





1)

$A \leftarrow \sigma_{(\text{genre} = \text{pop song})}(\text{GenreOfSong})$

$B \leftarrow \sigma_{(\text{name} = \text{Taylor Smith})}(\text{Artist})$

$\pi_{\{\text{title}\}}(A \bowtie \text{Song} \bowtie \text{SongCreating} \bowtie B)$

2)

$A \leftarrow \sigma_{(\text{name} = \text{Taylor Smith})}(\text{Artist})$

$B \leftarrow \sigma_{(\text{name} = \text{Ed Sheeran})}(\text{Artist})$

$\pi_{\{\text{title}\}}(\text{Song} \bowtie \text{SongCreating} \bowtie (A \cup B))$

3)

$A \leftarrow \sigma_{(\text{genre} = \text{pop song})}(\text{GenreOfSong})$

$B \leftarrow \sigma_{(\text{genre} = \text{hip-hop})}(\text{GenreOfSong})$

$C \leftarrow \pi_{\{\text{name}\}}(\text{Artist} \bowtie \text{SongCreating} \bowtie \text{Song} \bowtie A) - \pi_{\{\text{name}\}}(\text{Artist} \bowtie \text{SongCreating} \bowtie \text{Song} \bowtie B)$

$D \leftarrow \sigma_{(\text{gender} = \text{Female})}(\text{Artist})$

$E \leftarrow \sigma_{(\text{company} = \text{Universal Music Group})}(\text{Company})$

$F \leftarrow \pi_{\{\text{name}\}}(D \bowtie \text{JoinIn} \bowtie E)$

$G \leftarrow C \cap F$

4)

$A \leftarrow \pi_{\{\text{SID}\}}(\text{Songcreating} \bowtie \sigma_{(\text{name} = \text{Taylor Smith})}(\text{Artist}))$

$B \leftarrow \pi_{\{\text{alID}\}}(\sigma_{(\text{name} = \text{Taylor Smith})}(\text{Artist}))$

$C \leftarrow \pi_{\{\text{alID}\}}(\text{Songcreating} \bowtie A) - B$

$D \leftarrow \pi_{\{\text{alID}, \text{Genre}\}}(\text{Song Creating} \bowtie \text{GenreOfSong}) \div \pi_{\{\text{Genre}\}}(\text{GenreofSong})$

$E \leftarrow \pi_{\{\text{name}\}}(\text{Artist} \bowtie (C \cap D))$