Relational Algebra Solutions
UIBK - Music Streaming Service

Solutions to Queries

1. $\pi_{Name}(Artist)$
2. $\pi_{Title}(\sigma_{ArtistId=1}(Album))$
3. $\pi_{Name}(Track \bowtie_{Track.GenreId=Genre.GenreId} \sigma_{Name='Rock'}(Genre))$
4. $\pi_{Name}(Track \bowtie_{Track.TrackId=PlaylistContent.TrackId} \sigma_{PlaylistId=5}(PlaylistContent))$
5. $\pi_{FirstName,LastName}(Customer \bowtie_{Customer.CustomerId=Invoice.CustomerId} Invoice)$
6. $\pi_{FirstName,LastName}(\sigma_{Country='Italy'}(Customer))$
7. $\rho_{Count}(\gamma_{count(*)}(Track))$
8. $\pi_{Playlist.Name}((Playlist \bowtie PlaylistContent) \bowtie_{PlaylistContent.TrackId=Track.TrackId} (Track \bowtie_{Track.GenreId=Genre.Genrel}$ $\sigma_{Name='Jazz'}(Genre)))$
9. $\pi_{Name}(Track \bowtie_{Track.TrackId=InvoiceParts.TrackId} InvoiceParts)$
10. $\gamma_{avg(UnitPrice)}(Track)$
11. $\pi_{Artist.Name}(Artist \bowtie_{Artist.ArtistId=Album.ArtistId} Album)$
12. $\pi_{Name}(\sigma_{Miliseconds>300000}(Track))$
13. $\pi_{FirstName,LastName}(Customer \bowtie_{Customer.CustomerId=Invoice.CustomerId} \sigma_{InvoiceDate='2026-01-11'}(Invoice))$
14. $\pi_{Name}(Track \bowtie_{Track.TrackId=PlaylistContent.TrackId} PlaylistContent)$
15. $\pi_{Name}(Track) - \pi_{Name}(Track \bowtie_{Track.TrackId=InvoiceParts.TrackId} InvoiceParts)$
16. $\pi_{Name}(Artist) - \pi_{Artist.Name}(Artist \bowtie_{Artist.ArtistId=Album.ArtistId} Album)$
17. $\pi_{Playlist.Name}(\gamma_{PlaylistId,count(TrackId)\rightarrow cnt}(PlaylistContent) \bowtie_{cnt>10} Playlist)$
18. $\pi_{Name}(Track \bowtie_{Track.GenreId=Genre.GenreId} (\sigma_{Name='Classical' \wedge UnitPrice<1.00}(Genre \bowtie Track)))$
19. $\pi_{FirstName,LastName}(Customer \bowtie_{Customer.CustomerId=Invoice.CustomerId} \gamma_{CustomerId,sum(Total)\rightarrow total}(Invoice) \bowtie_{total>10}$ $Invoice)$
20. $\pi_{Track.Name}((Track \bowtie Album) \bowtie_{Album.ArtistId=Artist.ArtistId} \sigma_{Name \text{ LIKE } '\%Italy\%'}(Artist))$
21. $\pi_{Track.Name}((Track \bowtie InvoiceParts) \bowtie_{InvoiceParts.InvoiceId=Invoice.InvoiceId} (Invoice \bowtie_{Invoice.CustomerId=Customer.Cu}$ $\sigma_{City='Vienna'}(Customer)))$
22. $\pi_{Playlist.Name}(\gamma_{PlaylistId,count(distinctGenreId)\rightarrow genre_count}((Playlist \bowtie PlaylistContent) \bowtie_{PlaylistContent.TrackId=Track.T}$ $Track) \bowtie_{genre_count>1} Playlist)$
23. $\pi_{Name}(\gamma_{TrackId,count(PlaylistId)\rightarrow pl_count}(PlaylistContent) \bowtie_{pl_count\geq 2} Track)$

24. $\pi_{FirstName,LastName}(Customer \bowtie_{Customer.CustomerId=Invoice.CustomerId} (Invoice \bowtie_{Invoice.InvoiceId=InvoiceParts.Invoice}$
$InvoiceParts \bowtie_{InvoiceParts.TrackId=Track.TrackId} Track \bowtie_{Track.GenreId=Genre.GenreId} Genre)) \div \pi_{GenreId}(Genre)$

25. $\pi_{Name}(Track) - \pi_{Name}(Track \bowtie_{Track.TrackId=PlaylistContent.TrackId} PlaylistContent)$