ENSF 608 Fall 2021 – Lab 12

December 1, 2021
Dr. Emily Marasco

Recording Notice

Classes may be recorded. Recordings will only be uploaded to University approved platforms such as D2L, will only be for use by students and staff associated with the course, and will not be disseminated to a broader audience by the University.

If a student turns on their microphone or camera, or uses the public chat feature, this constitutes consent for the student's video image or sound audio to be uploaded with a recording. If a student wishes to ensure that their questions/faces/voices are not recorded in the video, they should instead use the private chat feature to ask questions.

Goals for Today

- Assignment 4 solutions
- Quiz 2 review
- Assignment 5 introduction
- Industry interview video
- Open design project question/work time

Reminder: Virtual Office Hours

- New form posted on D2L for each week
- 10 minute appointments with myself and the TAs
- Use D2L Zoom links for chosen session
- Must reserve 30 minutes ahead of **session** start time
- Contact Dr. Marasco for any changes

Assignment 4 Solutions

Single Expressions (4 marks)

1. $\pi_{\text{FName, LName}} (\text{PARTICIPANT})$
2. $\pi_{\text{OlympicID}} (\sigma_{\text{Sex} = \text{'M' AND FirstGames} = \text{'Rio 2016'}} (\text{ATHLETE}))$
3. $\pi_{\text{Country, LName, BirthYear}} (\text{PARTICIPANT} \bowtie_{\text{P.OlympicID} = \text{A.OlympicID}} \text{ATHLETE})$
4. $\pi_{\text{FName, Country}} (\sigma_{\text{Orientation} = \text{'Complete'}} (\text{PARTICIPANT} * \text{COACH}))$

Procedural Sequences (9 marks)

5. $BRONZE\_MEDALISTS \leftarrow \sigma_{Medal = \text{'Bronze'}} (INDIVIDUAL\_RESULTS)$

$BRONZE\_ATHLETES \leftarrow (BRONZE\_MEDALISTS \bowtie_{B.Olympian = A.OlympicID} ATHLETE)$

$RESULT \leftarrow \pi_{FirstGames} (BRONZE\_ATHLETES)$

6. $IND\_GOLD \leftarrow \sigma_{Medal = \text{'Gold'}} (INDIVIDUAL\_RESULTS)$

$TEAM\_GOLD \leftarrow \sigma_{Medal = \text{'Gold'}} (TEAM\_RESULTS)$

$I\_CNTRY \leftarrow \pi_{Country} (IND\_GOLD \bowtie_{I.Olympian = P.OlympicID} PARTICIPANT)$

$T\_ID \leftarrow TEAM\_GOLD \bowtie_{TG.Team = T.TeamID} TEAM$

$T\_CNTRY \leftarrow \pi_{Country} (T\_ID \bowtie_{T.Member1 = P.OlympicID} PARTICIPANT)$

$RESULT \leftarrow I\_CNTRY \cup T\_CNTRY$

Procedural Sequences (9 marks)

6. $IND\_GOLD \leftarrow \sigma_{Medal = \text{'Gold'}} (INDIVIDUAL\_RESULTS)$

$TEAM\_GOLD \leftarrow \sigma_{Medal = \text{'Gold'}} (TEAM\_RESULTS)$

$I\_CNTRY \leftarrow \pi_{Country} (IND\_GOLD \bowtie_{I.Olympian = P.OlympicID} PARTICIPANT)$

$T\_ID \leftarrow TEAM\_GOLD \bowtie_{TG.Team = T.TeamID} TEAM$

$T\_CNTRY \leftarrow \pi_{Country} (T\_ID \bowtie_{T.Member1 = P.OlympicID} PARTICIPANT)$

$RESULT \leftarrow I\_CNTRY \cup T\_CNTRY$

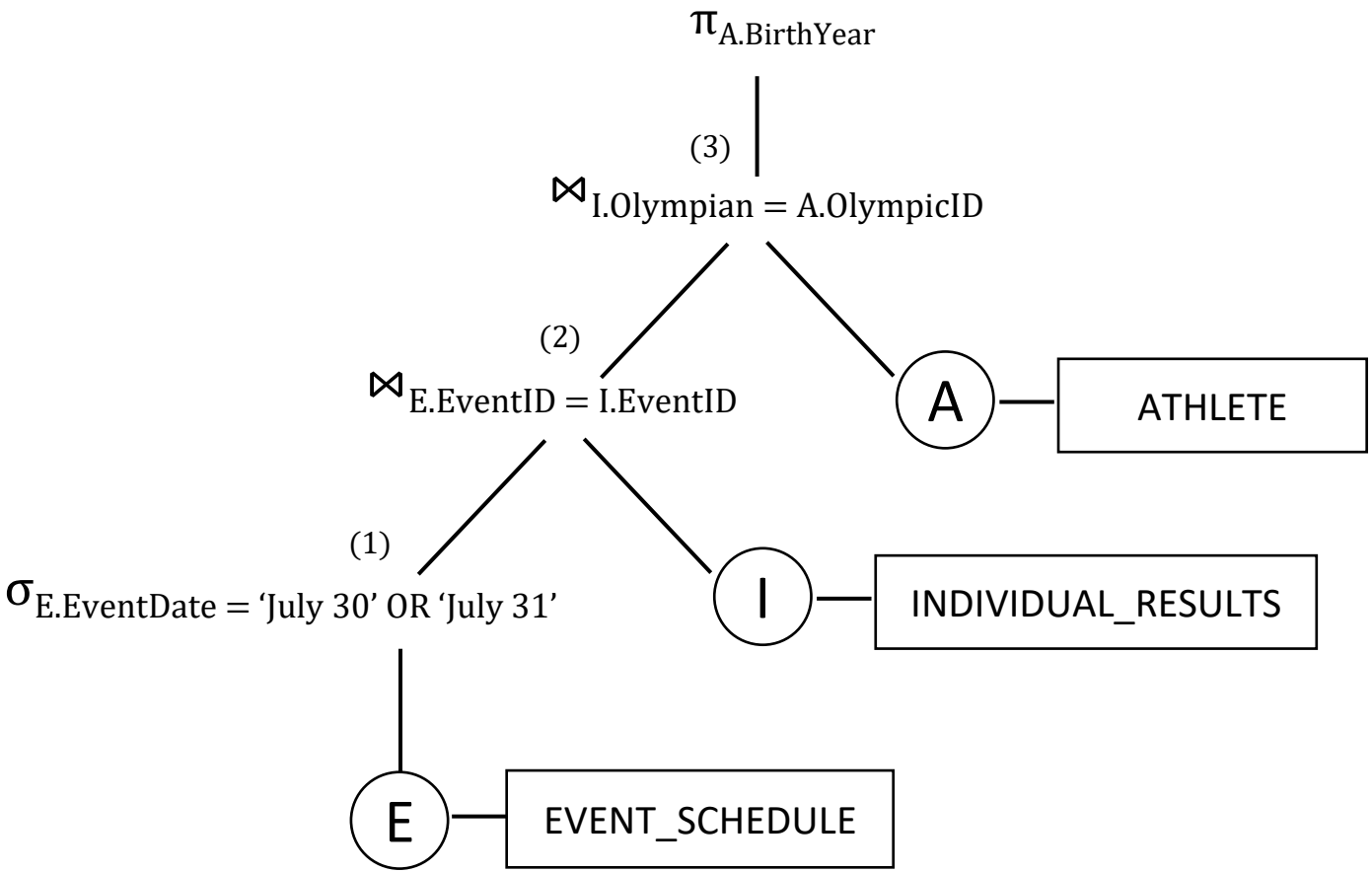
7. $WITH\_GOLD \leftarrow I\_CNTRY \cup T\_CNTRY$

$ALL\_COUNTRIES \leftarrow \pi_{Country} (PARTICIPANT)$

$RESULT \leftarrow ALL\_COUNTRIES - WITH\_GOLD$

8. Query Tree & Corresponding Expression (8 marks)

$$\pi_{\text{A.BirthYear}}\left(\left(\left(\sigma_{\text{E.EventDate} = \text{'July 30' OR 'July 31'}} \text{EVENT\_SCHEDULE}\right) \bowtie_{\text{E.EventID} = \text{I.EventID}} \text{INDIVIDUAL\_RESULTS}\right) \bowtie_{\text{I.Olympian} = \text{A.OlympicID}} \text{ATHLETE}\right)$$



Quiz 2 Preparation

- Access Dec. 2nd 12:00 PM MT – Dec. 3rd 11:59 PM MT
- 60 minutes + 20 minutes for technical issues
- Once started, the quiz must be submitted within 80 minutes
- Focus on Topics 5 through 7
  - SQL, relational algebra, normalization and dependencies

Functional Dependencies

Use the following state of relation R to determine the possible functional dependencies. Find the combinations of X → Y where X functionally determines Y.

A	B	C	D	E
a1	b1	c1	d1	e1
a1	b2	c2	d1	e2
a2	b3	c3	d3	e3
a3	b4	c3	d4	e4
a4	b4	c4	d5	e5

Normal Forms Summarized

- 1st Normal Form
  - No composites, no multi-value, no nested relations
- 2nd Normal Form
  - All attributes must be dependent on the primary key
- 3rd Normal Form
  - No transitive dependencies
- Boyce-Codd Normal Form
  - Stronger form of 3rd normal form
  - If X → A in R, then X is a superkey of R

Normalization

What is the minimum form satisfied by the below relation?

StudentID	StudentName	CourseID	CourseName	Grade
1001	Elliot Brown	ENGG 100	Intro to Design	A
1001	Elliot Brown	ENGG 199.01	Special Topics	A-
1002	May Lim	ENGG 100	Intro to Design	B
1003	Janice Torg	ENGG 199.06	Special Topics	A-
2010	Elliot Brown	ENGG 400	Advanced Design	B+

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ENGG 199.01	Special Topics
ENGG 199.06	Special Topics
ENGG 400	Advanced Design

Assignment 5 and Industry Interview

Refer to documents posted on D2L and lab session recording.

Open Work Time

Refer to documents posted on D2L and lab session recording.

Upcoming Deliverables

- Quiz 2 (10%) – Access Dec. 2nd/3rd
- Assignment 5 (6%) – Due last day of classes
- Joint ENSF 607/608 Project (30%) – Due last day of classes

This week:

- Keep the conversation going! Share interesting stories on data and databases in the world.
- Complete Quiz 2
- Complete Assignment 5
- Work on design project