(67506) Databases – Spring 2022 – Exercise (2)

Muaz Abdeen 300575297

Mohammad Ghanayem 208653220

Question (1):

$\boldsymbol{A}$:= authors (<u>name</u>, <u>conference</u>, <u>year</u>, institution, count, adjustedcount)

$\boldsymbol{C}$:= conferences (<u>conference</u>, area, subarea)

$\boldsymbol{I}$:= institutions (<u>institution</u>, region, country)

1. Names of authors belong to "Hebrew University of Jerusalem".

$$\pi_{name}\left(\sigma_{institution="Hebrew\ University\ of\ Jerusalem"}\ \boldsymbol{A}\right)$$

2. Names of authors belong to an Israeli institution, and the name of the institution.

$$\pi_{name,institution}\left(\sigma_{country="il"}\ \boldsymbol{A} \bowtie \boldsymbol{I}\right)$$

3. Names of authors (and their corresponding institution) belong to an Israeli institution, whose $adjustedcount \geq 2$, in any conference with subarea of "*db*" <u>or</u> area of "*ai*".

$$\mathcal{X} := \pi_{name,conference,year,institution}\left(\left(\sigma_{adjustedcount \geq 2}\ \boldsymbol{A}\right) \bowtie \left(\sigma_{country="il"}\ \boldsymbol{I}\right)\right)$$

$$\pi_{name,institution}\left(\mathcal{X} \bowtie \left(\sigma_{\substack{area="ai" \\ \vee\ subarea="db"}}\ \boldsymbol{C}\right)\right)$$

4. (a) Names of authors from HUJI, who publish papers in conference with subarea of "*vision*" <u>and</u> in conference with subarea of "*ml*".

$$\left(\pi_{name}\left(\sigma_{\substack{institution="Hebrew\ University\ of\ Jerusalem" \\ \wedge\ subarea="vision"}}\ \boldsymbol{A} \bowtie \boldsymbol{C}\right)\right.$$

$$\left.\cap\ \pi_{name}\left(\sigma_{\substack{institution="Hebrew\ University\ of\ Jerusalem" \\ \wedge\ subarea="ml"}}\ \boldsymbol{A} \bowtie \boldsymbol{C}\right)\right)$$

(b) Names of authors from HUJI, for which there is a year, they publish in this year papers in conference with subarea of "*vision*" and in conference with subarea of "*ml*". Return rows in the form: $(year, name)$.

This article differs from the previous, in that both conferences must be in the same year, where the previous asks about who published in the two subareas no matter if they were in the same year or not.

$$\pi_{year,name}\left(\sigma_{institution="Hebrew\ University\ of\ Jerusalem"\ \wedge\ subarea="vision"}\ \boldsymbol{A}\bowtie\boldsymbol{C}\right)$$
$$\cap\ \pi_{year,name}\left(\sigma_{institution="Hebrew\ University\ of\ Jerusalem"\ \wedge\ subarea="ml"}\ \boldsymbol{A}\bowtie\boldsymbol{C}\right)$$

5. Names of authors who publish only in the "*systems*" area, only before 1990 .

$$(\pi_{name}\ \boldsymbol{A}) - \pi_{name}\left(\sigma_{year\geq 1990\ \vee\ area\neq"systems"}\ \boldsymbol{A}\bowtie\boldsymbol{C}\right)$$

6. Names of authors who publish a paper in every conference in "*AI*" area, in which "Noam Nisan" has published a paper (but not necessarily in the same year).

$$\left(\pi_{name,conference}\ \boldsymbol{A}\right)\div\pi_{conference}\left(\sigma_{name="Noam\ Nisan"\ \wedge\ area="ai"}\ \boldsymbol{A}\bowtie\boldsymbol{C}\right)$$

7. For every year from 2000 to 2020, return row(s) of form $(year, name)$ of record-holder(s) from "Hebrew University of Jerusalem".

$$\boldsymbol{A_2} := \left(\rho_{A_2(n_2,c_2,y_2,inst_2,count_2,adjc_2)}\boldsymbol{A}\right)$$

$$\mathcal{X} := \sigma_{name \neq n_2}\left(\sigma_{\substack{institution="Hebrew\ University\ of\ Jerusalem"\boldsymbol{A} \\ \wedge\ conference="focs" \\ \wedge\ 2000 \leq year \leq 2020}}\right) \times \left(\sigma_{\substack{inst_2="Hebrew\ University\ of\ Jerusalem"\boldsymbol{A_2} \\ \wedge\ c_2="focs" \\ \wedge\ 2000 \leq y_2 \leq 2020}}\right)$$

$$\pi_{year,name} - \left(\pi_{year,name}\left(\sigma_{\substack{year = y_2 \\ \wedge\ count < count_2}}\mathcal{X}\right)\right)$$