

CS2202 Mini Project Report

Team Members: -

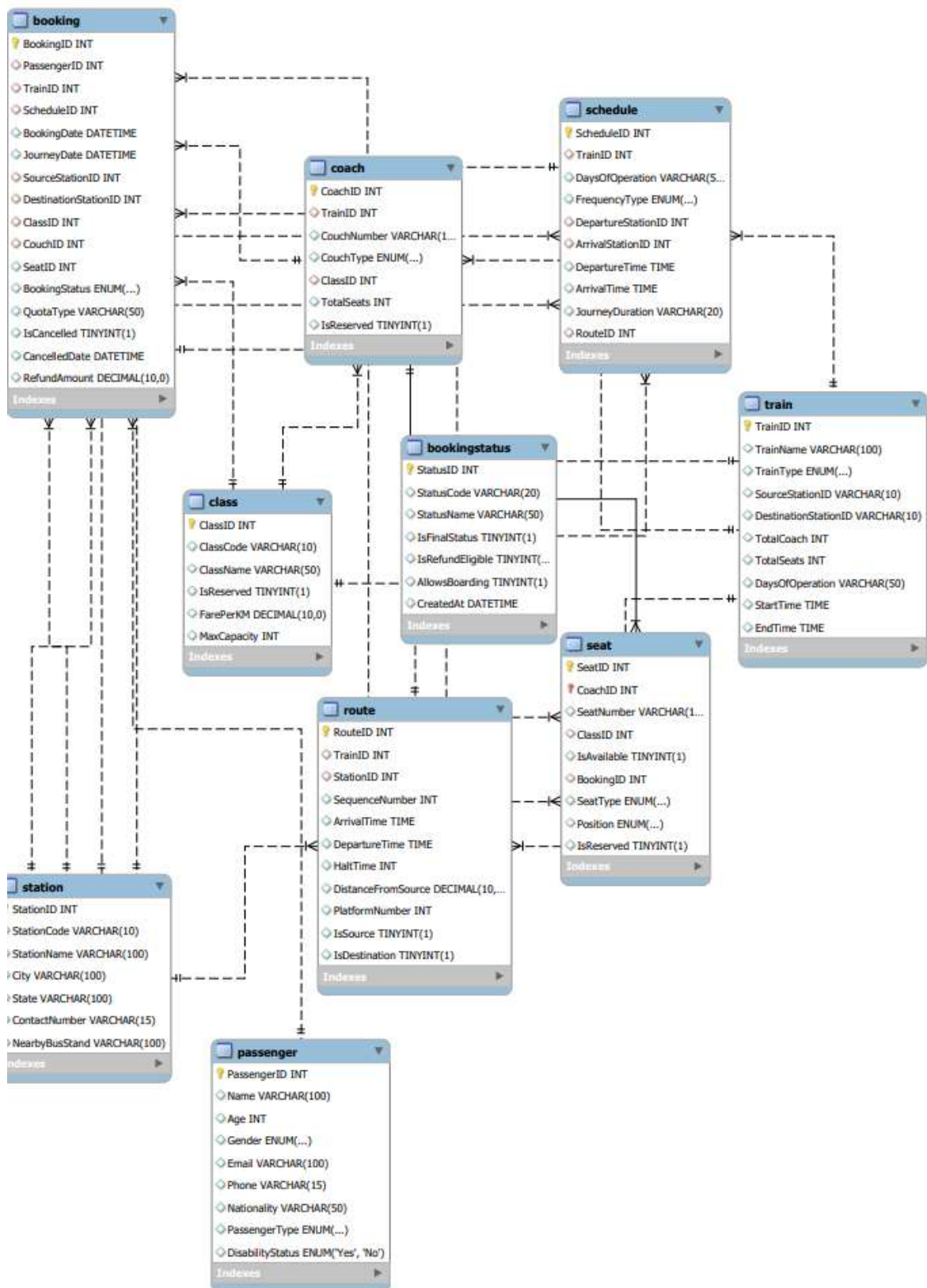
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- ER Diagram with descriptions.



• Relational schema and normalization process.

1. Booking

Primary Key: BookingID

Foreign Keys: PassengerID, TrainID, ScheduleID, SourceStationID,
DestinationStationID, ClassID, CoachID, SeatID

Observations:

All values are atomic.

Non-key fields are fully dependent on BookingID.

No partial or transitive dependencies.

Normalization: 3NF

Reason: Fulfills 1NF, 2NF, and 3NF conditions. Non-key attributes do not depend on other non-key attributes.

2. BookingStatus

Primary Key: StatusID

Observations:

Atomic fields.

StatusCode, StatusName, IsFinalStatus, etc., depend solely on StatusID.

No transitive dependencies.

Normalization: BCNF

Reason: Single candidate key StatusID. All other fields depend only on it.

3. Class

Primary Key: ClassID

Observations:

Attributes like ClassCode, ClassName, FarePerKM depend only on ClassID.

All atomic fields.

Normalization: BCNF

Reason: All non-key attributes are fully functionally dependent on the candidate key ClassID.

4. Coach

Primary Key: CoachID

Foreign Keys: TrainID, ClassID

Observations:

CouchNumber, CouchType, etc., are atomic.

Fully dependent on CoachID.

Normalization: 3NF

Reason: Could be BCNF if CoachID is the only candidate key. Otherwise, 3NF if TrainID + CouchNumber can form a candidate key (depends on business rules).

5. Passenger

Primary Key: PassengerID

Observations:

Atomic fields (Name, Email, etc.).

No derived or transitive dependencies.

Normalization: BCNF

Reason: All attributes depend only on PassengerID.

6. Route

Primary Key: Composite (TrainID, StationID, SequenceNumber) or possibly RouteID

Observations:

Atomic data.

Arrival, departure, platform details depend on train+station+sequence.

Normalization: 3NF or BCNF

Reason: If RouteID is unique and every field depends on it — BCNF. If composite key is used — still 3NF (with no partial dependencies).

7. Schedule

Primary Key: ScheduleID

Foreign Keys: TrainID, RouteID, DepartureStationID, ArrivalStationID

Observations:

Attributes depend solely on ScheduleID.

No transitive dependencies.

Normalization: BCNF

8. Seat

Primary Key: SeatID

Foreign Keys: CoachID, ClassID, BookingID

Observations:

Atomic fields like SeatNumber, SeatType, etc.

No transitive dependencies.

Normalization: 3NF

Reason: Could be BCNF if SeatID is the only candidate key.

9. Station

Primary Key: StationID

Observations:

Fields like StationCode, StationName, etc. are atomic and depend on StationID.

Normalization: BCNF

10. Train

Primary Key: TrainID

Observations:

Atomic fields like TrainName, TrainType, etc.

All depend only on TrainID.

Normalization: BCNF

- Sample data summary (e.g., SELECT COUNT(*) on each table).

```
mysql> Select * from Station;
```

StationID	StationCode	StationName	City	State	ContactNumber	NearbyBusStand
1	SC	Secunderabad Junction	Secunderabad	Telangana	04012345678	JBS Bus Stand
2	NZJ	Nazipet Junction	Nazipet	Telangana	08722233444	Nazipet Bus Stand
3	PDP	Peddapalli	Peddapalli	Telangana	08722244444	Peddapalli Bus Stand
4	ROM	Ramagundam	Ramagundam	Telangana	08722255555	Ramagundam Bus Stand
5	MCI	Manchiryal	Manchiryal	Telangana	08722266666	Manchiryal Bus Stand
6	BPA	Bellampalli	Bellampalli	Telangana	08722277777	Bellampalli Bus Stand
7	SKZR	Sirpur Kaghaznagar	Sirpur Kaghaznagar	Telangana	08722288888	SKZR Bus Stand
8	BPQ	Balharshah	Balharshah	Maharashtra	07173223344	Balharshah Bus Stand
9	COP	Chandrapur	Chandrapur	Maharashtra	07173244444	Chandrapur Bus Stand
10	SEGM	Sevagram	Wardha	Maharashtra	07173255555	Sevagram Bus Stand
11	NGP	Nagpur Junction	Nagpur	Maharashtra	07173266666	Nagpur Bus Stand
12	HTL	Hatol	Katol	Maharashtra	07173277777	Hatol Bus Stand
13	BET	Betul	Betul	Madhya Pradesh	07173288888	Betul Bus Stand
14	ITR	Itarsi Junction	Itarsi	Madhya Pradesh	07173299999	Itarsi Bus Stand
15	JBP	Jabalpur	Jabalpur	Madhya Pradesh	07173300000	Jabalpur Bus Stand
16	KTE	Katni Junction	Katni	Madhya Pradesh	07173311111	Katni Bus Stand
17	STA	Satna Junction	Satna	Madhya Pradesh	07173322222	Satna Bus Stand
18	PRYJ	Prayagraj Junction	Prayagraj	Uttar Pradesh	07173333333	Prayagraj Bus Stand
19	PRRB	Prayagraj Rambhag	Prayagraj	Uttar Pradesh	07173344444	Rambhag Bus Stand
20	GYN	Gyanpur Road	Gyanpur	Uttar Pradesh	07173355555	Gyanpur Bus Stand
21	BHLR	Bhulanpur	Varanasi	Uttar Pradesh	07173366666	Bhulanpur Bus Stand
22	BSB	Varanasi Junction	Varanasi	Uttar Pradesh	07173377777	Varanasi Bus Stand
23	DDU	PT. Deen Dayal Upadhyaya Junction	Mughalsarai	Uttar Pradesh	07173388888	Mughalsarai Bus Stand
24	DLN	Dildarnagar Junction	Dildarnagar	Bihar	06115223344	Dildarnagar Bus Stand
25	BXR	Buxar	Buxar	Bihar	06115234444	Buxar Bus Stand
26	ARA	Ara Junction	Ara	Bihar	06115245555	Ara Bus Stand
27	DNR	Danapur Junction	Danapur	Bihar	06115256666	Danapur Bus Stand
28	TPTV	Tirupati Main	Tirupati	Andhra Pradesh	0877-2222222	Tirupati Bus Stand
29	TCNR	Tiruchanur	Tirupati	Andhra Pradesh	0877-2233445	Tiruchanur Bus Stop
30	RU	Renigunta Junction	Renigunta	Andhra Pradesh	0877-2266777	Renigunta Bus Depot
31	RUXC	Renigunta Chord Cabin	Renigunta	Andhra Pradesh	0877-2266888	Renigunta Bus Depot
32	YPO	Yerpedu	Yerpedu	Andhra Pradesh	0877-2299111	Yerpedu Bus Stand
33	RCG	Rachaganneri	Rachaganneri	Andhra Pradesh	0877-2288222	Rachaganneri Bus Stop
34	WHT	Sri Mahalahasti	Sri Mahalahasti	Andhra Pradesh	08778-222333	Sri Mahalahasti Bus Stand
35	AKVT	Akhurti	Akhurti	Andhra Pradesh	08778-224444	Akhurti Village Stop
36	YLLK	Yellakuru	Yellakuru	Andhra Pradesh	08778-225555	Yellakuru Bus Stop
37	YAL	Yataluru	Yataluru	Andhra Pradesh	08778-226677	Yataluru Bus Stop
38	GDR	Gudur Junction	Gudur	Andhra Pradesh	08624-222222	Gudur Bus Stand
39	NLR	Nellore	Nellore	Andhra Pradesh	0861-2323456	Nellore RTC Bus Stand
40	OGL	Ongole	Ongole	Andhra Pradesh	08592-244444	Ongole Main Bus Stand
41	CLX	Chirala	Chirala	Andhra Pradesh	08594-266777	Chirala Bus Station
42	TEL	Tenali Junction	Tenali	Andhra Pradesh	08644-255555	Tenali Bus Depot
43	BZA	Vijayawada Junction	Vijayawada	Andhra Pradesh	0866-2578888	Pandit Nehru Bus Station
44	HMT	Hannam	Hannam	Telangana	08742-223344	Hannam Bus Stand
45	MABD	Mahbubabad	Mahbubabad	Telangana	08719-244555	Mahbubabad Bus Station
46	KDM	Kesamudram	Kesamudram	Telangana	08719-245666	Kesamudram Bus Stand
47	JN	Jangaon	Jangaon	Telangana	08716-226688	Jangaon Bus Stop
48	WL	Warangal	Warangal	Telangana	0876-2447888	Warangal Bus Station
49	NKD	Nekonda	Nekonda	Telangana	08718-225599	Nekonda Bus Stop
50	MDR	Madhira	Madhira	Telangana	08683-222888	Madhira Bus Depot
51	NDS	New Delhi Railway Station	New Delhi	Delhi	01112345678	ISBT Kashmere Gate
52	CNR	Kanpur Central	Kanpur	Uttar Pradesh	05122567890	Kanpur Bus Stand
53	GAYA	Gaya Junction	Gaya	Bihar	06112456789	Gaya Bus Stand
54	PRME	Parasnath	Giridih	Jharkhand	06522234567	Giridih Bus Stand
55	DWB	Dhanbad Junction	Dhanbad	Jharkhand	03262234567	Dhanbad Bus Stand
56	ASN	Asansol Junction	Asansol	West Bengal	03322234567	Asansol Bus Stand
57	HWH	Howrah Junction	Kolkata	West Bengal	03322234567	Howrah Bus Stand

57 rows in set (0.68 sec)

```
mysql> Select * from Trains;
```

TrainID	TrainName	TrainType	SourceStationID	DestinationStationID	TotalCoach	TotalSeats	DaysOfOperation	StartTime	EndTime
12302	Kolkata Rajdhani Express	Shatabdi	NDS	KM	18	1080	Mon, Tue, Wed, Thu, Fri, Sat, Sun	18:55:00	19:00:00
12762	Padmaswati Express	Express	SC	TPTV	18	1080	Mon, Tue, Wed, Thu, Fri, Sat, Sun	18:30:00	05:00:00
12791	Secunderabad/Danapur SuperFast Express	SuperFast	SC	DNR	18	1080	Mon, Tue, Wed, Thu, Fri, Sat, Sun	08:35:00	18:00:00

3 rows in set (0.60 sec)

```
mysql> Select * from Route;
```

RouteID	TrainID	StationID	SequenceNumber	ArrivalTime	DepartureTime	HaltTime	DistanceFromSource	PlatformNumber	IsSource	IsDestination
1	12382	51	1	NULL	16:55:00	0	0	1	1	0
2	12382	52	2	19:30:00	19:35:00	5	640	2	0	0
3	12382	16	3	22:15:00	22:20:00	5	835	2	0	0
4	12382	23	4	00:10:00	00:15:00	5	790	2	0	0
5	12382	53	5	02:00:00	02:05:00	5	990	2	0	0
6	12382	54	6	03:15:00	03:20:00	5	1120	2	0	0
7	12382	55	7	04:20:00	04:25:00	5	1200	2	0	0
8	12382	56	8	05:30:00	05:35:00	5	1310	2	0	0
9	12382	57	9	18:00:00	NULL	0	1650	1	0	1
10	12763	1	1	NULL	06:00:00	0	0	1	1	0
11	12763	2	2	06:45:00	06:50:00	5	60	2	0	0
12	12763	47	3	07:20:00	07:22:00	2	85	2	0	0
13	12763	46	4	07:40:00	07:42:00	2	120	2	0	0
14	12763	45	5	08:00:00	08:02:00	2	160	2	0	0
15	12763	44	6	08:20:00	08:25:00	5	170	2	0	0
16	12763	43	7	08:20:00	08:25:00	5	230	2	0	0
17	12763	42	8	10:10:00	10:12:00	2	270	2	0	0
18	12763	41	9	10:40:00	10:42:00	2	300	2	0	0
19	12763	40	10	11:15:00	11:20:00	5	340	2	0	0
20	12763	39	11	12:00:00	12:05:00	5	390	2	0	0
21	12763	38	12	12:40:00	12:45:00	5	430	2	0	0
22	12763	37	13	13:10:00	13:12:00	2	480	2	0	0
23	12763	36	14	13:25:00	13:27:00	2	470	2	0	0
24	12763	35	15	13:40:00	13:42:00	2	480	2	0	0
25	12763	34	16	14:00:00	14:00:00	0	500	2	0	0
26	12763	33	17	14:20:00	14:22:00	2	520	2	0	0
27	12763	32	18	14:40:00	14:42:00	2	535	2	0	0
28	12763	31	19	15:00:00	15:02:00	2	550	2	0	0
29	12763	30	20	15:10:00	15:12:00	2	555	2	0	0
30	12763	29	21	15:30:00	15:32:00	2	570	2	0	0
31	12763	28	22	16:00:00	NULL	0	580	1	0	1
32	12791	1	1	NULL	06:00:00	0	0	1	1	0
33	12791	2	2	06:45:00	06:50:00	5	60	2	0	0
34	12791	3	3	07:30:00	07:32:00	2	120	2	0	0
35	12791	4	4	08:10:00	08:12:00	2	160	2	0	0
36	12791	5	5	08:45:00	08:47:00	2	220	2	0	0
37	12791	6	6	09:20:00	09:22:00	2	260	2	0	0
38	12791	7	7	10:00:00	10:02:00	2	300	2	0	0
39	12791	8	8	10:40:00	10:42:00	2	350	2	0	0
40	12791	9	9	11:20:00	11:22:00	2	400	2	0	0
41	12791	10	10	12:00:00	12:02:00	2	450	2	0	0
42	12791	11	11	12:45:00	12:50:00	5	500	2	0	0
43	12791	12	12	13:30:00	13:32:00	2	540	2	0	0
44	12791	13	13	14:15:00	14:17:00	2	580	2	0	0
45	12791	14	14	15:00:00	15:05:00	5	620	2	0	0
46	12791	15	15	16:00:00	16:02:00	2	670	2	0	0
47	12791	16	16	17:00:00	17:02:00	2	710	2	0	0
48	12791	17	17	18:00:00	18:02:00	2	750	2	0	0
49	12791	18	18	19:00:00	19:02:00	2	800	2	0	0
50	12791	19	19	19:20:00	19:22:00	2	820	2	0	0
51	12791	20	20	19:40:00	19:42:00	2	840	2	0	0
52	12791	21	21	20:00:00	20:02:00	2	860	2	0	0
53	12791	22	22	20:20:00	20:25:00	5	880	2	0	0
54	12791	23	23	21:00:00	21:02:00	2	900	2	0	0
55	12792	24	24	21:40:00	21:42:00	2	940	2	0	0
56	12791	25	25	22:15:00	22:17:00	2	960	2	0	0
57	12791	26	26	22:45:00	22:47:00	2	1010	1	0	0
58	12791	27	27	23:30:00	NULL	0	1050	1	0	1

```
58 rows in set (0.00 sec)
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```
mysql> Select * from Class;
```

ClassID	ClassCode	ClassName	IsReserved	FarePerKM	MaxCapacity
1	SL	Sleeper Class	1	12	1000
2	3A	Third AC	1	15	500
3	2A	Second AC	1	17	400
4	1A	First AC	1	20	200
5	GN	General Class	0	11	1200

```
5 rows in set (0.00 sec)
```


mysql> Select * from Coach;

CoachID	TrainID	CouchNumber	CouchType	ClassID	TotalSeats	IsReserved
1	12302	S1	Sleeper	1	60	1
2	12302	S2	Sleeper	1	60	1
3	12302	S3	Sleeper	1	60	1
4	12302	S4	Sleeper	1	60	1
5	12302	S5	Sleeper	1	60	1
6	12302	S6	Sleeper	1	60	1
7	12302	S7	Sleeper	1	60	1
8	12302	S8	Sleeper	1	60	1
9	12302	S9	Sleeper	1	60	1
10	12302	B1	AC Third	2	50	1
11	12302	B2	AC Third	2	50	1
12	12302	B3	AC Third	2	50	1
13	12302	B4	AC Third	2	50	1
14	12302	A1	AC Second	3	40	1
15	12302	A2	AC Second	3	40	1
16	12302	H1	AC First	4	20	1
17	12302	GN1	General	5	120	0
18	12302	GN2	General	5	120	0
19	12763	S1	Sleeper	1	60	1
20	12763	S2	Sleeper	1	60	1
21	12763	S3	Sleeper	1	60	1
22	12763	S4	Sleeper	1	60	1
23	12763	S5	Sleeper	1	60	1
24	12763	S6	Sleeper	1	60	1
25	12763	S7	Sleeper	1	60	1
26	12763	S8	Sleeper	1	60	1
27	12763	S9	Sleeper	1	60	1
28	12763	B1	AC Third	2	50	1
29	12763	B2	AC Third	2	50	1
30	12763	B3	AC Third	2	50	1
31	12763	B4	AC Third	2	50	1
32	12763	A1	AC Second	3	40	1
33	12763	A2	AC Second	3	40	1
34	12763	H1	AC First	4	20	1
35	12763	GN1	General	5	120	0
36	12763	GN2	General	5	120	0
37	12791	S1	Sleeper	1	60	1
38	12791	S2	Sleeper	1	60	1
39	12791	S3	Sleeper	1	60	1
40	12791	S4	Sleeper	1	60	1
41	12791	S5	Sleeper	1	60	1
42	12791	S6	Sleeper	1	60	1
43	12791	S7	Sleeper	1	60	1
44	12791	S8	Sleeper	1	60	1
45	12791	S9	Sleeper	1	60	1
46	12791	B1	AC Third	2	50	1
47	12791	B2	AC Third	2	50	1
48	12791	B3	AC Third	2	50	1
49	12791	B4	AC Third	2	50	1
50	12791	A1	AC Second	3	40	1
51	12791	A2	AC Second	3	40	1
52	12791	H1	AC First	4	20	1
53	12791	GN1	General	5	120	0
54	12791	GN2	General	5	120	0

54 rows in set (0.00 sec)

mysql> Select * from Schedule;

ScheduleID	TrainID	DaysOfOperation	FrequencyType	DepartureStationID	ArrivalStationID	DepartureTime	ArrivalTime	JourneyDuration	RouteID
1	12302	Mon,Tue,Wed,Thu,Fri,Sat,Sun	Daily	51	57	16:35:00	10:00:00	18.003 hours	1
2	12763	Mon,Tue,Wed,Thu,Fri,Sat,Sun	Daily	1	28	00:00:00	10:00:00	10 hours	10
3	12791	Mon,Tue,Wed,Thu,Fri,Sat,Sun	Daily	1	27	00:00:00	23:30:00	17.5 hours	12

3 rows in set (0.00 sec)

mysql> Select * from Passenger;

PassengerID	Name	Age	Gender	Email	Phone	Nationality	PassengerType	DisabilityStatus
1	Rajesh Kumar	30	male	rajesh.kumar@example.com	9876543210	Indian	Adult	No
2	Anjali Singh	25	female	anjali.singh@example.com	9988776655	Indian	Adult	No
3	Aarav Mehta	19	male	aarav.mehta@example.com	9988665544	Indian	child	No
4	Sanya Patel	70	female	sanya.patel@example.com	9999998899	Indian	senior citizen	No
5	Navi Shankar	45	male	ravi.shankar@example.com	9765432109	Indian	Adult	Yes
6	Priya Gupta	18	female	priya.gupta@example.com	9988777788	Indian	student	No
7	Mohammed Ali	60	male	mohammed.ali@example.com	9765321098	Indian	senior citizen	Yes
8	Meera Iyer	5	female	meera.iyer@example.com	9566677889	Indian	child	No
9	Vikram Chauhan	35	male	vikram.chauhan@example.com	9333005566	Indian	Adult	No
10	Neha Sharma	28	female	neha.sharma@example.com	9200334455	Indian	Adult	No
11	Arvind Yadav	50	male	arvind.yadav@example.com	9876554321	Indian	Adult	No
12	Kiran Reddy	22	female	kiran.reddy@example.com	0004778899	Indian	Adult	No
13	Suresh Kumar	65	male	suresh.kumar@example.com	9666554433	Indian	senior citizen	Yes
14	Nisha Verma	20	female	nisha.verma@example.com	0065332200	Indian	Adult	No
15	Siddharth Sharma	13	male	siddharth.sharma@example.com	9399221100	Indian	child	No
16	Divya Nair	32	female	divya.nair@example.com	9199887700	Indian	Adult	No
17	Rajeev Chandra	40	male	rajeev.chandra@example.com	9488776655	Indian	Adult	No
18	Manoj Joshi	75	male	manoj.joshi@example.com	9222345678	Indian	senior citizen	Yes
19	Senali Deshmukh	8	female	senali.deshmukh@example.com	9360007766	Indian	child	No
20	Harish Bhat	60	male	harish.bhat@example.com	9766432100	Indian	senior citizen	No

mysql> select * from Booking;														
BookingID	PassengerID	TrainID	ScheduleID	BookingDate	BookingTime	SourceLocationID	DestinationLocationID	ClassID	CoachID	SeatID	BookingStatus	QueueType	IsCancelled	CancellationData
1	1	117801	1	2025-04-12 10:00:00	2025-04-12 10:00:00	51	97	4	10	10	conf	General	0	NULL
2	2	117802	2	2025-04-12 14:00:00	2025-04-12 14:00:00	52	98	5	11	11	conf	General	0	NULL
3	3	117803	3	2025-04-12 18:00:00	2025-04-12 18:00:00	53	99	6	12	12	conf	General	0	NULL
4	4	117804	4	2025-04-13 06:00:00	2025-04-13 06:00:00	54	100	7	13	13	conf	General	0	NULL
5	5	117805	5	2025-04-13 10:00:00	2025-04-13 10:00:00	55	101	8	14	14	conf	General	0	NULL
6	6	117806	6	2025-04-13 14:00:00	2025-04-13 14:00:00	56	102	9	15	15	conf	General	0	NULL
7	7	117807	7	2025-04-13 18:00:00	2025-04-13 18:00:00	57	103	10	16	16	conf	General	0	NULL
8	8	117808	8	2025-04-14 06:00:00	2025-04-14 06:00:00	58	104	11	17	17	conf	General	0	NULL
9	9	117809	9	2025-04-14 10:00:00	2025-04-14 10:00:00	59	105	12	18	18	conf	General	0	NULL
10	10	117810	10	2025-04-14 14:00:00	2025-04-14 14:00:00	60	106	13	19	19	conf	General	0	NULL
11	11	117811	11	2025-04-14 18:00:00	2025-04-14 18:00:00	61	107	14	20	20	conf	General	0	NULL
12	12	117812	12	2025-04-15 06:00:00	2025-04-15 06:00:00	62	108	15	21	21	conf	General	0	NULL
13	13	117813	13	2025-04-15 10:00:00	2025-04-15 10:00:00	63	109	16	22	22	conf	General	0	NULL
14	14	117814	14	2025-04-15 14:00:00	2025-04-15 14:00:00	64	110	17	23	23	conf	General	0	NULL
15	15	117815	15	2025-04-15 18:00:00	2025-04-15 18:00:00	65	111	18	24	24	conf	General	0	NULL
16	16	117816	16	2025-04-16 06:00:00	2025-04-16 06:00:00	66	112	19	25	25	conf	General	0	NULL
17	17	117817	17	2025-04-16 10:00:00	2025-04-16 10:00:00	67	113	20	26	26	conf	General	0	NULL
18	18	117818	18	2025-04-16 14:00:00	2025-04-16 14:00:00	68	114	21	27	27	conf	General	0	NULL
19	19	117819	19	2025-04-16 18:00:00	2025-04-16 18:00:00	69	115	22	28	28	conf	General	0	NULL
20	20	117820	20	2025-04-17 06:00:00	2025-04-17 06:00:00	70	116	23	29	29	conf	General	0	NULL
21	21	117821	21	2025-04-17 10:00:00	2025-04-17 10:00:00	71	117	24	30	30	conf	General	0	NULL
22	22	117822	22	2025-04-17 14:00:00	2025-04-17 14:00:00	72	118	25	31	31	conf	General	0	NULL
23	23	117823	23	2025-04-17 18:00:00	2025-04-17 18:00:00	73	119	26	32	32	conf	General	0	NULL
24	24	117824	24	2025-04-18 06:00:00	2025-04-18 06:00:00	74	120	27	33	33	conf	General	0	NULL
25	25	117825	25	2025-04-18 10:00:00	2025-04-18 10:00:00	75	121	28	34	34	conf	General	0	NULL
26	26	117826	26	2025-04-18 14:00:00	2025-04-18 14:00:00	76	122	29	35	35	conf	General	0	NULL
27	27	117827	27	2025-04-18 18:00:00	2025-04-18 18:00:00	77	123	30	36	36	conf	General	0	NULL
28	28	117828	28	2025-04-19 06:00:00	2025-04-19 06:00:00	78	124	31	37	37	conf	General	0	NULL
29	29	117829	29	2025-04-19 10:00:00	2025-04-19 10:00:00	79	125	32	38	38	conf	General	0	NULL
30	30	117830	30	2025-04-19 14:00:00	2025-04-19 14:00:00	80	126	33	39	39	conf	General	0	NULL
31	31	117831	31	2025-04-19 18:00:00	2025-04-19 18:00:00	81	127	34	40	40	conf	General	0	NULL
32	32	117832	32	2025-04-20 06:00:00	2025-04-20 06:00:00	82	128	35	41	41	conf	General	0	NULL
33	33	117833	33	2025-04-20 10:00:00	2025-04-20 10:00:00	83	129	36	42	42	conf	General	0	NULL
34	34	117834	34	2025-04-20 14:00:00	2025-04-20 14:00:00	84	130	37	43	43	conf	General	0	NULL
35	35	117835	35	2025-04-20 18:00:00	2025-04-20 18:00:00	85	131	38	44	44	conf	General	0	NULL
36	36	117836	36	2025-04-21 06:00:00	2025-04-21 06:00:00	86	132	39	45	45	conf	General	0	NULL
37	37	117837	37	2025-04-21 10:00:00	2025-04-21 10:00:00	87	133	40	46	46	conf	General	0	NULL
38	38	117838	38	2025-04-21 14:00:00	2025-04-21 14:00:00	88	134	41	47	47	conf	General	0	NULL
39	39	117839	39	2025-04-21 18:00:00	2025-04-21 18:00:00	89	135	42	48	48	conf	General	0	NULL
40	40	117840	40	2025-04-22 06:00:00	2025-04-22 06:00:00	90	136	43	49	49	conf	General	0	NULL
41	41	117841	41	2025-04-22 10:00:00	2025-04-22 10:00:00	91	137	44	50	50	conf	General	0	NULL
42	42	117842	42	2025-04-22 14:00:00	2025-04-22 14:00:00	92	138	45	51	51	conf	General	0	NULL
43	43	117843	43	2025-04-22 18:00:00	2025-04-22 18:00:00	93	139	46	52	52	conf	General	0	NULL
44	44	117844	44	2025-04-23 06:00:00	2025-04-23 06:00:00	94	140	47	53	53	conf	General	0	NULL
45	45	117845	45	2025-04-23 10:00:00	2025-04-23 10:00:00	95	141	48	54	54	conf	General	0	NULL
46	46	117846	46	2025-04-23 14:00:00	2025-04-23 14:00:00	96	142	49	55	55	conf	General	0	NULL
47	47	117847	47	2025-04-23 18:00:00	2025-04-23 18:00:00	97	143	50	56	56	conf	General	0	NULL
48	48	117848	48	2025-04-24 06:00:00	2025-04-24 06:00:00	98	144	51	57	57	conf	General	0	NULL
49	49	117849	49	2025-04-24 10:00:00	2025-04-24 10:00:00	99	145	52	58	58	conf	General	0	NULL
50	50	117850	50	2025-04-24 14:00:00	2025-04-24 14:00:00	100	146	53	59	59	conf	General	0	NULL
51	51	117851	51	2025-04-24 18:00:00	2025-04-24 18:00:00	101	147	54	60	60	conf	General	0	NULL
52	52	117852	52	2025-04-25 06:00:00	2025-04-25 06:00:00	102	148	55	61	61	conf	General	0	NULL
53	53	117853	53	2025-04-25 10:00:00	2025-04-25 10:00:00	103	149	56	62	62	conf	General	0	NULL
54	54	117854	54	2025-04-25 14:00:00	2025-04-25 14:00:00	104	150	57	63	63	conf	General	0	NULL
55	55	117855	55	2025-04-25 18:00:00	2025-04-25 18:00:00	105	151	58	64	64	conf	General	0	NULL
56	56	117856	56	2025-04-26 06:00:00	2025-04-26 06:00:00	106	152	59	65	65	conf	General	0	NULL
57	57	117857	57	2025-04-26 10:00:00	2025-04-26 10:00:00	107	153	60	66	66	conf	General	0	NULL
58	58	117858	58	2025-04-26 14:00:00	2025-04-26 14:00:00	108	154	61	67	67	conf	General	0	NULL
59	59	117859	59	2025-04-26 18:00:00	2025-04-26 18:00:00	109	155	62	68	68	conf	General	0	NULL
60	60	117860	60	2025-04-27 06:00:00	2025-04-27 06:00:00	110	156	63	69	69	conf	General	0	NULL
61	61	117861	61	2025-04-27 10:00:00	2025-04-27 10:00:00	111	157	64	70	70	conf	General	0	NULL
62	62	117862	62	2025-04-27 14:00:00	2025-04-27 14:00:00	112	158	65	71	71	conf	General	0	NULL
63	63	117863	63	2025-04-27 18:00:00	2025-04-27 18:00:00	113	159	66	72	72	conf	General	0	NULL
64	64	117864	64	2025-04-28 06:00:00	2025-04-28 06:00:00	114	160	67	73	73	conf	General	0	NULL
65	65	117865	65	2025-04-28 10:00:00	2025-04-28 10:00:00	115	161	68	74	74	conf	General	0	NULL
66	66	117866	66	2025-04-28 14:00:00	2025-04-28 14:00:00	116	162	69	75	75	conf	General	0	NULL
67	67	117867	67	2025-04-28 18:00:00	2025-04-28 18:00:00	117	163	70	76	76	conf	General	0	NULL
68	68	117868	68	2025-04-29 06:00:00	2025-04-29 06:00:00	118	164	71	77	77	conf	General	0	NULL
69	69	117869	69	2025-04-29 10:00:00	2025-04-29 10:00:00	119	165	72	78	78	conf	General	0	NULL
70	70	117870	70	2025-04-29 14:00:00	2025-04-29 14:00:00	120	166	73	79	79	conf	General	0	NULL
71	71	117871	71	2025-04-29 18:00:00	2025-04-29 18:00:00	121	167	74	80	80	conf	General	0	NULL
72	72	117872	72	2025-04-30 06:00:00	2025-04-30 06:00:00	122	168	75	81	81	conf	General	0	NULL
73	73	117873	73	2025-04-30 10:00:00	2025-04-30 10:00:00	123	169	76	82	82	conf	General	0	NULL
74	74	117874	74	2025-04-30 14:00:00	2025-04-30 14:00:00	124	170	77	83	83	conf	General	0	NULL
75	75	117875	75	2025-04-30 18:00:00	2025-04-30 18:00:00	125	171	78	84	84	conf	General	0	NULL
76	76	117876	76	2025-05-01 06:00:00	2025-05-01 06:00:00	126	172	79	85	85	conf	General	0	NULL
77	77	117877	77	2025-05-01 10:00:00	2025-05-01 10:00:00	127	173	80	86	86	conf	General	0	NULL
78	78	117878	78	2025-05-01 14:00:00	2025-05-01 14:00:00	128	174	81	87	87	conf	General	0	NULL
79	79	117879	79	2025-05-01 18:00:00	2025-05-01 18:00:00	129	175	82	88	88	conf	General	0	NULL
80	80	117880	80	2025-05-02 06:00:00	2025-05-02 06:00:00	130	176	83	89	89	conf	General	0	NULL
81	81	117881	81	2025-05-02 10:00:00	2025-05-02 10:00:00	131	177	84	90	90	conf	General	0	NULL
82	82	117882	82	2025-05-02 14:00:00	2025-05-02 14:00:00	132	178	85	91	91	conf	General	0	NULL
83	83	117883	83	2025-05-02 18:00:00	2025-05-02 18:00:00	133	179	86	92	92	conf	General	0	NULL
84	84	117884	84	2025-05-03 06:00:00	2025-05-									

- SQL queries, procedures, triggers.
- PNR status tracking for a given ticket.

```

1  DELIMITER //
2  CREATE PROCEDURE GetPNRStatusTracking (
3      IN p_bookingID INT
4  )
5  BEGIN
6      SELECT
7          b.BookingID,
8          p.Name AS PassengerName,
9          t.TrainName AS TrainName,
10         b.JourneyDate,
11         b.BookingStatus,
12         b.IsCancelled,
13         b.RefundAmount,
14         CASE
15             WHEN b.BookingStatus = 'W1' THEN NULL
16             ELSE s.SeatNumber
17         END AS SeatNumber
18     FROM Booking b
19     JOIN Passenger p ON b.PassengerID = p.PassengerID
20     JOIN Train t ON b.TrainID = t.TrainID
21     LEFT JOIN Seat s
22         ON b.SeatID = s.SeatID
23         AND b.CoachID = s.CoachID
24     WHERE b.BookingID = p_bookingID
25     GROUP BY b.BookingID;
26 END;
27 //
28 DELIMITER ;

```

```
mysql> CALL GetPNRStatusTracking(1);
```

BookingID	PassengerName	TrainName	JourneyDate	BookingStatus	IsCancelled	RefundAmount	SeatNumber
1	Rajesh Kumar	Kolkata Rajdhani Express	2025-04-15 16:55:00	cnf	0	0	H1-10

1 row in set (0.01 sec)

- Train schedule lookup for a given train.

```

1  DELIMITER //
2
3  ● ○ CREATE PROCEDURE GetTrainSchedule (
4      IN p_trainID INT
5  )
6  ○ BEGIN
7      SELECT
8          s.ScheduleID,
9          s.TrainID,
10         t.TrainName,
11         s.DaysOfOperation,
12         s.FrequencyType,
13         ds.StationName AS DepartureStationName,
14         a.StationName AS ArrivalStationName,
15         s.DepartureTime,
16         s.ArrivalTime,
17         s.JourneyDuration,
18         s.RouteID
19     FROM Schedule s
20     JOIN Train t ON s.TrainID = t.TrainID
21     JOIN Station ds ON s.DepartureStationID = ds.StationID
22     JOIN Station a ON s.ArrivalStationID = a.StationID
23     WHERE s.TrainID = p_trainID;
24 END;
25 //
26
27 DELIMITER ;

```

spql> call GetTrainSchedule(12382);

ScheduleID	TrainID	TrainName	DaysOfOperation	FrequencyType	DepartureStationName	ArrivalStationName	DepartureTime	ArrivalTime	JourneyDuration	RouteID
1	12382	Kallista Rajdhani Express	Mon,Tue,Wed,Thu,Fri,Sat,Sun	Daily	New Delhi Railway Station	Haridwar Junction	16:55:00	18:00:00	1h 05m	1

1 row in set (0.00 sec)

- Available seats query for a specific train, date and class.

```

1  DELIMITER //
2  ● CREATE PROCEDURE GetAvailableSeats(
3      IN p_trainID INT,
4      IN p_journeyDate DATETIME
5  )
6  BEGIN
7      SELECT
8          Coach.CouchType AS Class,
9          COUNT(DISTINCT Coach.CoachID) *
10         CASE
11             WHEN Coach.CouchType = 'General' THEN 120
12             WHEN Coach.CouchType = 'Sleeper' THEN 60
13             WHEN Coach.CouchType = 'AC Third' THEN 50
14             WHEN Coach.CouchType = 'AC Second' THEN 40
15             WHEN Coach.CouchType = 'AC First' THEN 20
16             ELSE 0
17         END AS TotalSeats,
18         SUM(CASE WHEN Seat.IsAvailable = 1 THEN 1 ELSE 0 END) AS AvailableSeats
19     FROM Coach
20     LEFT JOIN Seat
21         ON Coach.CoachID = Seat.CoachID
22     WHERE Coach.TrainID = p_trainID
23     GROUP BY Coach.CouchType;
24 END
25 //
26 DELIMITER ;
27

```

```
mysql> CALL GetAvailableSeats(12302,"2025-04-15 16:55:00");
```

Class	TotalSeats	AvailableSeats
Sleeper	540	540
AC First	20	13
AC Second	80	80
AC Third	200	200
General	240	240

5 rows in set (0.04 sec)

Query OK, 0 rows affected (0.09 sec)

- List all passengers traveling on a specific train on a given date.

```

1  DELIMITER //
2  ● ○ CREATE PROCEDURE GetConfirmedPassengers(
3      IN p_trainID INT,
4      IN p_journeyDate DATETIME
5  )
6  ○ BEGIN
7      SELECT
8          p.PassengerID,
9          p.Name,
10         p.Age,
11         p.Gender,
12         b.TrainID,
13         b.JourneyDate,
14         b.BookingStatus
15     FROM Booking b
16     JOIN Passenger p ON b.PassengerID = p.PassengerID
17     WHERE b.TrainID = p_trainID
18         AND b.JourneyDate = p_journeyDate
19         AND b.BookingStatus = 'cnf';
20 END;
21 //
22 DELIMITER ;

```

```

mysql> CALL GetConfirmedPassengers(12791,"2025-04-29 06:00:00");
+-----+-----+-----+-----+-----+-----+-----+
| PassengerID | Name           | Age | Gender | TrainID | JourneyDate       | BookingStatus |
+-----+-----+-----+-----+-----+-----+-----+
| 22 | Dheeraj Reddy | 22 | male   | 12791 | 2025-04-29 06:00:00 | cnf           |
| 23 | Dheeraj Reddy | 22 | male   | 12791 | 2025-04-29 06:00:00 | cnf           |
| 24 | Dheeraj Reddy | 22 | male   | 12791 | 2025-04-29 06:00:00 | cnf           |
| 25 | naveen        | 22 | male   | 12791 | 2025-04-29 06:00:00 | cnf           |
| 26 | naveen        | 22 | male   | 12791 | 2025-04-29 06:00:00 | cnf           |
+-----+-----+-----+-----+-----+-----+-----+
5 rows in set (0.00 sec)

Query OK, 0 rows affected (0.04 sec)

```

- Retrieve all waitlisted passengers for a particular train.

```
1  DELIMITER //
2  ● CREATE PROCEDURE GetWaitlistedPassengers(
3      IN p_trainID INT
4  )
5  BEGIN
6      SELECT
7          p.PassengerID,
8          p.Name,
9          p.Email,
10         b.TrainID,
11         b.JourneyDate,
12         b.BookingStatus
13     FROM Booking b
14     JOIN Passenger p ON b.PassengerID = p.PassengerID
15     WHERE b.TrainID = p_trainID
16         AND b.BookingStatus = 'wl';
17 END;
18 //
19 DELIMITER ;
```

```
mysql> CALL GetWaitlistedPassengers(12763);
```

PassengerID	Name	Email	TrainID	JourneyDate	BookingStatus
2	Anjali Singh	anjali.singh@example.com	12763	2025-04-16 06:00:00	wl
19	Sonali Deshmukh	sonali.deshmukh@example.com	12763	2025-04-26 06:00:00	wl

```
2 rows in set (0.00 sec)
```

```
Query OK, 0 rows affected (0.02 sec)
```

- Find total amount that needs to be refunded for cancelling a train.

```

1  DELIMITER //
2  • CREATE PROCEDURE GetTotalRefundAmount (
3      IN p_trainID INT,
4      IN p_journeyDate DATETIME
5  )
6  BEGIN
7      SELECT
8          T.TrainID,
9          T.TrainName,
10         ROUND(SUM((R2.DistanceFromSource - R1.DistanceFromSource) * C.FarePerKM), 2) AS TotalRefund
11     FROM Booking B
12     JOIN Train T ON B.TrainID = T.TrainID
13     JOIN Class C ON B.ClassID = C.ClassID
14     JOIN Route R1 ON B.TrainID = R1.TrainID AND B.SourceStationID = R1.StationID
15     JOIN Route R2 ON B.TrainID = R2.TrainID AND B.DestinationStationID = R2.StationID
16     WHERE B.TrainID = p_trainID
17           AND B.JourneyDate = p_journeyDate
18     GROUP BY T.TrainID, T.TrainName;
19 END;
20 //
21 DELIMITER ;

```

```

mysql> CALL GetTotalRefundAmount(12791,"2025-04-29 06:00:00");
+-----+-----+-----+
| TrainID | TrainName | TotalRefund |
+-----+-----+-----+
| 12791 | Secunderabad?Danapur Superfast Express | 105000 |
+-----+-----+-----+
1 row in set (0.00 sec)

Query OK, 0 rows affected (0.01 sec)

```


- Total revenue generated from ticket bookings over a specified period.

```
1 DELIMITER //
2 * CREATE PROCEDURE GetTotalRevenue(
3     IN p_startDate DATETIME,
4     IN p_endDate   DATETIME,
5     IN p_bookingStatus VARCHAR(10)
6 )
7 BEGIN
8     SELECT
9         ROUND(SUM((R2.DistanceFromSource - R1.DistanceFromSource) * C.FarePerKM), 2) AS TotalRevenue
10    FROM Booking B
11    JOIN Train T ON B.TrainID = T.TrainID
12    JOIN Class C ON B.ClassID = C.ClassID
13    JOIN Route R1 ON B.TrainID = R1.TrainID AND B.SourceStationID = R1.StationID
14    JOIN Route R2 ON B.TrainID = R2.TrainID AND B.DestinationStationID = R2.StationID
15    WHERE B.JourneyDate BETWEEN p_startDate AND p_endDate
16          AND B.BookingStatus = p_bookingStatus;
17 END;
18 //
19 DELIMITER ;
```

```
mysql> CALL GetTotalRevenue("2025-04-16 06:00:00", "2025-04-29 06:00:00", "cnf");
+-----+
| TotalRevenue |
+-----+
|      233200 |
+-----+
1 row in set (0.03 sec)

Query OK, 0 rows affected (0.03 sec)
```

- Cancellation records with refund status.

```

1 DELIMITER //
2 • CREATE PROCEDURE GetCancellationRecords()
3 BEGIN
4     SELECT
5         b.BookingID,
6         p.Name AS PassengerName,
7         t.TrainName,
8         b.JourneyDate,
9         b.BookingStatus,
10        b.IsCancelled,
11        b.CancelledDate,
12        b.RefundAmount
13    FROM Booking b
14    JOIN Passenger p ON b.PassengerID = p.PassengerID
15    JOIN Train t ON b.TrainID = t.TrainID
16    WHERE b.BookingStatus = 'cancelled';
17 END;
18 //
19 DELIMITER ;

```

```

mysql> CALL GetCancellationRecords();

```

BookingID	PassengerName	TrainName	JourneyDate	BookingStatus	IsCancelled	CancelledDate	RefundAmount
5	Havi Shankar	Padmaavati Express	2025-04-17 06:00:00	cancelled	1	2025-04-13 16:00:00	250
15	Siddharth Sharma	Secunderabad-Danapur Superfast Express	2025-04-22 06:00:00	cancelled	1	2025-04-19 16:00:00	300

```

2 rows in set (0.00 sec)

Query OK, 0 rows affected (0.03 sec)

```

- Find the busiest route based on passenger count.

```
1 DELIMITER $$
2 • CREATE PROCEDURE sp_busiest_route()
3 BEGIN
4     SELECT
5         ds.StationName AS SourceStationName,
6         asd.StationName AS DestinationStationName,
7         COUNT(*) AS PassengerCount
8     FROM Booking b
9     JOIN Station ds ON b.SourceStationID = ds.StationID
10    JOIN Station asd ON b.DestinationStationID = asd.StationID
11    WHERE b.BookingStatus = 'cnf'
12    GROUP BY b.SourceStationID, b.DestinationStationID
13    ORDER BY PassengerCount DESC
14    LIMIT 1;
15 END $$
16 DELIMITER ;
```

```
mysql> CALL sp_busiest_route();
+-----+-----+-----+
| SourceStationName | DestinationStationName | PassengerCount |
+-----+-----+-----+
| Secunderabad Junction | Danapur Junction | 11 |
+-----+-----+-----+
1 row in set (0.00 sec)

Query OK, 0 rows affected (0.01 sec)
```

- Generate an itemized bill for a ticket including all charges.

```
1  DELIMITER $$
2  * CREATE PROCEDURE sp_itemized_bill_by_class (IN pBookingID INT)
3  BEGIN
4      SELECT
5          b.BookingID,
6          p.Name AS PassengerName,
7          t.TrainName,
8          s.DepartureTime,
9          s.ArrivalTime,
10         cla.ClassName,
11         c.CouchNumber,
12         -- Calculate the base fare based on the distance difference multiplied by the fare per KM:
13         ROUND(SUM((R2.DistanceFromSource - R1.DistanceFromSource) * cla.FarePerKM), 2) AS BaseFare,
14         -- Calculate the service charge based on the class:
15         CASE
16             WHEN cla.ClassName = 'First AC' THEN 750.00
17             WHEN cla.ClassName = 'Second AC' THEN 500.00
18             WHEN cla.ClassName = 'Third AC' THEN 250.00
19             WHEN cla.ClassName = 'General' THEN 0.00
20             WHEN cla.ClassName = 'Sleeper' THEN 100.00
21             ELSE 0.00
22         END AS ServiceCharge,
```

```

23      -- Total amount is the base fare plus the determined service charge:
24      (ROUND(SUM((R2.DistanceFromSource - R1.DistanceFromSource) * cla.FarePerKM), 2) +
25      CASE
26          WHEN cla.ClassName = 'First AC' THEN 750.00
27          WHEN cla.ClassName = 'Second AC' THEN 500.00
28          WHEN cla.ClassName = 'Third AC' THEN 250.00
29          WHEN cla.ClassName = 'General' THEN 0.00
30          WHEN cla.ClassName = 'Sleeper' THEN 100.00
31          ELSE 0.00
32      END) AS TotalAmount
33  FROM Booking b
34  JOIN Passenger p ON b.PassengerID = p.PassengerID
35  JOIN Train t ON b.TrainID = t.TrainID
36  JOIN Coach c ON b.CoachID = c.CoachID
37  JOIN Class cla ON b.ClassID = cla.ClassID
38  JOIN Schedule s ON b.ScheduleID = s.ScheduleID
39  JOIN Route R1 ON b.TrainID = R1.TrainID AND b.SourceStationID = R1.StationID
40  JOIN Route R2 ON b.TrainID = R2.TrainID AND b.DestinationStationID = R2.StationID
41  WHERE b.BookingID = pBookingID
42  GROUP BY
43      b.BookingID,
44      p.Name,
45      t.TrainName,
46      s.DepartureTime,
47      s.ArrivalTime,
48      cla.ClassName,
49      c.CoachNumber;
50  END $$
51  DELIMITER ;

```

```
mysql> CALL sp_itemized_bill_by_class(19);
```

BookingID	PassengerName	TrainName	DepartureTime	ArrivalTime	ClassName	CoachNumber	BaseFare	ServiceCharge	TotalAmount
19	Sonali Deshmukh	Padmavati Express	06:00:00	16:00:00	First AC	H1	1100	750.00	12350.00

```
1 row in set (0.01 sec)
```

```
Query OK, 0 rows affected (0.03 sec)
```

- Other interesting queries beyond the required ones.

- Book Ticket for a New Passenger.

```
1 DELIMITER //
```

```
2 CREATE PROCEDURE BookTicketForNewPassenger (  
3     IN p_name          VARCHAR(100),  
4     IN p_age           INT,  
5     IN p_gender        VARCHAR(10),  
6     IN p_email         VARCHAR(100),  
7     IN p_phone         VARCHAR(15),  
8     IN p_nationality   VARCHAR(50),  
9     IN p_type          VARCHAR(20),  
10    IN p_disability     VARCHAR(10),  
11  
12    IN b_trainID        INT,  
13    IN b_journeyDate    DATETIME,  
14    IN b_sourceStationName VARCHAR(100),  
15    IN b_destinationStationName VARCHAR(100),  
16    IN b_className      VARCHAR(50),  
17    IN b_quota          VARCHAR(20)  
18 )  
19 BEGIN  
20     -- Local variables for lookups and process control  
21     DECLARE new_passengerID INT;  
22     DECLARE selected_seatID INT;  
23     DECLARE selected_coachID INT;  
24     DECLARE booking_status VARCHAR(10);  
25     DECLARE new_bookingID INT;  
26     DECLARE v_sourceStationID INT;  
27     DECLARE v_destinationStationID INT;  
28     DECLARE v_classID INT;  
29     DECLARE v_scheduleID INT;  
30  
31     -- Step 1: Insert new passenger details
```



```

31 -- Step 1: Insert new passenger details
32 INSERT INTO Passenger (Name, Age, Gender, Email, Phone, Nationality, PassengerType, DisabilityStatus)
33 VALUES (p_name, p_age, p_gender, p_email, p_phone, p_nationality, p_type, p_disability);
34 SET new_passengerID = LAST_INSERT_ID();
35
36 -- Step 2: Look up source station ID using station name
37 SELECT IFNULL(MAX(StationID), 0)
38 INTO v_sourceStationID
39 FROM Station
40 WHERE StationName = b_sourceStationName;
41 IF v_sourceStationID = 0 THEN
42     SIGNAL SQLSTATE '45000' SET MESSAGE_TEXT = 'Invalid source station name.';
43 END IF;
44
45 -- Look up destination station ID using station name
46 SELECT IFNULL(MAX(StationID), 0)
47 INTO v_destinationStationID
48 FROM Station
49 WHERE StationName = b_destinationStationName;
50 IF v_destinationStationID = 0 THEN
51     SIGNAL SQLSTATE '45000' SET MESSAGE_TEXT = 'Invalid destination station name.';
52 END IF;
53
54 -- Look up class ID using class name
55 SELECT IFNULL(MAX(ClassID), 0)
56 INTO v_classID
57 FROM Class
58 WHERE ClassName = b_className;
59 IF v_classID = 0 THEN
60     SIGNAL SQLSTATE '45000' SET MESSAGE_TEXT = 'Invalid class name.';
61 END IF;

```

```

62
63 -- Look up schedule ID using train id and the identified source and destination station IDs
64 SELECT IFNULL(MAX(ScheduleID), 0)
65 INTO v_scheduleID
66 FROM Schedule
67 WHERE TrainID = b_trainID
68 AND DepartureStationID = v_sourceStationID
69 AND ArrivalStationID = v_destinationStationID;
70 IF v_scheduleID = 0 THEN
71     SIGNAL SQLSTATE '45000' SET MESSAGE_TEXT = 'Invalid train number or no schedule for the provided source and destination.';
72 END IF;
73
74 -- Step 3: Find an available seat for the identified class in the specified train,
75 -- ensuring that the seat belongs to a coach of that train.
76 SELECT Seat.SeatID, Seat.CoachID
77 INTO selected_seatID, selected_coachID
78 FROM Seat
79 JOIN Coach ON Seat.CoachID = Coach.CoachID
80 WHERE Coach.TrainID = b_trainID
81 AND Coach.ClassID = v_classID
82 AND Seat.IsAvailable = 1
83 LIMIT 1;
84
85 -- Step 4: Insert booking details based on seat availability
86 IF selected_seatID IS NOT NULL THEN
87     SET booking_status = 'cnf';
88
89     INSERT INTO Booking (
90         PassengerID, TrainID, ScheduleID, BookingDate, JourneyDate,
91         SourceStationID, DestinationStationID, ClassID,

```

```

92         CouchID, SeatID, BookingStatus, QuotaType,
93         IsCancelled, CancelledDate, RefundAmount
94     )
95     VALUES (
96         new_passengerID, b_trainID, v_scheduleID, NOW(), b_journeyDate,
97         v_sourceStationID, v_destinationStationID, v_classID,
98         selected_coachID, selected_seatID, booking_status, b_quota,
99         0, NULL, 0
100    );
101
102    SET new_bookingID = LAST_INSERT_ID();
103
104    -- Mark the selected seat as booked and update reservation flag.
105    UPDATE Seat
106        SET IsAvailable = 0,
107            IsReserved = 1,
108            BookingID = new_bookingID
109        WHERE SeatID = selected_seatID
110            AND CoachID = selected_coachID;
111    ELSE
112        -- If no seat is available, proceed with a waitlisted booking.
113        SET booking_status = 'wl';
114
115    INSERT INTO Booking (
116        PassengerID, TrainID, ScheduleID, BookingDate, JourneyDate,
117        SourceStationID, DestinationStationID, ClassID,
118        CouchID, SeatID, BookingStatus, QuotaType,
119        IsCancelled, CancelledDate, RefundAmount
120    )
121    VALUES (
122        new_passengerID, b_trainID, v_scheduleID, NOW(), b_journeyDate,
123
124        v_sourceStationID, v_destinationStationID, v_classID,
125        NULL, NULL, booking_status, b_quota,
126        0, NULL, 0
127    );
128    END IF;
129    END;
130    //
131    DELIMITER ;

```

```

mysql> CALL BookTicketForNewPassenger(
->    'Sathvik', 19, 'male', 'ss@example.com', '7876543210',
->    'Indian', 'Adult', 'No',
->    12791, '2025-04-29 06:00:00', "Secunderabad Junction", "Danapur Junction", "First AC", 'General');
Query OK, 1 row affected (0.03 sec)

```



```
mysql> select * from Passenger;
```

PassengerID	Name	Age	Gender	Email	Phone	Nationality	PassengerType	DisabilityStatus
1	Rajesh Kumar	38	male	rajesh.kumar@example.com	9876543218	Indian	Adult	No
2	Anjali Singh	25	female	anjali.singh@example.com	9988776655	Indian	Adult	No
3	Aarav Mehta	18	male	aarav.mehta@example.com	9988665544	Indian	child	No
4	Sanya Patel	70	female	sanya.patel@example.com	9898989898	Indian	senior citizen	No
5	Ravi Shankar	45	male	ravi.shankar@example.com	9765432189	Indian	Adult	Yes
6	Priya Gupta	18	female	priya.gupta@example.com	9988777788	Indian	student	No
7	Mohammed Ali	68	male	mohammed.ali@example.com	9765321898	Indian	senior citizen	Yes
8	Meera Iyer	5	female	meera.iyer@example.com	9556677889	Indian	child	No
9	Vikram Chauhan	35	male	vikram.chauhan@example.com	9113445566	Indian	Adult	No
10	Neha Sharma	28	female	neha.sharma@example.com	9288334455	Indian	Adult	No
11	Arvind Yadav	50	male	arvind.yadav@example.com	9876554321	Indian	Adult	No
12	Kiran Reddy	22	female	kiran.reddy@example.com	9944778899	Indian	Adult	No
13	Suresh Kumar	65	male	suresh.kumar@example.com	8665554433	Indian	senior citizen	Yes
14	Nisha Verma	28	female	nisha.verma@example.com	9865332200	Indian	Adult	No
15	Siddharth Sharma	13	male	siddharth.sharma@example.com	9399221180	Indian	child	No
16	Divya Nair	32	female	divya.nair@example.com	9199887700	Indian	Adult	No
17	Rajeev Chandra	40	male	rajeev.chandra@example.com	9488776655	Indian	Adult	No
18	Manoj Joshi	75	male	manoj.joshi@example.com	9222345678	Indian	senior citizen	Yes
19	Sonali Deshpande	8	female	sonali.deshpande@example.com	9389887766	Indian	child	No
20	Harish Bhat	60	male	harish.bhat@example.com	9756432180	Indian	senior citizen	No
21	Dheeraj Reddy	22	male	dheeraj@example.com	9876543218	Indian	Adult	No
22	Dheeraj Reddy	22	male	dheeraj@example.com	9876543218	Indian	Adult	No
23	Dheeraj Reddy	22	male	dheeraj@example.com	9876543218	Indian	Adult	No
24	Dheeraj Reddy	22	male	dheeraj@example.com	9876543218	Indian	Adult	No
25	naveen	22	male	dheeraj@example.com	9876543218	Indian	Adult	No
26	naveen	22	male	dheeraj@example.com	9876543218	Indian	Adult	No
27	kuladeep	22	male	dheeraj@example.com	9876543218	Indian	Adult	No
28	kuladeep	22	male	dheeraj@example.com	9876543218	Indian	Adult	No
29	kuladeep	22	male	dheeraj@example.com	9876543218	Indian	Adult	No
30	Sathvik	19	male	ss@example.com	7876543210	Indian	Adult	No

```
38 rows in set (0.00 sec)
```

- Cancel Ticket for an Existing Passenger.

```
1 DELIMITER //
```

```
2 • CREATE PROCEDURE CancelTicket (IN p_BookingID INT)
```

```
3 BEGIN
```

```
4     DECLARE v_PassengerID INT;
```

```
5
```

```
6     -- First: Update seat record(s) to remove reference to the booking.
```

```
7     UPDATE Seat
```

```
8         SET IsAvailable = 1,
```

```
9             BookingID = NULL,
```

```
10            IsReserved = 0
```

```
11     WHERE BookingID = p_BookingID;
```

```
12
```

```
13     -- Retrieve the PassengerID associated with the booking.
```

```
14     SELECT PassengerID
```

```
15         INTO v_PassengerID
```

```
16         FROM Booking
```

```
17         WHERE BookingID = p_BookingID;
```

```
18
```

```
19     -- Delete the booking record.
```

```
20     DELETE FROM Booking
```

```
21         WHERE BookingID = p_BookingID;
```

```
22
```

```
23     -- Delete the passenger record.
```

```
24     DELETE FROM Passenger
```

```
25         WHERE PassengerID = v_PassengerID;
```

```
26 END //
```

```
27 DELIMITER ;
```

```
mysql> CALL CancelTicket(23);
Query OK, 1 row affected (0.04 sec)

mysql> select * from Passenger;
```

PassengerID	Name	Age	Gender	Email	Phone	Nationality	PassengerType	DisabilityStatus
1	Rajesh Kumar	38	male	rajesh.kumar@example.com	9876543210	Indian	Adult	No
2	Anjali Singh	25	female	anjali.singh@example.com	9988776655	Indian	Adult	No
3	Aarav Mehta	18	male	aarav.mehta@example.com	9988665544	Indian	child	No
4	Sanya Patel	78	female	sanya.patel@example.com	9898989898	Indian	senior citizen	No
5	Ravi Shankar	45	male	ravi.shankar@example.com	9765432109	Indian	Adult	Yes
6	Priya Gupta	18	female	priya.gupta@example.com	9988777788	Indian	student	No
7	Mohammed Ali	68	male	mohammed.ali@example.com	9765321800	Indian	senior citizen	Yes
8	Neera Iyer	3	female	neera.iyer@example.com	9556677889	Indian	child	No
9	Vikram Chaudhary	35	male	vikram.chaudhary@example.com	9333445566	Indian	Adult	No
10	Neha Sharma	28	female	neha.sharma@example.com	9200334455	Indian	Adult	No
11	Arvind Yadav	58	male	arvind.yadav@example.com	987654321	Indian	Adult	No
12	Kiran Reddy	22	female	kiran.reddy@example.com	9944778899	Indian	Adult	No
13	Suresh Kumar	65	male	suresh.kumar@example.com	9666554433	Indian	senior citizen	Yes
14	Nisha Verma	28	female	nisha.verma@example.com	9865332244	Indian	Adult	No
15	Siddharth Sharma	13	male	siddharth.sharma@example.com	9399221100	Indian	child	No
16	Divya Nair	32	female	divya.nair@example.com	9199887744	Indian	Adult	No
17	Rajeev Chandra	40	male	rajeev.chandra@example.com	9488776655	Indian	Adult	No
18	Manoj Joshi	75	male	manoj.joshi@example.com	9222345678	Indian	senior citizen	Yes
19	Sonali Deshmukh	8	female	sonali.deshmukh@example.com	9389887766	Indian	child	No
20	Harish Bhat	66	male	harish.bhat@example.com	9756432100	Indian	senior citizen	No
21	Dheeraj Reddy	22	male	dheeraj@example.com	9876543210	Indian	Adult	No
22	Dheeraj Reddy	22	male	dheeraj@example.com	9876543210	Indian	Adult	No
23	Dheeraj Reddy	22	male	dheeraj@example.com	9876543210	Indian	Adult	No
24	naveen	22	male	dheeraj@example.com	9876543210	Indian	Adult	No
25	naveen	22	male	dheeraj@example.com	9876543210	Indian	Adult	No
26	naveen	22	male	dheeraj@example.com	9876543210	Indian	Adult	No
27	Kuldeep	22	male	dheeraj@example.com	9876543210	Indian	Adult	No
28	Kuldeep	22	male	dheeraj@example.com	9876543210	Indian	Adult	No
29	Kuldeep	22	male	dheeraj@example.com	9876543210	Indian	Adult	No
30	Sathvik	18	male	ss@example.com	7876543210	Indian	Adult	No

```
29 rows in set (0.08 sec)
```

- Find total amount that needs to be refunded for cancelling a train by Class.

```
1 DELIMITER //
2 CREATE PROCEDURE GetTotalRefundAmountByClass (
3     IN p_trainID INT,
4     IN p_journeyDate DATETIME
5 )
6 BEGIN
7     SELECT
8         T.TrainID,
9         T.TrainName,
10        C.ClassName,
11        ROUND(SUM((R2.DistanceFromSource - R1.DistanceFromSource) * C.FarePerKM), 2) AS TotalRefund
12    FROM Booking B
13    JOIN Train T ON B.TrainID = T.TrainID
14    JOIN Class C ON B.ClassID = C.ClassID
15    JOIN Route R1 ON B.TrainID = R1.TrainID AND B.SourceStationID = R1.StationID
16    JOIN Route R2 ON B.TrainID = R2.TrainID AND B.DestinationStationID = R2.StationID
17    WHERE B.TrainID = p_trainID
18        AND B.JourneyDate = p_journeyDate
19    GROUP BY T.TrainID, T.TrainName, C.ClassName;
20 END;
21 //
22 DELIMITER ;
```

```
mysql> CALL GetTotalRefundAmountByClass(12791,"2025-04-29 06:00:00");
```

TrainID	TrainName	ClassName	TotalRefund
12791	Secunderabad-Danapur Superfast Express	First AC	105000

```
1 row in set (0.00 sec)

Query OK, 0 rows affected (0.01 sec)
```

- Find the idlest route based on passenger count.

```
1 DELIMITER $$
2
3 • CREATE PROCEDURE sp_idelst_route()
4 BEGIN
5     SELECT
6         ds.StationName AS SourceStationName,
7         asd.StationName AS DestinationStationName,
8         COUNT(*) AS PassengerCount
9     FROM Booking b
10    JOIN Station ds ON b.SourceStationID = ds.StationID
11    JOIN Station asd ON b.DestinationStationID = asd.StationID
12   WHERE b.BookingStatus = 'cnf'
13   GROUP BY b.SourceStationID, b.DestinationStationID
14   ORDER BY PassengerCount
15   LIMIT 1;
16 END $$
17
18 DELIMITER ;
19
```

```
mysql> CALL sp_idelst_route();
```

SourceStationName	DestinationStationName	PassengerCount
New Delhi Railway Station	Howrah Junction	2

```
1 row in set (0.00 sec)
```

```
Query OK, 0 rows affected (0.01 sec)
```