PS 1: Problem 16
Relational-algebra queries

problem 16.1

$$\text{natural\_join\_Oscar\_Movie} \leftarrow (\text{Oscar}) \bowtie_{\text{Oscar.movie\_id=Movie.id}} (\text{Movie})$$

$$\text{tuples\_bst\_pic\_2010s} \leftarrow \sigma_{\text{Oscar.type='BEST-PICTURE'} \wedge \text{Oscar.year} \leq 2019 \wedge \text{Oscar.year} \geq 2010} (\text{natural\_join\_Oscar\_Movie})$$

$$\text{final\_result} \leftarrow \pi_{\text{Movie.name,Oscar.year}} (\text{tuples\_bst\_pic\_2010s})$$

problem 16.2

$$\text{Movie\_left\_out\_join\_Oscar} \leftarrow (\text{Movie}) \bowtie_{\text{Movie.id = Oscar.movie\_id}} (\text{Oscar})$$

$$\text{tuples\_rank\_1to25} \leftarrow \sigma_{\text{Movie.earnings\_rank} \leq 25} \text{Movie\_left\_out\_join\_Oscar}$$

$$\text{final\_result} \leftarrow \pi_{\text{Movie.earnings\_rank, Movie.name, Oscar.type}} (\text{tuples\_rank\_1to25})$$

problem 16.3

$$\text{bst\_spprt\_tuples} \leftarrow \sigma_{\text{A.actor\_id=O.person\_id} \wedge \text{O.type LIKE 'BEST-SUPPORTING\%'}} (\text{Oscar} \times \text{Actor})$$

$$\text{actor\_id\_bst\_spprt} \leftarrow \pi_{\text{A.actor\_id}} (\text{bst\_spprt\_tuples})$$

$$\text{bst\_actor\_actress\_tuples} \leftarrow \sigma_{\text{A.actor\_id=O.person\_id} \wedge \text{O.type='BEST-ACTOR'} \vee \text{O.type='BEST-ACTRESS'}} (\text{Oscar} \times \text{Actor})$$

$$\text{actor\_id\_bst\_actor\_actress} \leftarrow \pi_{\text{A.actor\_id}} (\text{bst\_actor\_actress\_tuples})$$

$$\text{final\_table} \leftarrow \text{actor\_id\_bst\_spprt} - \text{actor\_id\_bst\_actor\_actress}$$