End Semester Exam :-

RDBMS.

Q.1. (1) The do decomposition is lossless.

Q.2. (1) 2 NF

Q.3. (2) $3/2^J$

Q.4. (1) (3) $\pi_{A1}(\sigma_{F1 \wedge F2}(r)) \mid \pi_{A1}(\pi_{A3}(\sigma_{F1 \wedge F2}(r)))$

Q.5. (1) 512, 8

Q.6. (4) 103

Q.7. (3) (4) (3) A relation in first normal form doesnot allow multi-determines depen. (4) fourth normal

Q.8 (1) $A \rightarrow BH$, $B \rightarrow CE$, $D \rightarrow B$

Q.9 (2) σ is commutative, π is not commutative

Q.10 (2) 4.

Q.13. ~~Student(rollno, name, coursecode)~~
grade

student(rollno, name, courseCode, grade)

course(courseCode, courseName)

(a) TRC to find students who failed in any course.

~~t| ∃ s ∈ student, ~~

$$\left\{ t \mid \exists c \in Course, \exists s \in student \left(s[grade] = 'F' \wedge \right. \right.$$
$$s[courseCode] = c[courseCode], t[courseName] = $$
$$\left. \left. c[courseName], t[name] = s[name] \right) \right\}$$

(b) DRC query to find all student names who failed in course with code 'SQL'.

$$\begin{array}{cccc} S_R & S_n & S_c & S_g \end{array}$$
$$student(rollno, name, courseCode, grade)$$

$$course(\underset{C_c}{courseCode}, \underset{C_n}{courseName})$$

$$\left\{ \langle S_n \rangle \mid (\exists S_R)(\exists S_c)(\exists S_g)(\exists C_c) \left(\langle S_R, S_n, S_c, S_g \rangle \in student \right. \right.$$
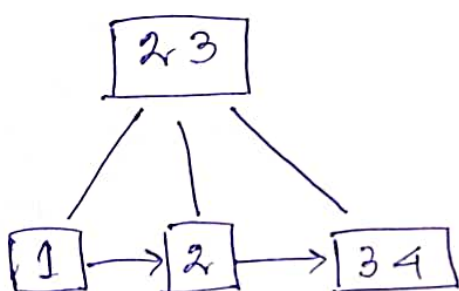$$\left. \wedge \langle C_c, 'SQL' \rangle \in course \wedge S_g = 'F' \wedge C_c = S_c \right) \right\}$$
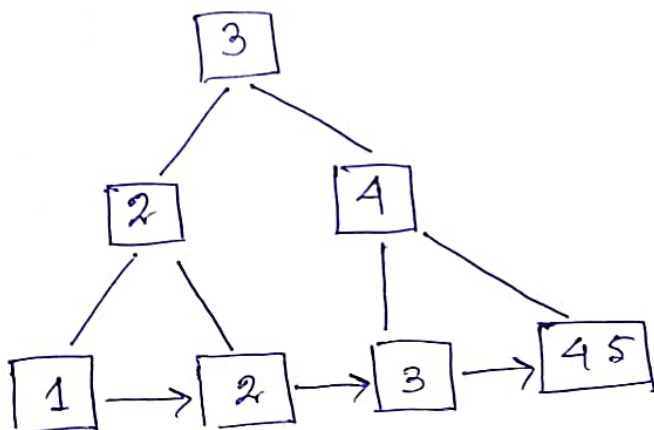
12. 1. $\boxed{3}$

2. $\boxed{2\ 3}$

3.
$123 \quad \left\lceil \dfrac{n-1}{2} \right\rceil$

4.
234

5.
345

6.
45 6

7.

35

2   4   6

1 → 2 → 3 → 4 → 5 → 6 7

5 6 7

8.

3 5

2   4   6 7

1 → 2 → 3 → 4 → 5 → 6 → 7 8

6 7 8
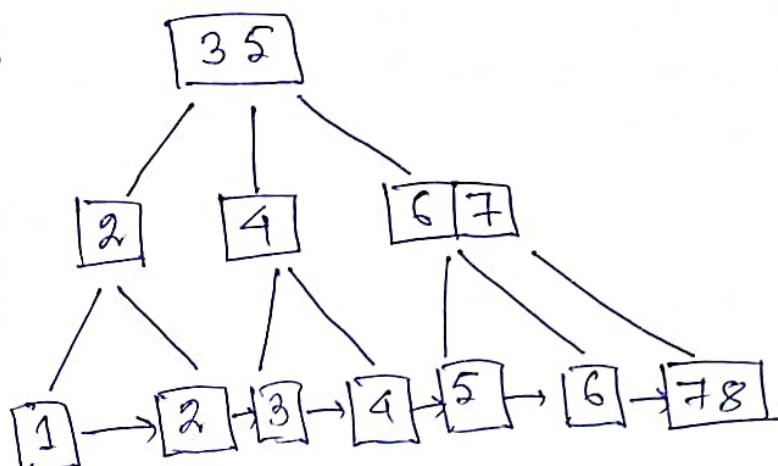
9.

5

3   7

2   4   6   8
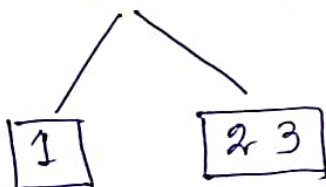
1 → 2 → 3 → 4 → 5 → 6 → 7 → 8 9
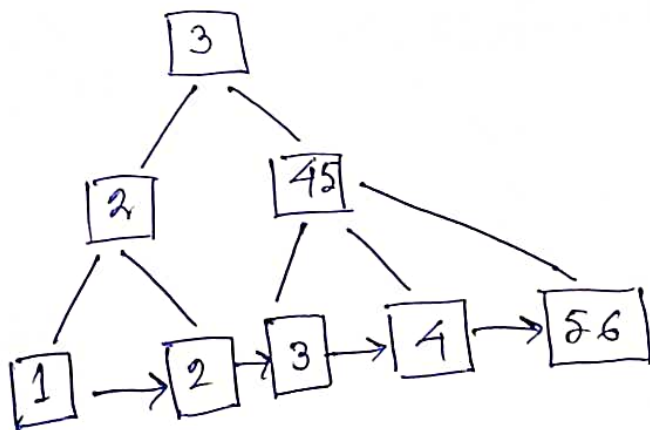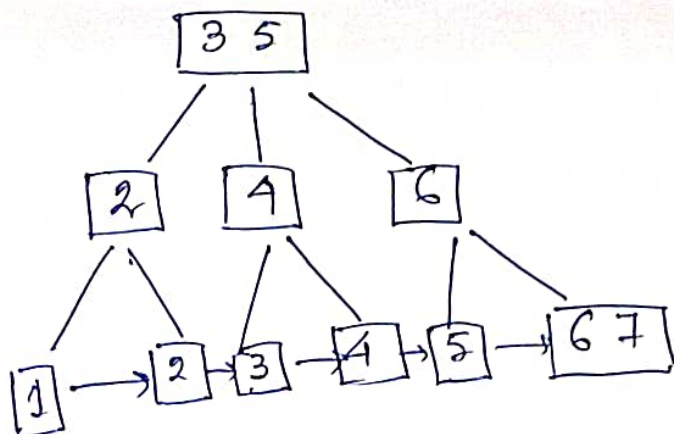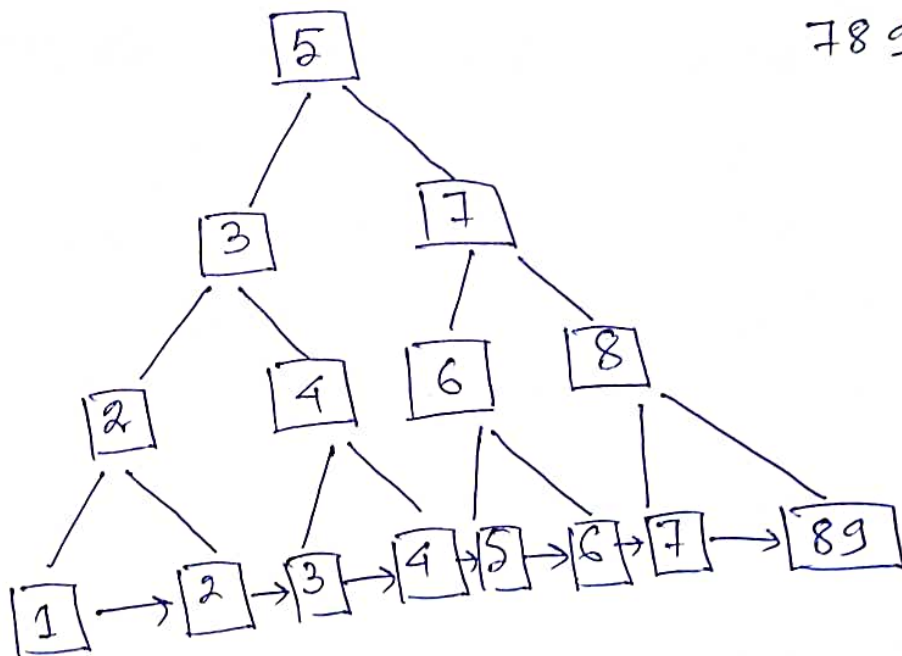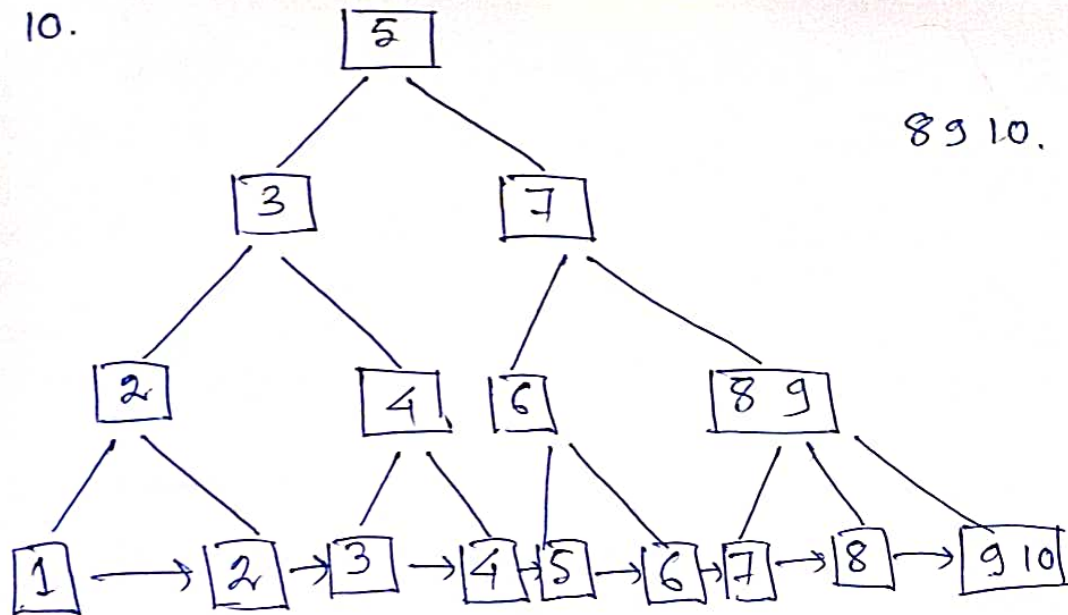
7 8 9

10.

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15. A railway reservation system that maintains data in an RDBMS.

It holds data such as train schedule, routes, passenger reservations and cancellations.

$$
\left.
\begin{array}{l}
\text{Schedule} \Rightarrow S \\
\text{routes} \quad \Rightarrow r \\
\\
\text{Passenger Reservations} \Rightarrow P \\
\text{Cancellations} \Rightarrow C
\end{array}
\right\} \text{Attribute map.}
$$

$r \rightarrow S$ as Schedule is dependent on train routes.

$rS \rightarrow Pr$ passenger reservation also depends on schedule and routes

$SP \rightarrow C$ Cancellation depends on schedule and Passenger reservation.

Schedule will be foreign key which will be only dependentent on routes taken and route is primary key. Which is unique.

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14. **Officer**

Loan No.	Amount
L 201504	10,000,00
L 201801	50,000,00

Payment

Loan No.	Pay-Id	P.Date
L201504	TRNO1	19/2/2021
L201801	TRNO5	05/03/2021

Here payment is a weak entity

The relational schemas are as follows.

Officer (LoanNo. , Amount)

Payment (LoanNo. , Pay-Id , P. Date)

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11. We would like to capture daily covid transmission Data. Let us make a table with primary key is Patient ID. Other attributes are Name, Agegroup, Symptoms, travel history.

Let us write down the table.

Patient_ID	Name	Age group	Symptoms	travel history
001	S. Ghosh	20-30	Sore throat	Bhubaneswar
001	S. Ghosh	20-30	Fever	Kolkata
001	S. Ghosh	20.30	Fatigue	Sonarpur.
001	S. Ghosh	20-30	cough.	Darjeeling
003	P. Day	30-40	Fever	Bangalore
003.	P. Das.	30-40	Sore throat	USA
004	S. Roy	20-30	Cough	USA
004	S. Roy	20-30	cough	Kalkata

This table is in 3rd normal form, as there is no transitive dependency. primary key is patient Id ok but the table design is not good. here primary key multi determines symptom and travel history and Age group.

like {Patient_ID} $\longrightarrow\longrightarrow$ {symptoms}

{Patient - ID} $\longrightarrow\longrightarrow$ {travel history}.

So, this table is not in 4th Normal form. To make it in 4th normal, we need to decompose the table.

16.

Student (rollno, sname)

course (cid, cname)

registration (rid, cid, year, semester, rollno)

grade (rollno, rid, lettergrade)

16. Select max(Lettergrade) from registration as r,
and grade g where r.rid = g.rid and r.cid = 'RSV'
groupby lettergrade;

17. Select sname from student as S, registration
as r, grade as g where S.rollno = g.rollno and
r.rid = g.rid and r.semester = "Oct-Nov" and
g.lettergrade = 'F';

18. Select max(cidcount) from (select count(cid) as cidcount
from registration group by cid);

19. Update course as c, registration as r set cid = "SQL"
where c.cid = r.cid and cid = "RSV";

20. Given that Ashish's name exists in student table

Insert into course values ("RSV2", 'RDBMS, SQL
and visualization 2");

Insert into registration (cid, year, semester, rollno)
values ("RSV2", 2021, "Feb-Mar", "MDS201905");

21. I liked the entire RDBMS concept. Specially the Relational calculus. It was taught in the last moment, that is why I spend a lot of time to understand the logical concept of it.

\# We have studied Propositional Logic in the past discrete mathematics course. Now the Relational Algebra is the practical application in real life where we have used in SQL. That is why I was able to relate both the topics more clearly

\# Finally I liked the table design part. I used to take a lot of time while designing the tables in excel in industry and filtering operation was really painful. But in SQL I liked the Idea of filtering very much.

Finally I got selected at Legato Health Internship as I was able to answer my project (Past) in the view of & ER diagram. That is why I will be greatful to this course which helped me to bag the internship at very first company