Litfu Kurtuluş CS353 - HW1 21903025

Q1)

a) • Find albums in 2022

$t_1 \leftarrow \sigma_{year=2022}(Album)$

• Find singers who have an album in 2022

$t_2 \leftarrow singer \bowtie_{singer.s\text{-}name = t_1.s\text{-}name} (t_1)$

• Give the final result

$\Pi_{s\text{-}name, nationality}\left(\sigma_{birth\text{-}year>1998}(t_2)\right)$

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b) • Find Albums released in 2022 and have rating greater than 4

$t_1 \leftarrow \sigma_{year=2022 \wedge rating>4.0}(Album)$

• Find the songs and return their titles and writers

$t_2 \leftarrow SongInAlbum \bowtie_{SongInAlbum.a\text{-}title = t_1.a\text{-}title} (t_1)$

$\Pi_{s\text{-}title, written\text{-}by}\left(t_2 \bowtie_{t_2.s\text{-}title = Song.s\text{-}title} Song\right)$

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c) $\Pi_{name}\left(\sigma_{nationality = "Turkish"}\left(Singer \bowtie_{Singer.s\text{-}name = t_1.s\text{-}name} \rho_{t_1}\left(\sigma_{year \neq 2022}(Album)\right)\right)\right)$

d) • Find the highest rate

$t_1 \leftarrow \mathcal{G}_{\max(\text{rating}) \text{ as rating}}(\sigma_{\text{year}=2022}(\text{Album}))$

Natural join

$\Pi_{\text{a-title, s-name}}(\text{Album} \bowtie t_1)$

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e) • Find number of songs in each album

$t_1 \leftarrow \text{a-title } \mathcal{G}_{\text{Count (s-title) as a-size}}(\text{SongInAlbum})$

• Return the title of the albums which have more than 10 songs

$\Pi_{\text{a-title}}(\sigma_{\text{a-size}>10}(t_1))$

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f) • Find songs in the album "ABC"

$t_1 \leftarrow \sigma_{\text{a-title} = \text{"ABC"}}(\text{SongInAlbum})$

• Use natural join to get the song length attributes

$t_2 \leftarrow t_1 \bowtie \text{Song}$

• Find the shortest length

$t_3 \leftarrow \mathcal{G}_{\min(\text{length}) \text{ as length}}(t_2)$

• Use natural join and return the result

$\Pi_{\text{s-title, track-number}}(t_2 \bowtie t_3)$

Q2)

a) $\Pi_{name, price}\left(\sigma_{company = \text{"Pfizer"} \wedge production\text{-}year = 2022}(Drug)\right)$

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b) . Find patients who have prescriptions written by their primary doctor

$t_1 \leftarrow Patient \bowtie (Prescription)$

$Patient.TCK = Prescription.patient\text{-}TCK$

$\wedge$

$Patient.primary\text{-}doctor\text{-}TCK = Prescription.doctor\text{-}TCK$

. Return the final result

$\Pi_{TCK, name}\left(\sigma_{t_1.date = \text{"22/02/2023"}}(t_1)\right)$

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c) . Find yesterdays prescriptions

$t_1 \leftarrow \sigma_{date = \text{"22/02/2023"}}(Prescription)$

. Use join operations to get Drug names and company

$t_2 \leftarrow t_1 \bowtie DrugInPrescription$

$t_1.id = DrugInPrescription.presc\text{-}id$

$t_3 \leftarrow t_2 \bowtie Drug$

$t_2.drug\text{-}name = Drug.name$

. Return the Result

$\Pi_{name, company}(t_3)$

d)

. Find yesterday's prescriptions

$t_1 \leftarrow \sigma_{\text{date} = \text{"23/02/2023"}}(\text{Prescription})$

. Find doctor's in Ankara

$t_2 \leftarrow \sigma_{\text{City} = \text{"Ankara"}}(\text{Doctor})$

. Find doctors that have written prescription yesterday and in ankara

$t_3 \leftarrow t_1 \bowtie_{t_1.\text{doctor-TCK} = t_2.\text{TCK}} t_2$

. Find patients and return the result

$\Pi_{\text{TCK, name}} (t_3 \bowtie_{t_3.\text{patient-TCK} = \text{Patient.TCK}} \text{Patient})$

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e)

$t_1 \leftarrow \text{production-year}\ \mathcal{G}_{\max(\text{price}) \text{ as price}}(\text{Drug})$

$\Pi_{\text{name, company}} (t_1 \bowtie \text{Drug})$

f) find yesterday's prescriptions

$t_1 \leftarrow \sigma(\text{Prescription})$
$\quad date = "25/02/2023"$

merge drugs and prescription tables

$t_2 \leftarrow t_1 \bowtie (\text{DrugInPrescription})$
$\quad t_1.id = \text{DrugInPrescription.Presc\_id}$

calculate the number of drugs in each prescription

$t_3 \leftarrow id\ \mathcal{G}(t_2)$
$\quad count(drug\text{-}none)\ as\ size$

find the prescription with max drugs in it.

$t_4 \leftarrow \mathcal{G}(t_3)$
$\quad max(size)\ as\ size$

get the id of the prescription

$t_5 \leftarrow t_4 \bowtie t_3$

get the tck of the doctor and return the result

$\Pi(t_5 \bowtie \text{Prescription})$
$\quad doctor\text{-}TCK, id$

9) . Find yesterday's prescriptions

$t_1 \leftarrow \sigma_{date = "25/02/2023"}(Prescription)$

. Find drugs in yesterday's prescriptions

$t_2 \leftarrow t_1 \bowtie_{t_1.id = DrugInPrescription.PrescId} (DrugInPrescription)$

. Calculate the number of appearances of each drug

$t_3 \leftarrow {}_{drug\text{-}name}\mathcal{G}_{count(id)\ as\ size}(t_2)$

. find the drugs which appeared at least 100 times

$t_4 \leftarrow \sigma_{size \geq 100}(t_3)$

. return the result

$\Pi_{name, company}(t_4 \bowtie_{t_4.drug\text{-}name = Drug.name} Drug)$

b) . Find the oldest patient

$t_1 \leftarrow \mathcal{G}$ (Patient)
min(birth year) as birthyear

$t_2 \leftarrow$ Patient $\bowtie t_1$

. Calculate how many prescription have been written to each patient

$t_3 \leftarrow$ patient-TCK $\mathcal{G}$(Prescription)
count(id) as size

. Find patients which have at least 10 prescription

$t_4 \leftarrow \sigma_{\text{size} \geq 10}(t_3)$

. Return the result

$$\Pi_{TCK, Name}\left(t_2 \bowtie_{t_2.TCK = t_4.\text{patient-TCK}} t_4\right)$$