

נדב פיירמן שטרן
207018250
תרגול שעה 14

1. $\pi_{\text{universityName}} \left(\sigma_{((\text{state} = \text{Denmark}) \cup (\text{state} = \text{Greece}) \cup (\text{state} = \text{"Spain"}))}(\text{Universities}) \right)$
2. $\pi_{\text{state}} \left(\sigma_{\text{NumberOfPublications} > 32}(\text{Universities}) \right)$
3.
 - a. $\pi_{\text{researcherName}, \text{researcherGrant}} \left(\sigma_{\text{R.NumberOfPublications} < 41} \left(\sigma_{\text{R.universityName} = \text{U.universityName}} (\rho_{\text{R}}(\text{Researchers}) \times \rho_{\text{U}}(\text{Universities})) \right) \right)$
 - b. $\pi_{\text{researcherName}, \text{researcherGrant}} \left(\sigma_{\text{R.NumberOfPublications} < 41} \left(\rho_{\text{R}}(\text{Researchers}) \bowtie_{\text{universityName}} \rho_{\text{U}}(\text{Universities}) \right) \right)$
4. $\pi_{\text{researcherName}, \text{universityName}} \left(\sigma_{\text{R.researcherAddress} = \text{U.state}} \left(\rho_{\text{R}}(\text{Researchers}) \bowtie_{\text{universityName}} \rho_{\text{U}}(\text{Universities}) \right) \right)$
5. $\pi_{\text{researcherName}, \text{researcherAddress}} \left(\sigma_{(\text{P2.authorName} = \text{"Prof.Daniel Barak"}) \cap (\text{P1.authorName} \neq \text{"Prof.Daniel Barak"})} \left(\rho_{\text{R}}(\text{R}) \bowtie_{\theta = (\text{R.researcherName} = \text{P1.authorName})} \left(\rho_{\text{P1}}(\text{Publications}) \bowtie_{\text{articleName}} \rho_{\text{P2}}(\text{Publications}) \right) \right) \right)$
6. $\pi_{\text{authorName}} \left(\sigma_{\text{field} = \text{"AI"}}(\text{Publications}) \right) - \pi_{\text{authorName}} \left(\sigma_{\text{field} = \text{"DB"}}(\text{Publications}) \right)$
7. $\pi_{\text{articleName}} \left(\rho_{\text{U}}(\text{Universities}) \bowtie_{\theta = ((\text{R.universityName} = \text{U.universityName}) \cap (\text{state} = \text{Israel}))} \left(\rho_{\text{P}}(\text{Publications}) \bowtie_{\theta = (\text{P.authorName} = \text{R.researcherName})} \rho_{\text{R}}(\text{Researchers}) \right) \right)$

$$8. \pi_{\text{universityName}} \left(\sigma_{\text{U.NumberOfPublications} > 120}(\text{Universities}) \right) - \pi_{\text{universityName}} \left(\sigma_{(\text{P.year} = 2022) \wedge (\text{P.field} = \text{"SQL"})} \left(\rho_{\text{P}}(\text{Publications}) \bowtie_{\theta = (\text{P.authorName} = \text{R.researcherName})} \rho_{\text{R}}(\text{Researchers}) \right) \right)$$

$$9. \pi_{\text{universityName}} \left(\sigma_{(\text{U1.state} = \text{"India"}) \wedge (\text{U2.State} = \text{"USA"}) \wedge (\text{U2.universityName} = \text{"Yale University"})} \left(\rho_{\text{U1}}(\text{Universities}) \bowtie_{\theta = (\text{U1.NumberOfPublications} > \text{U2.NumberOfPublications})} \rho_{\text{U2}}(\text{Universities}) \right) \right)$$