

$$1a) \pi_{\text{COSAOME, NOME}} \left(DO \bowtie \rho_{CF \leftarrow \text{DOCENTE}} \pi_{\text{DOCENTE}} \sigma_{\text{OREESORC} > \text{ORELEZ}} CO \right)$$

$$1b) R\phi := \sigma_{\text{VOTO} \geq 18 \wedge \text{ANNOPIANO} = 1} ES \quad R\phi_A := \pi_{\text{STUDENTE, CORSO}} (R\phi)$$

$$R1 := \rho_{C1 \leftarrow \text{CORSO}} R\phi_A$$

$$R2 := \sigma_{C1 \neq \text{CORSO}} (R\phi_A \bowtie R1)$$

$$\pi_{\text{MATRICOLA, COSAOME, NOME, CORSO}} \left((\rho_{\text{MATRICOLA} \leftarrow \text{STUDENTE}} R2) \bowtie SA \right)$$

$$1c) R\phi := \pi_{\text{CFU}} CO ; R1 := \pi_{\text{CFU}} \left(\sigma_{\text{CFU} \neq C} ((\rho_{C \leftarrow \text{CFU}} R\phi) \bowtie R\phi) \right)$$

$$R2 := CO \bowtie (R\phi - R1)$$

$$R3 := \pi_{\text{ORELAB}} R2 ; R4 := \pi_{\text{ORELAB}} \left(\sigma_{\text{ORELAB} > OR} ((\rho_{OR \leftarrow \text{ORELAB}} R3) \bowtie R3) \right)$$

$$R2 \bowtie (R3 - R4)$$

$$1d) R\phi := \pi_{\text{FACOLTA, CITTA, ATENEO}} \left(SD \bowtie_{\text{CODICE} = \text{FACOLTA}} FA \right)$$

$$R1 := \rho_{F \leftarrow \text{FACOLTA}} R\phi$$

$$R2 := \pi_{\text{CITTA, ATENEO}} \left(\sigma_{\text{FACOLTA} \neq F} (R\phi \bowtie R1) \right)$$

$$UN \bowtie \left(\rho_{\substack{\text{CODICE} \leftarrow \text{ATENEO,} \\ \text{CITTA} \leftarrow \text{CITTA}}} R2 \right)$$