Functional Dependencies (FDs)

1. **Hostel Table**
    - **FD:** Hostel_Name -> {Is_AC, Type_of_Room, Number_of_rooms}
2. **Student Table (Supertype)**
    - **FD:** Student_ID -> {Name, Age, Program, Category, Distance, Room_No, Hostel_Name, Contact_Info}
3. **Alaknanda_Student Table (Subtype)**
    - **FD:** Student_ID -> {Country, Prev_Year_Resident}
4. **Kaveri_Student Table (Subtype)**
    - **FD:** Student_ID -> {CGPA, Prev_Year_Resident}
5. **Saraswati_Student Table (Subtype)**
    - **FD:** Student_ID -> {Prev_Year_Resident}
6. **Room Table**
    - **FD:** {Room_No, Hostel_Name} -> {Current_Capcity, Last_Cleaned, Insect_Repellant_Spray}
7. **Visitor Table**
    - **FD:** {Student_ID, Visitor_Name, Relation} -> Visit_Date
8. **In Table**
    - **FD:** {Student_ID, Date} -> In_Time
9. **Out Table**
    - **FD:** {Student_ID, Date} -> {Out_Time, Number_of_nights, Address}
10. **Staff Table**
    - **FD:** Staff_ID -> {Name, Contact_Info, Address, Role, Shift_Time, Shift_Days, Salary, Hostel_Name}
11. **Parent/ Guardian Table**
    - **FD:** {Student_ID, Guardian_Name, Relation} -> Contact_Info
12. **Complaint Table**
    - **FD:** Complaint_ID -> {Student_ID, Complaint_Type, Description, Status, Date_Filed, Date_Resolved, Assigned_Staff}

Normalization

The database schema has been normalized up to **Third Normal Form (3NF)** to eliminate redundancy and ensure data integrity. Each table meets the following criteria:

- **First Normal Form (1NF):** All tables contain only atomic values (no repeating groups or arrays), ensuring that each attribute holds a single, indivisible value per row.
- **Second Normal Form (2NF):** Since each table has a well-defined primary key, all non-key attributes are fully functionally dependent on the entire primary key, avoiding partial dependencies. For tables with composite primary keys, each non-key attribute is dependent on the entire key combination.
- **Third Normal Form (3NF):** There are no transitive dependencies within any table. This means that non-key attributes are not dependent on other non-key attributes but only on the primary key, ensuring that all attributes directly describe the entity represented by the table.