

Hostel Allotment System

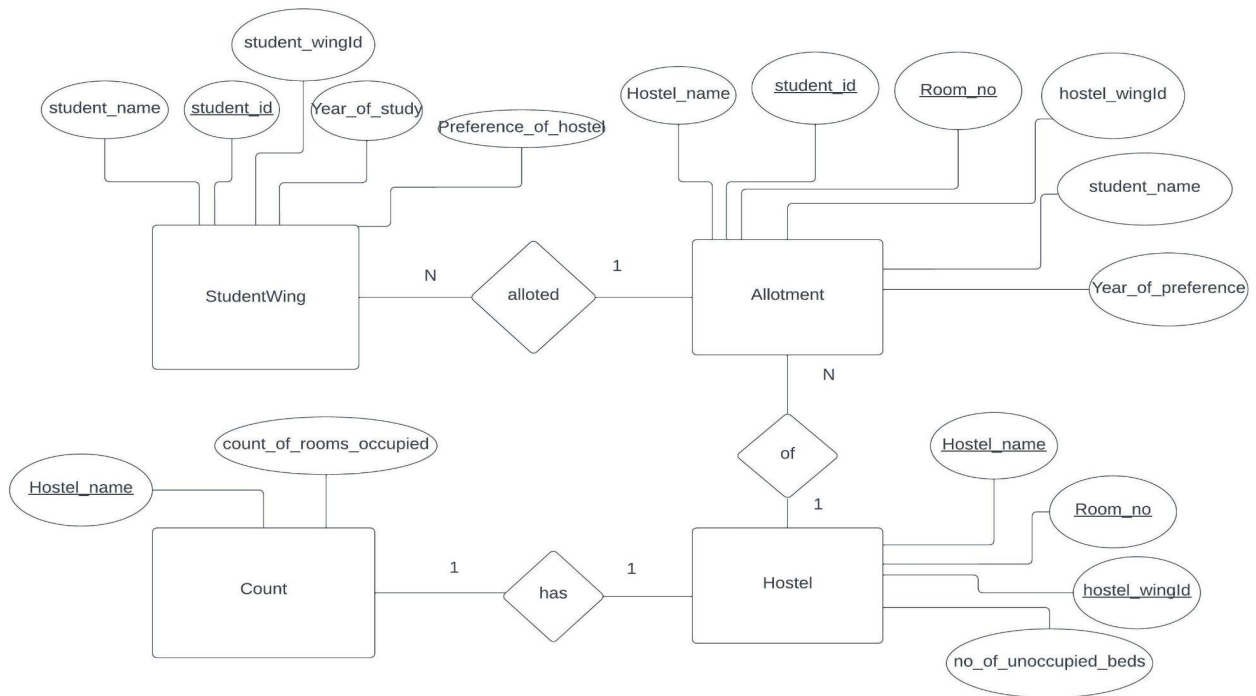


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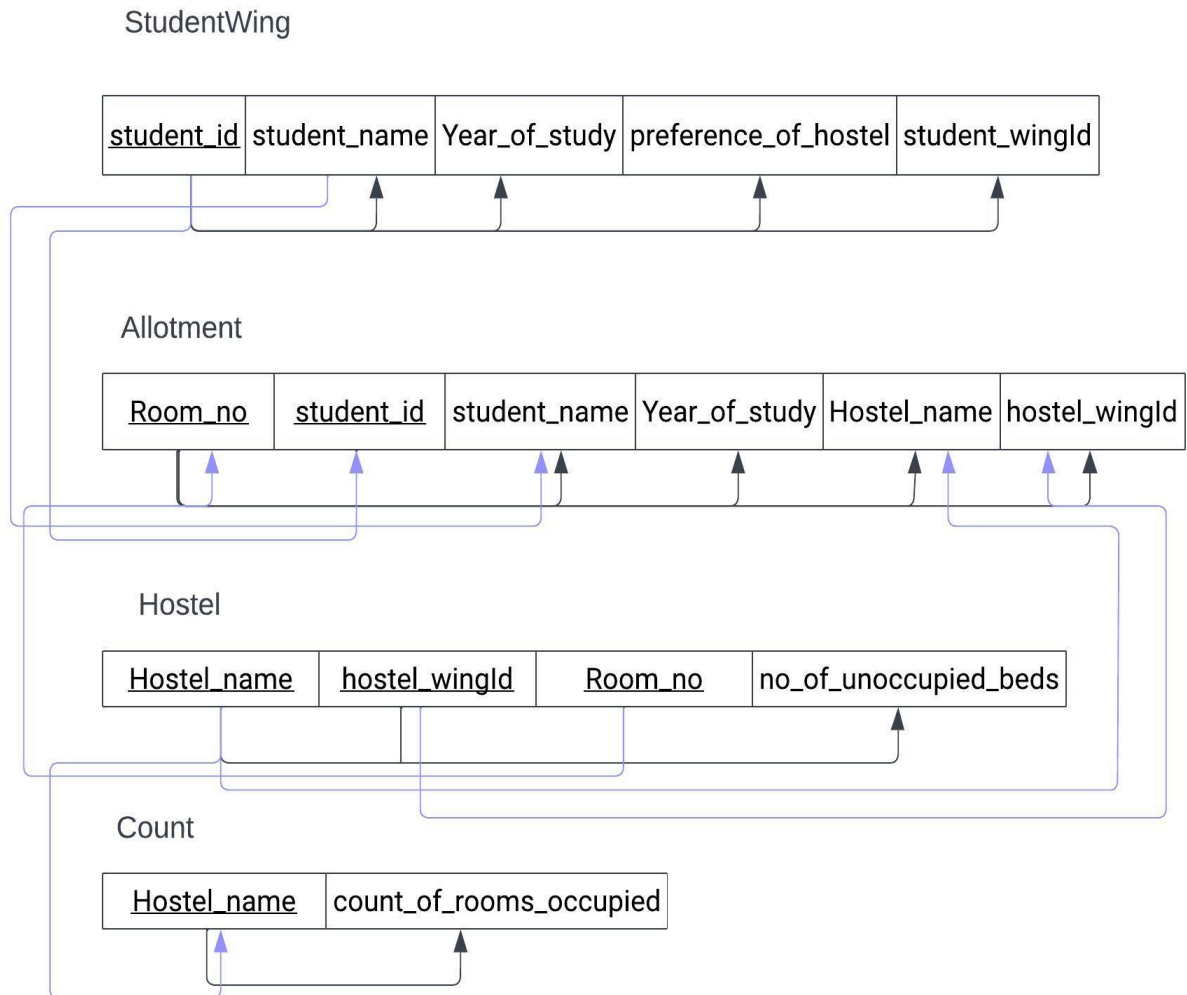
ER Diagram



Conversion & Normalisation

From the above ER diagram, the following relational schema is derived. The relational schema is in 1NF all attributes are single-valued and can have atomic values only. The underlying schema is in 2NF because all attributes are fully functional dependent, i.e., are dependent on the entire primary key and not part of it as clear from the functional dependencies mentioned below. Schema is in 3NF because all functional dependencies have LHS as the primary key and there are no transitive dependencies.

Relational Schema



Relational schema

StudentWing

student_id (PK), student_name, Year_of_study, preference_of_hostel, student_wingId

Allotment

Room_no(PK), student_id (PK) (FK), student_name, Year_of_study, Hostel_name ,
hostel_wingId

Hostel

Hostel_name (PK), hostel_wingId (PK), Room_no (PK), no_of_unoccupied_beds

Count

Hostel_name (PK), count_of_rooms_occupied

Functional Dependencies

Student_id \rightarrow student_name, Year_of_study, preference_of_hostel, student_wingId

Room_no, student_id \rightarrow student_name, Year_of_study, Hostel_name, hostel_wingId

Hostel_name, hostel_wingId, Room_no \rightarrow no_of_unoccupied_beds

Hostel_name \rightarrow count_of_rooms_occupied

SQL Queries

1. Creating DATABASE

```
1 CREATE DATABASE hostel_db;
2 USE hostel_db;
3
4 CREATE TABLE StudentWing (
5     student_id VARCHAR(20) NOT NULL PRIMARY KEY,
6     student_name VARCHAR(255),
7     student_wingId INT,
8     Year_of_study INT,
9     preference_of_hostel VARCHAR(255)
10 );
11
```

✓ 22	19:03:10	CREATE DATABASE hostel_db	1 row(s) affected	0.00061 sec
✓ 23	19:03:10	USE hostel_db	0 row(s) affected	0.00015 sec
✓ 24	19:03:10	CREATE TABLE StudentWing (student_id VARCHAR(20) NOT NULL PRIMARY KEY, student_name VARCHAR(255), student_wingId INT, Year_of_study INT, preference_of_hostel VARC...	0 row(s) affected	0.021 sec

```
CREATE TABLE Allotment (
    Hostel_name VARCHAR(255),
    Room_no INT,
    hostel_wingId INT,
    student_id VARCHAR(20) NOT NULL,
    student_name VARCHAR(255),
    Year_of_study INT,
    PRIMARY KEY (Room_no, student_id),
    FOREIGN KEY (student_id) REFERENCES StudentWing(student_id)
);

CREATE TABLE Hostel(
    Hostel_name VARCHAR(255),
    Room_no INT,
    hostel_wingId INT,
    no_of_unoccupied_beds INT,
    PRIMARY KEY (Hostel_name, hostel_wingId, Room_no)
);

CREATE TABLE Count (
    Hostel_name VARCHAR(255) PRIMARY KEY,
    count_of_rooms_occupied INT
);
```

✓ 26	19:04:13	CREATE TABLE Allotment (Hostel_name VARCHAR(255), Room_no INT, hostel_wingId INT, student_id VARCHAR(20) NOT NULL, student_name VARCHAR(255), Year_of_study INT,...	0 row(s) affected	0.016 sec
✓ 27	19:04:17	CREATE TABLE Hostel(Hostel_name VARCHAR(255), Room_no INT, hostel_wingId INT, no_of_unoccupied_beds INT, PRIMARY KEY (Hostel_name, hostel_wingId, Room_no))	0 row(s) affected	0.010 sec
✓ 28	19:04:21	CREATE TABLE Count (Hostel_name VARCHAR(255) PRIMARY KEY, count_of_rooms_occupied INT)	0 row(s) affected	0.011 sec

2. Inserting student details

```
INSERT INTO StudentWing (student_id, student_name, student_wingId, Year_of_study, preference_of_hostel)
VALUES
('2020AXPS0001', 'Raj', 2, 2, 'RAM'),
('2020AXPS0002', 'Aryan', 5, 2, 'RAM'),
('2020AXPS0003', 'Amit', 1, 2, 'BUDH'),
('2020AXPS0004', 'Siddharth', 3, 2, 'BUDH'),
('2020AXPS0005', 'Vikram', 9, 2, 'RAM'),
('2020AXPS0006', 'Ankit', 8, 2, 'RAM'),
('2020AXPS0007', 'Rajat', 6, 2, 'BUDH'),
('2020AXPS0008', 'Gaurav', 7, 2, 'BUDH'),
('2020AXPS0009', 'Rahul', 2, 1, 'SR'),
('2020AXPS0010', 'Amitabh', 5, 1, 'SR'),
('2020AXPS0011', 'Alok', 1, 1, 'ASHOK'),
('2020AXPS0012', 'Nishant', 3, 1, 'ASHOK'),
('2020AXPS0013', 'Anurag', 9, 1, 'SR'),
('2020AXPS0014', 'Rohit', 8, 1, 'SR'),
('2020AXPS0015', 'Deepak', 6, 1, 'ASHOK'),
('2020AXPS0016', 'Vineet', 7, 1, 'ASHOK'),
('2020AXPS0017', 'Aditya', 2, 3, 'SHANKAR'),
('2020AXPS0018', 'Karan', 5, 3, 'SHANKAR'),
('2020AXPS0019', 'Arjun', 1, 3, 'VYAS'),
('2020AXPS0020', 'Abhishek', 3, 3, 'VYAS'),
('2020AXPS0021', 'Sushant', 9, 3, 'SHANKAR'),
('2020AXPS0022', 'Rajesh', 8, 3, 'SHANKAR'),
('2020AXPS0023', 'Yash', 6, 3, 'VYAS'),
('2020AXPS0024', 'Harsh', 7, 3, 'VYAS'),
('2020AXPS0025', 'Kunal', 2, 4, 'KRISHNA'),
```

29 19:04:24 INSERT INTO StudentWing (student_id, student_name, student_wingId, Year_of_study, preference_of_hostel) VALUES ('2020AXPS0001', 'Raj', 2, 2, 'RAM'), ('2020AXPS0002', 'Aryan', 5, 2, 'RAM'), ('2020AXPS0003', 'Amit', 1, 2, 'BUDH'), ('2020AXPS0004', 'Siddharth', 3, 2, 'BUDH'), ('2020AXPS0005', 'Vikram', 9, 2, 'RAM'), ('2020AXPS0006', 'Ankit', 8, 2, 'RAM'), ('2020AXPS0007', 'Rajat', 6, 2, 'BUDH'), ('2020AXPS0008', 'Gaurav', 7, 2, 'BUDH'), ('2020AXPS0009', 'Rahul', 2, 1, 'SR'), ('2020AXPS0010', 'Amitabh', 5, 1, 'SR'), ('2020AXPS0011', 'Alok', 1, 1, 'ASHOK'), ('2020AXPS0012', 'Nishant', 3, 1, 'ASHOK'), ('2020AXPS0013', 'Anurag', 9, 1, 'SR'), ('2020AXPS0014', 'Rohit', 8, 1, 'SR'), ('2020AXPS0015', 'Deepak', 6, 1, 'ASHOK'), ('2020AXPS0016', 'Vineet', 7, 1, 'ASHOK'), ('2020AXPS0017', 'Aditya', 2, 3, 'SHANKAR'), ('2020AXPS0018', 'Karan', 5, 3, 'SHANKAR'), ('2020AXPS0019', 'Arjun', 1, 3, 'VYAS'), ('2020AXPS0020', 'Abhishek', 3, 3, 'VYAS'), ('2020AXPS0021', 'Sushant', 9, 3, 'SHANKAR'), ('2020AXPS0022', 'Rajesh', 8, 3, 'SHANKAR'), ('2020AXPS0023', 'Yash', 6, 3, 'VYAS'), ('2020AXPS0024', 'Harsh', 7, 3, 'VYAS'), ('2020AXPS0025', 'Kunal', 2, 4, 'KRISHNA'), 32 row(s) affected Re... 0.0035 sec

	student_id	student_na...	student_win...	Year_of_study	preference_of_hos...	
▶	2020AXPS0001	Raj	2	2	RAM	
	2020AXPS0002	Aryan	5	2	RAM	
	2020AXPS0003	Amit	1	2	BUDH	
	2020AXPS0004	Siddharth	3	2	BUDH	
	2020AXPS0005	Vikram	9	2	RAM	
	2020AXPS0006	Ankit	8	2	RAM	
	2020AXPS0007	Rajat	6	2	BUDH	
	2020AXPS0008	Gaurav	7	2	BUDH	
	2020AXPS0009	Rahul	2	1	SR	
	2020AXPS0010	Amitabh	5	1	SR	
	2020AXPS0011	Alok	1	1	ASHOK	
	2020AXPS0012	Nishant	3	1	ASHOK	
	2020AXPS0013	Anurag	9	1	SR	
	2020AXPS0014	Rohit	8	1	SR	
	2020AXPS0015	Deepak	6	1	ASHOK	
	2020AXPS0016	Vineet	7	1	ASHOK	
	2020AXPS0017	Aditya	2	3	SHANKAR	
	2020AXPS0018	Karan	5	3	SHANKAR	
	2020AXPS0019	Arjun	1	3	VYAS	
	2020AXPS0020	Abhishek	3	3	VYAS	
	2020AXPS0021	Sushant	9	3	SHANKAR	
	2020AXPS0022	Rajesh	8	3	SHANKAR	
	2020AXPS0023	Yash	6	3	VYAS	
	2020AXPS0024	Harsh	7	3	VYAS	
	2020AXPS0025	Kunal	2	4	KRISHNA	

3. Inserting Rooms

```
INSERT INTO Hostel (Hostel_name, Room_no, hostel_wingId, no_of_unoccupied_beds)
VALUES
('SR', 1, 1, 2), ('SR', 2, 1, 2), ('SR', 3, 1, 2), ('SR', 4, 1, 2),
('SR', 5, 1, 2), ('SR', 6, 1, 2), ('SR', 7, 1, 2), ('SR', 8, 1, 2),
('SR', 9, 2, 2), ('SR', 10, 2, 2), ('SR', 11, 2, 2), ('SR', 12, 2, 2),
('SR', 13, 2, 2), ('SR', 14, 2, 2), ('SR', 15, 2, 2), ('SR', 16, 2, 2),
('SR', 17, 3, 2), ('SR', 18, 3, 2), ('SR', 19, 3, 2), ('SR', 20, 3, 2),
('SR', 21, 3, 2), ('SR', 22, 3, 2), ('SR', 23, 3, 2), ('SR', 24, 3, 2),
('SR', 25, 4, 2), ('SR', 26, 4, 2), ('SR', 27, 4, 2), ('SR', 28, 4, 2),
('SR', 29, 4, 2), ('SR', 30, 4, 2), ('SR', 31, 4, 2), ('SR', 32, 4, 2),
('SR', 33, 5, 2), ('SR', 34, 5, 2), ('SR', 35, 5, 2), ('SR', 36, 5, 2),
('SR', 37, 5, 2), ('SR', 38, 5, 2), ('SR', 39, 5, 2), ('SR', 40, 5, 2),
('SR', 41, 6, 2), ('SR', 42, 6, 2), ('SR', 43, 6, 2), ('SR', 44, 6, 2),
('SR', 45, 6, 2), ('SR', 46, 6, 2), ('SR', 47, 6, 2), ('SR', 48, 6, 2),
('SR', 49, 7, 2), ('SR', 50, 7, 2), ('SR', 51, 7, 2), ('SR', 52, 7, 2),
('SR', 53, 7, 2), ('SR', 54, 7, 2), ('SR', 55, 7, 2), ('SR', 56, 7, 2),
('SR', 57, 8, 2), ('SR', 58, 8, 2), ('SR', 59, 8, 2), ('SR', 60, 8, 2),
('SR', 61, 8, 2), ('SR', 62, 8, 2), ('SR', 63, 8, 2), ('SR', 64, 8, 2),
('SR', 65, 9, 2), ('SR', 66, 9, 2), ('SR', 67, 9, 2), ('SR', 68, 9, 2),
('SR', 69, 9, 2), ('SR', 70, 9, 2), ('SR', 71, 9, 2), ('SR', 72, 9, 2),
('SR', 73, 10, 2), ('SR', 74, 10, 2), ('SR', 75, 10, 2), ('SR', 76, 10, 2),
('SR', 77, 10, 2), ('SR', 78, 10, 2), ('SR', 79, 10, 2), ('SR', 80, 10, 2),

('ASHOK', 1, 1, 2), ('ASHOK', 2, 1, 2), ('ASHOK', 3, 1, 2), ('ASHOK', 4, 1, 2),
('ASHOK', 5, 1, 2), ('ASHOK', 6, 1, 2), ('ASHOK', 7, 1, 2), ('ASHOK', 8, 1, 2),
('ASHOK', 9, 2, 2), ('ASHOK', 10, 2, 2), ('ASHOK', 11, 2, 2), ('ASHOK', 12, 2, 2),
('ASHOK', 13, 2, 2), ('ASHOK', 14, 2, 2), ('ASHOK', 15, 2, 2), ('ASHOK', 16, 2, 2),
```

Hostel_name	Room_no	hostel_wingId	no_of_unoccupied_b...
ASHOK	1	1	2
ASHOK	2	1	2
ASHOK	3	1	2
ASHOK	4	1	2
ASHOK	5	1	2
ASHOK	6	1	2
ASHOK	7	1	2
ASHOK	8	1	2
ASHOK	9	2	2
ASHOK	10	2	2
ASHOK	11	2	2
ASHOK	12	2	2
ASHOK	13	2	2
ASHOK	14	2	2
ASHOK	15	2	2
ASHOK	16	2	2
ASHOK	17	3	2
ASHOK	18	3	2
ASHOK	19	3	2
ASHOK	20	3	2
ASHOK	21	3	2
ASHOK	22	3	2
ASHOK	23	3	2
ASHOK	24	3	2
ASHOK	25	4	2

4. Deleting a room allotment

```
246 • INSERT INTO Allotment (Hostel_name, Room_no, hostel_wingId, student_id, student_name, Year_of_study) VALUES ('VYAS', 17,2,'2020AXPS0020', 'Abhishek', 3);
247 • Select * FROM Allotment;
248
```

100% 11:247

Result Grid Filter Rows: Search Edit: Export/Import:

	Hostel_name	Room_no	hostel_wingId	student_id	student_na...	Year_of_study
▶	BUDH	1	1	2020AXPS0003	Amit	2
	RAM	9	2	2020AXPS0001	RAJ	2
	VYAS	17	2	2020AXPS0020	Abhishek	3
	NULL	NULL	NULL	NULL	NULL	NULL

```
248      -- Deleting a room allotment:
249 • DELETE FROM Allotment WHERE Room_no = '17' AND student_id = '2020AXPS0020' ;
250 • Select * FROM Allotment;
251
252
```


100% 4:250


Result Grid Filter Rows: Search Edit: Export/Import:

	Hostel_name	Room_no	hostel_wingId	student_id	student_na...	Year_of_study
▶	BUDH	1	1	2020AXPS0003	Amit	2
	RAM	9	2	2020AXPS0001	RAJ	2
	NULL	NULL	NULL	NULL	NULL	NULL

Room allotment of Abhishek has been deleted.

5. Updating Hostel preferences

252  **Select * FROM StudentWing;**


	student_id	student_na...	student_win...	Year_of_study	preference_of_hos...	
	2020AXPS0010	Amitabh	5	1	SR	
	2020AXPS0011	Alok	1	1	ASHOK	
	2020AXPS0012	Nishant	3	1	ASHOK	
	2020AXPS0013	Anurag	9	1	SR	
	2020AXPS0014	Rohit	8	1	SR	
	2020AXPS0015	Deepak	6	1	ASHOK	
	2020AXPS0016	Vineet	7	1	ASHOK	
	2020AXPS0017	Aditya	2	3	SHANKAR	
	2020AXPS0018	Karan	5	3	SHANKAR	
	2020AXPS0019	Arjun	1	3	VYAS	
▶	2020AXPS0020	Abhishek	3	3	SHANKAR	
	2020AXPS0021	Sushant	9	3	SHANKAR	
	2020AXPS0022	Rajesh	8	3	SHANKAR	
	2020AXPS0023	Yash	6	3	VYAS	
	2020AXPS0024	Harsh	7	3	VYAS	
	2020AXPS0025	Kunal	2	4	KRISHNA	
	2020AXPS0026	Harsh	5	4	KRISHNA	








253 -- Updating hostel preferences:


254 • UPDATE StudentWing SET preference_of_hostel = 'VYAS' WHERE student_id = '2020AXPS0020';

255 • Select * FROM StudentWing;

256


100%  2:255








Result Grid   Filter Rows: Edit:    Export/Import:  

	student_id	student_na...	student_win...	Year_of_study	preference_of_hos...	
	2020AXPS0006	Ankit	8	2	RAM	
	2020AXPS0007	Rajat	6	2	BUDH	
	2020AXPS0008	Gaurav	7	2	BUDH	
	2020AXPS0009	Rahul	2	1	SR	
	2020AXPS0010	Amitabh	5	1	SR	
	2020AXPS0011	Alok	1	1	ASHOK	
	2020AXPS0012	Nishant	3	1	ASHOK	
	2020AXPS0013	Anurag	9	1	SR	
	2020AXPS0014	Rohit	8	1	SR	
	2020AXPS0015	Deepak	6	1	ASHOK	
	2020AXPS0016	Vineet	7	1	ASHOK	
	2020AXPS0017	Aditya	2	3	SHANKAR	
	2020AXPS0018	Karan	5	3	SHANKAR	
	2020AXPS0019	Arjun	1	3	VYAS	
	2020AXPS0020	Abhishek	3	3	VYAS	
	2020AXPS0021	Sushant	9	3	SHANKAR	
	2020AXPS0022	Rajesh	8	3	SHANKAR	
	2020AXPS0023	Yash	6	3	VYAS	
	2020AXPS0024	Harsh	7	3	VYAS	

For Abhishek preference_of_hostel has been changed from SHANKAR to VYAS.


6. Allot a student a specific room








259  `Select * FROM Allotment;`

Result Grid   Filter Rows: Edit:    Export/Import:  

	Hostel_name	Room_no	hostel_wingId	student_id	student_na...	Year_of_study
▶	BUDH	1	1	2020AXPS0003	Amit	2
	NULL	NULL	NULL	NULL	NULL	NULL

```
260 ■ INSERT INTO Allotment (Hostel_name, Room_no, hostel_wingId, student_id, student_name, Year_of_study) VALUES ('RAM', 9, 2, '2020AXPS0001', 'RAJ', 2);
261 ■ Select * FROM Allotment;
262
263
```

100%  37:257


Result Grid   Filter Rows: Edit:    Export/Import:  








	Hostel_name	Room_no	hostel_wingId	student_id	student_na...	Year_of_study
▶	BUDH	1	1	2020AXPS0003	Amit	2
	RAM	9	2	2020AXPS0001	RAJ	2
	NULL	NULL	NULL	NULL	NULL	NULL

Raj has been allotted room number 9 in RAM Bhawan.

7. View all free rooms

```
264 -- View all free rooms
265 ■ SELECT * FROM Hostel WHERE no_of_unoccupied_beds > 0;
266
```

100%  6:265

Result Grid   Filter Rows: Edit:    Export/Import:  

	Hostel_name	Room_no	hostel_wingId	no_of_unoccupied_b...
	RAM	7	1	2
	RAM	8	1	2
	RAM	9	2	1
	RAM	10	2	2
	RAM	11	2	2

Shows all the rooms that have at least 1 bed empty.

8. Retrieving the database of all students residing in the specific hostel after allotment.

```
283 -- Retrieving database of all students residing in specific hostel
284 • SELECT * FROM StudentWing s
285 JOIN Allotment a ON s.student_id = a.student_id
WHERE a.Hostel_name = 'RAM';
```

100% 7:284

Result Grid Filter Rows: Search Export:

student_id	student_na...	student_win...	Year_of_study	preference_of_hos...	Hostel_name	Room_no	hostel_wingId	student_id	student_na...	Year_of_study
2020AXPS0001	Raj	2	2	RAM	RAM	9	2	2020AXPS0001	RAJ	2

9. View all wingies

```
317 -- View wingies (neighbouring 8 room) info
318 • SELECT * FROM Allotment WHERE hostel_wingId = 2 AND hostel_name = 'RAM';
319
320
```

100% 23:318

Result Grid Filter Rows: Search Edit: Export/Import:

Hostel_name	Room_no	hostel_wingId	student_id	student_na...	Year_of_study
RAM	9	2	2020AXPS0001	RAJ	2
NULL	NULL	NULL	NULL	NULL	NULL

10. Updating Room status

```
UPDATE Hostel SET no_of_unoccupied_beds = no_of_unoccupied_beds - 1 WHERE Hostel_name = 'RAM' AND Room_no = 9 AND hostel_wingId = 2;
```