int, name:string, capital:float, amusement_name:string]}

[are_visited_by] : {[timestamp:date, gid:(guests), aid:(attractions)]}

[hire]: {[eid:(entrepreneurs), aid:(attractions), mid(machanics), salary:float]}

E2.**a)**

1. [comapnies founded in 2005] := $\sigma_{\text{founding_year}=2005}([\text{estate_agencies}])$
 [agents working for agancies founded in 2005] := [estate_agents] $\bowtie_{\text{agency=name}}$ [comapnies founded in 2005]
 $\pi_{\text{salary}}([\text{agents working for agancies founded in 2005}])$
2. [agents_not_sell] := [estate_agents] - ([estate_agents] $\bowtie_{\text{eid=agent}}$ [sell])
 [noobi_agents] := $\sigma_{\text{salary} \leq 1000}([\text{estate_agents}]) \bowtie_{\text{eid=eid}}$ [agents_not_sell]
 $\pi_{\text{birth_year}}([\text{persons}] \bowtie_{\text{pid=eid}}$ [noobi_agents])
3. [cheap_sell] := $\sigma_{\text{price} \leq 50000}([\text{sell}])$
 [houses_same_city] := [houses] $\bowtie_{[\text{houses}].\text{city}=[\text{cheap_sell}].\text{agent.agency.city}}$ [sell]
 [houses_different_city] := [houses] - [houses_same_city]
 $\pi_{\text{street}}([\text{houses_different_city}] \bowtie_{\text{hid=house.hid}}$ [cheap_sell])
4. [high_sell] := $\sigma_{\text{price} \geq 20.000}([\text{sell}])$
 [agents_high_sell] := $\sigma_{\text{count} \geq 4}(\gamma_{\text{agent, count}(*)}([\text{high_sell}]))$
 $\pi_{\text{name}}([\text{persons}] \bowtie_{\text{pid=eid}} ([\text{estate_agents}] \bowtie_{\text{eid=eid}}$ [agents_high_sell]))

b)

1. The price of houses sold who are located on the 'Dudweilerstraße' and have been sold by an agent who is earning at least 2000 euros.
2. The number of houses outside of Saarbrücken that are advertised below the desired budget.

Ex3.

1. $[George_Lucas_film] :=$
 $[movies] \bowtie_{id=movie_id} ([movies_directors] \bowtie_{director_id=id} (\sigma_{first_name='George', last_name='Lucas'}([directors])))$
 $[film_between] := \sigma_{1999 \leq year \leq 2005} ([George_Lucas_film])$
 $\pi_{name}(\sigma_{rank=\max(\pi_{rank}[film_between])}[film_between])$
2. $[darth_vador_movies] := \sigma_{role='Darth Vader'}([roles])$
 $[at_least_three_time_per_film] := \sigma_{count \geq 3} (\gamma_{actor_id, movie_id, count(*)}([darth_vador_movies]))$
 $count([movies] - ([movies] \bowtie_{id=movie_id} [at_least_three_time_per_film]))$