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Section: BCS-4B
Course: DataBase Systems

Question 1(a)

Applications

- applicationNo integer
- name varchar(30)
- CompanyNo integer
- type varchar(30)

User

- userNo integer
- user-name varchar(30)
- email varchar(30)
- city varchar(30)
- country ~~varchar(30)~~ 2

Company

- companyNo integer
- name varchar(30)
- email varchar(30)
- address varchar(50)
- phone char(11)

Accessed By

- userNo integer
- applicationNo integer
- date Date
- time time
- duration integer time

Question 1(b)

Applications : applicationNo, ~~CompanyNo~~

User : UserNo

Company : CompanyNo

Accessed by : UserNo, applicationNo, date, time

Question 1(c)

Applications

<u>applicationNo</u>	name	CompanyNo	type
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User

<u>userNo</u>	user-name	email	city	country
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Company

<u>companyNo</u>	name	email	address	phone
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Accessed By

<u>userNo</u>	<u>applicationNo</u>	<u>date</u>	<u>time</u>	<u>duration</u>
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Question 1(d)

Applications:

- (1, 'larai b Complaint', 1, 'games')
- (2, 'Hammad Absent', 2, 'productivity')
- (3, 'DC Notice', 3, 'kids')

User:

- (1, 'hitman16', 'larai b katar16@gmail.com', 'Okara', 'Pakistan')
- (2, 'Hammad12', '1215273@hr.nu.edu.pk', 'Lahore', 'Pakistan')
- (3, 'spamX', '1211794@hr.nu.edu.pk', 'Rawalpindi', 'Pakistan')

Company

- (1, 'Gameify', 'gameify@gmail.com', 'Faisal Town', '03247587323')
- (2, 'Prodgeeks', 'prodgeeks@gmail.com', 'Johar town', '03150100830')
- (3, 'Kidschool', 'kidschool@gmail.com', 'Model town', '03246499012')

Accessed by:

(1, 1, '2020-05-04', '12:15:02', '00:00:15')
(1, 2, '2021-11-30', '13:52:11', '00:01:01')
(2, 3, '2019-10-1', '01:01:01', '01:00:15')

referential integrity constraints:

Accessed by:

(5, 2, '2011-10-1', '02:00:00', '00:00:01')

User 5 does not exist.

Entity integrity constraint

(NULL, 'Snapchat', 'Snapchat@snapchat.com', 'california', 'USA')

* primary key cannot be Null.

- e).
- User country constraints: make sure it contains valid country codes like 'UK', 'US', 'PK'.
 - Company Email constraints: make sure table only contains email addresses from valid domains e.g. '@gmail.com', '@lhr.nu.edu.pk'.
 - Company Phone number: The phone number should be exactly 11 digits.

C) Referential Integrity constraints

Applications:

- Foreign key (CompanyNo) references Company(CompanyNo)
on update cascade on delete ~~cascade~~ ^{set Null} cascade.

Accessed by:

- Foreign key (ApplicationNo) references Applications(ApplicationNo)
on update cascade on delete ~~cascade~~ ^{set Null} cascade.
- Foreign key (UserNo) references ~~Appt User~~ User(UserNo)
on update cascade on delete ~~cascade~~ ^{set Null} cascade.

Question 2

$$1. R \leftarrow \pi_{(id, name)} \left(\sigma_{EID, Ename} Event \right)$$

$$2. R \leftarrow \sigma_{start_date = '2023-01-03' \text{ AND } end_date > '2023-01-03'} Event$$

$$3. R \leftarrow \pi_{EID, Ename, start_time} R$$

$$3. R \leftarrow \sigma_{(bdate > '1998-02-11' \text{ AND } OID = NULL)} Participants$$

$$4. \pi_{pname} R$$

$$R \leftarrow Organization * (\pi_{OID} sponsors)$$

$$\pi_{pname} R$$

$$5. R \leftarrow \sigma_{pname = 'Techlogix'} Organization$$

$$R_1 \leftarrow \pi_{OID} R$$

$$R_2 \leftarrow Participants * R_1$$

$$R_3 \leftarrow \pi_{}$$

$$R_3 \leftarrow$$

$$R_1 \leftarrow \sigma_{pname = 'Techlogix'} Organization$$

$$R_2 \leftarrow R_1 * \sigma_{(start_date < '2023-01-03' \text{ AND } end_date > '2023-01-03')} Sponsors$$

$$R_3 \leftarrow R_2 * Attended$$

$$\pi_{PID} R_3$$

$$6. R \leftarrow \pi_{EID} \left(\sigma_{type = 'seminar'} Event \right)$$

$$R_2 \leftarrow \pi_{OID} (Sponsors * R_1)$$

$$R_3 \leftarrow (Organization * R_2)$$

$$R_4 \leftarrow Organization - R_3$$

$$\pi_{Oname} R_4$$

$$7. R_1 \leftarrow \pi_{PID} F_{\text{count_EID Attended}}$$

$$\pi_{PID} (\sigma_{\text{count_EID}=5} R_1)$$

$$8. \pi_{PID} F_{\text{count_EID Attended}}$$

$$9. F_{\text{min amount, max amount, AVERAGE amount Sponsors.}}$$

$$10. \text{---}$$

$$11. R_1 \leftarrow \pi_{EID} (\sigma_{\text{type}='seminar'} \text{Event})$$

$$R_2 \leftarrow \pi_{OID} (R_1 \times \text{Sponsors})$$

$$R_3 \leftarrow R_2 \times \text{Organization}$$

$$S_1 \leftarrow \pi_{EID} (\sigma_{\text{type}='workshop'} \text{Event})$$

$$S_2 \leftarrow \pi_{OID} (S_1 \times \text{Sponsors})$$

$$S_3 \leftarrow S_2 \times \text{Organization.}$$

$$R_3 \times S_3$$

$$12. R_1 \leftarrow \pi_{EID} (\sigma_{\text{type}='seminars'} \text{Event})$$

$$R_2 \leftarrow \pi_{PID} (R_1 \times \text{Attended})$$

$$R_3 \leftarrow \pi_{\text{Name}} (R_2 \times \text{Participants})$$

$$S_1 \leftarrow \pi_{EID} (\sigma_{\text{type}='conference'} \text{Event})$$

$$S_2 \leftarrow S_1 \times \text{Attended}$$

$$S_3 \leftarrow S_2 \times \text{Attended}$$

$$S_4 \leftarrow S_3 \times \text{Participants}$$

$\pi_{PID} (S_4 \times R_3)$

13. $R_1 \leftarrow \pi_{EID} (\sigma_{\text{start date} \leq 5-01-2023 \text{ AND end date} \geq 5-01-2023} \text{ Event})$
 $R_2 \leftarrow \pi_{PID} (R_1 \times \text{Sponsors})$

~~$S_1 \leftarrow \pi_{EID} (\sigma_{\text{Attended}}$~~

$S_1 \leftarrow \pi_{PID} (\text{Participants})$

$S_2 \leftarrow \pi_{PID} \text{ Attended}$

$T_1 \leftarrow S_1 - S_2$

$R_2 \cup T_1$

~~14. Insert into Event values (1, 'Nascom', 'Fast Islamabad',
 'Seminar', '05-01-2023', '2023-01-06', '12:00:00',
 '06:00:00', '2023-01-05')~~

14. Insert into Event values (

1,

'Nascom',

'FAST ISLAMABAD',

'Seminar',

'2023-01-05',

'12:00:00',

'2023-01-06',

'06:00:00'

);

15. Delete From Organization
 where $OID = 1$;

5. $R_1 \leftarrow \pi_{OID}(\sigma_{oname='Techlogix' Organization})$

$R_2 \leftarrow R_1 * Sponsors$

~~$R_3 \leftarrow R_2 * Attended$~~

$S_1 \leftarrow \pi_{EID}(\sigma_{\substack{\text{start-date} \geq '2023-01-03' \text{ AND} \\ \text{end-date} \leq '2023-01-03'}} \text{Event})$

$R_3 \leftarrow \pi_{EID}(R_2 * S_1)$

$R_4 \leftarrow \pi_{PID}(R_3 * Attended)$