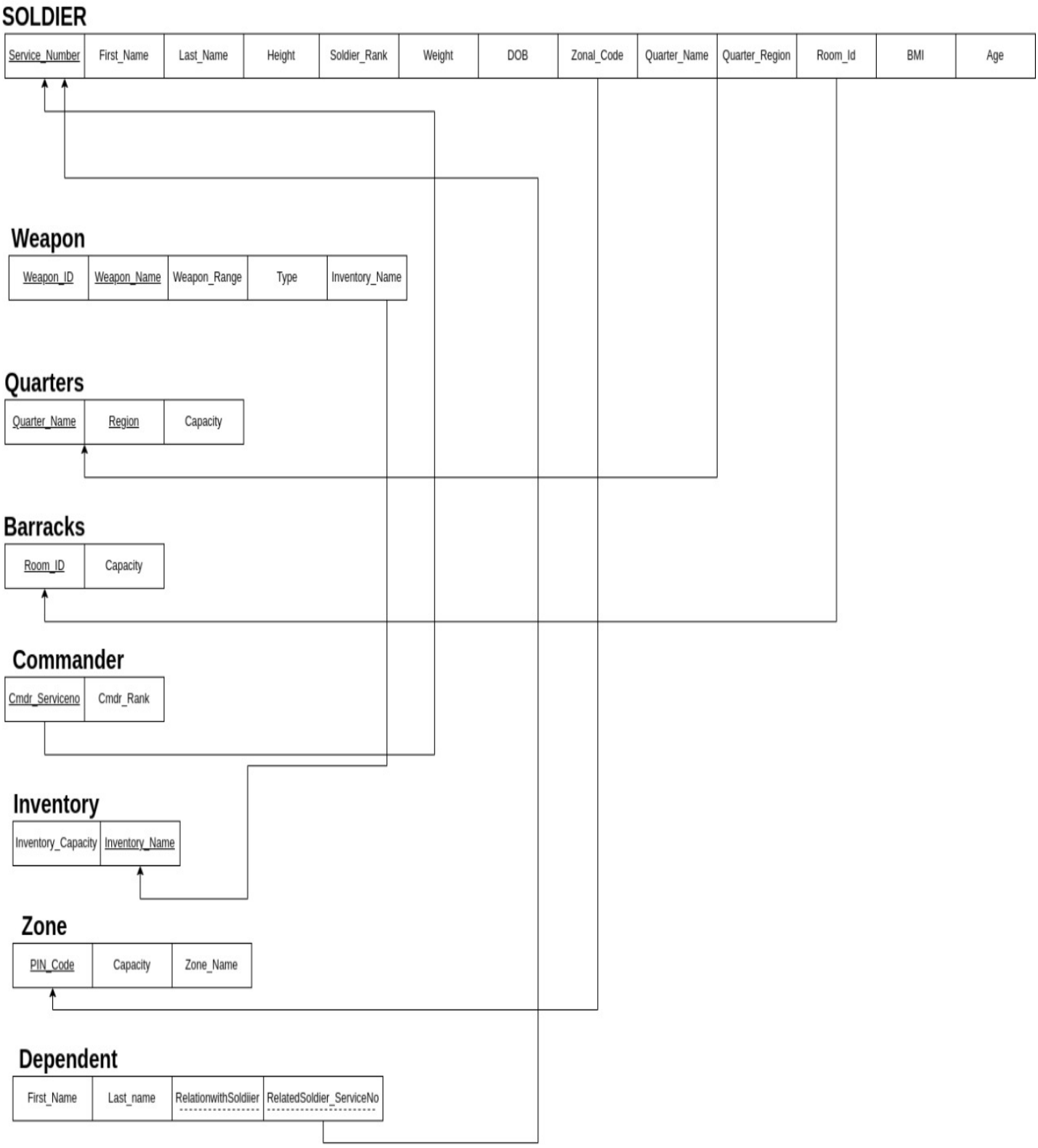
Project Phase 3

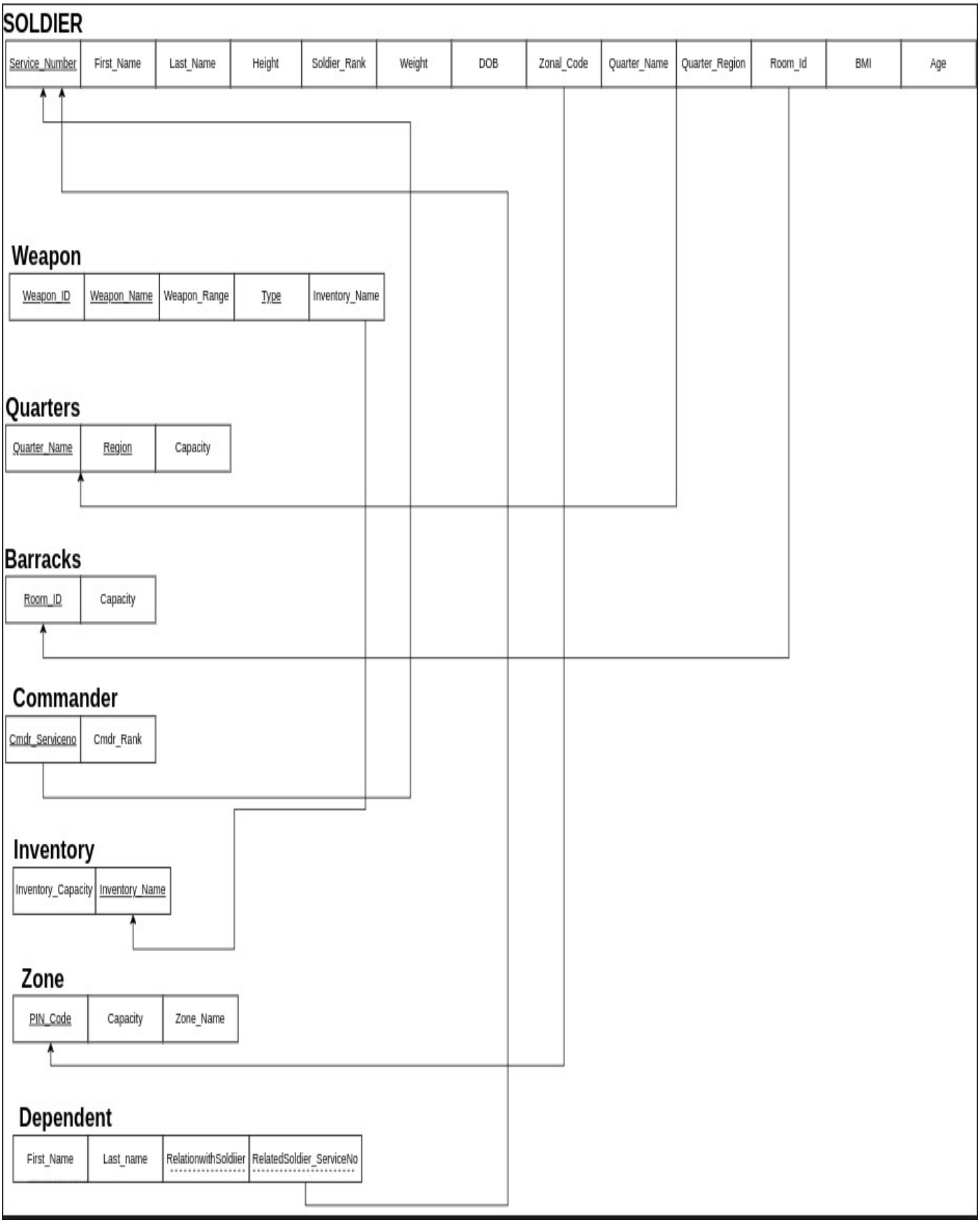
Part 1: Relational Model


SOLDIER
Service_Number
First_Name
Last_Name
Height
Soldier_Rank
Weight
DOB
Zonal_Code
Quarter_Name
Quarter_Region
Room_Id
BMI
Age
Weapon
Weapon_ID
Weapon_Name
Weapon_Range
Type
Inventory_Name
Quarters
Quarter_Name
Region
Capacity
Barracks
Room_ID
Capacity
Commander
Cmdr_Serviceno
Cmdr_Rank
Inventory
Inventory_Capacity
Inventory_Name
Zone
PIN_Code
Capacity
Zone_Name
Dependent
First_Name
Last_name
RelationwithSoldiier
RelatedSoldier_ServiceNo

Part 2: 1NF

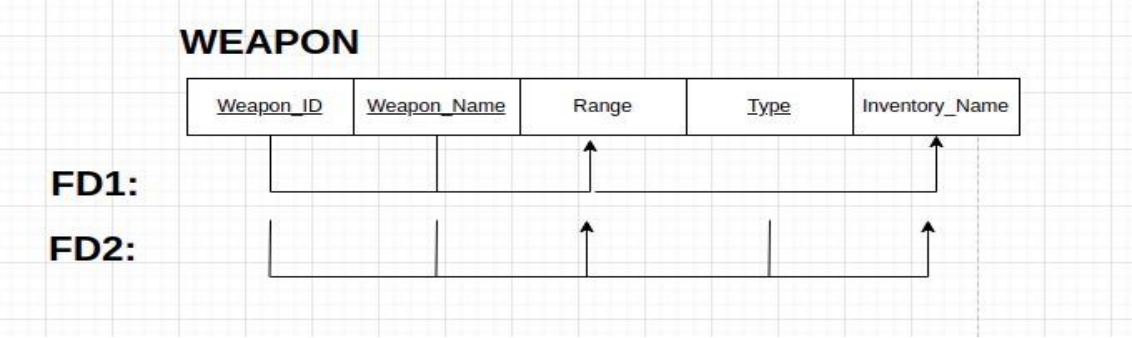
There should be no multivalued attributes in 1NF. Since ‘Type’ is a multi-valued attribute, we will have to change the table and tuples in such a way that the column ‘Type’ doesn’t have multiple values. If the attribute ‘Type’ has n values in a tuple, we must divide the row into n different rows with each row containing one of those values. This violates the condition that the primary key

{WeaponID,Weapon_Name) should be unique as all n rows will have the same value for {WeaponID,Weapon_Name}. Therefore, we will have to add ‘Type’ also to the set and should make {WeaponID,Weapon_Name,Type} as the new primary key.

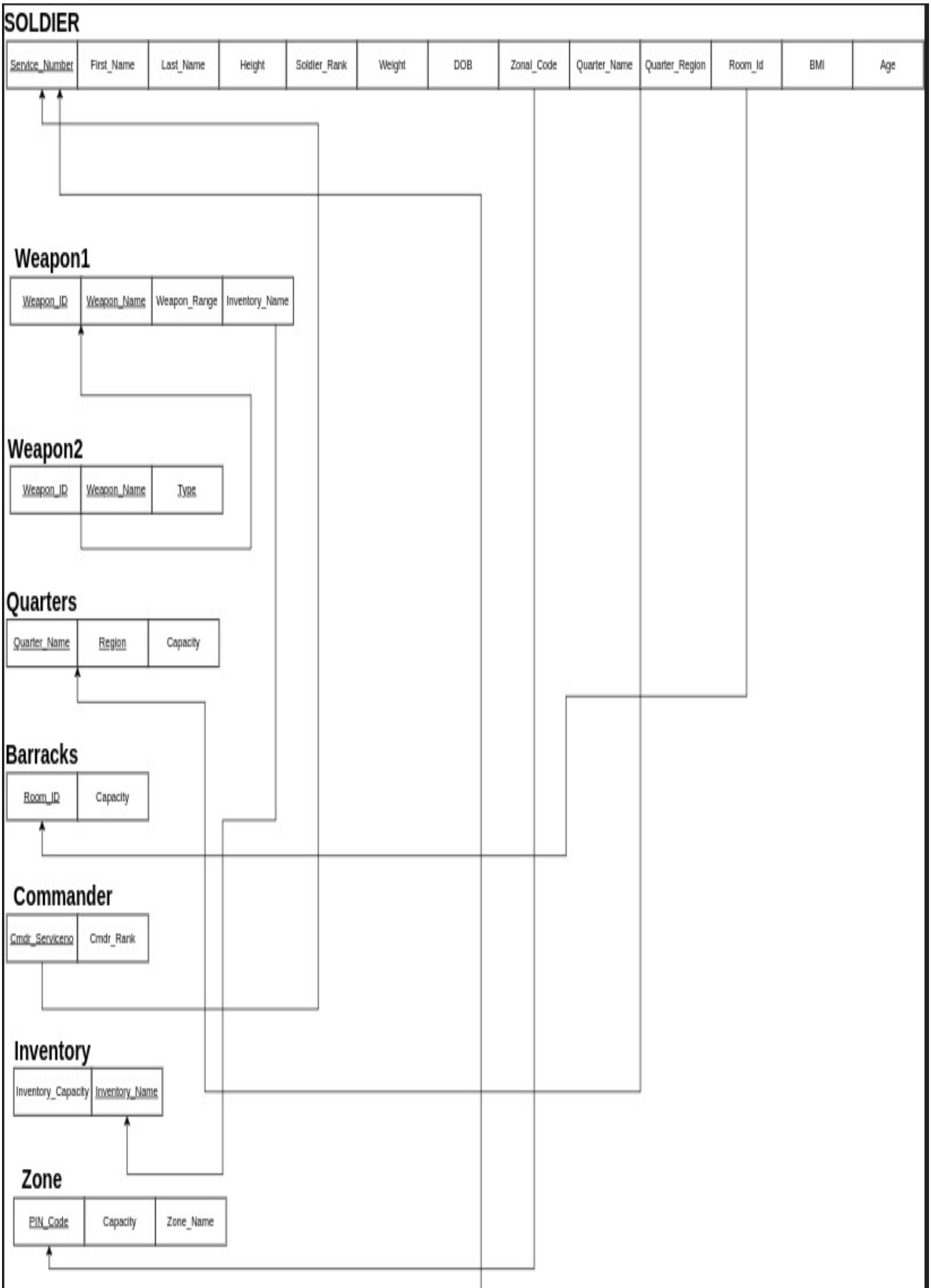

SOLDIER
Service_Number
First_Name
Last_Name
Height
Soldier_Rank
Weight
DOB
Zonal_Code
Quarter_Name
Quarter_Region
Room_Id
BMI
Age
Weapon
Weapon_ID
Weapon_Name
Weapon_Range
Type
Inventory_Name
Quarters
Quarter_Name
Region
Capacity
Barracks
Room_ID
Capacity
Commander
Cmdr_Serviceno
Cmdr_Rank
Inventory
Inventory_Capacity
Inventory_Name
Zone
PIN_Code
Capacity
Zone_Name
Dependent
First_Name
Last_name
RelationwithSoldiier
RelatedSoldier_ServiceNo

Part 3: 2NF

A relational scheme is said to be in its 2NF form when all non-prime attributes are fully functionally dependent on the primary key. But on careful observation we observe that the range of a weapon and inventory_name are partially dependent on the primary key i.e weapon_id, weapon_name and type. Because it is fully dependent on (weapon_id, weapon_name).

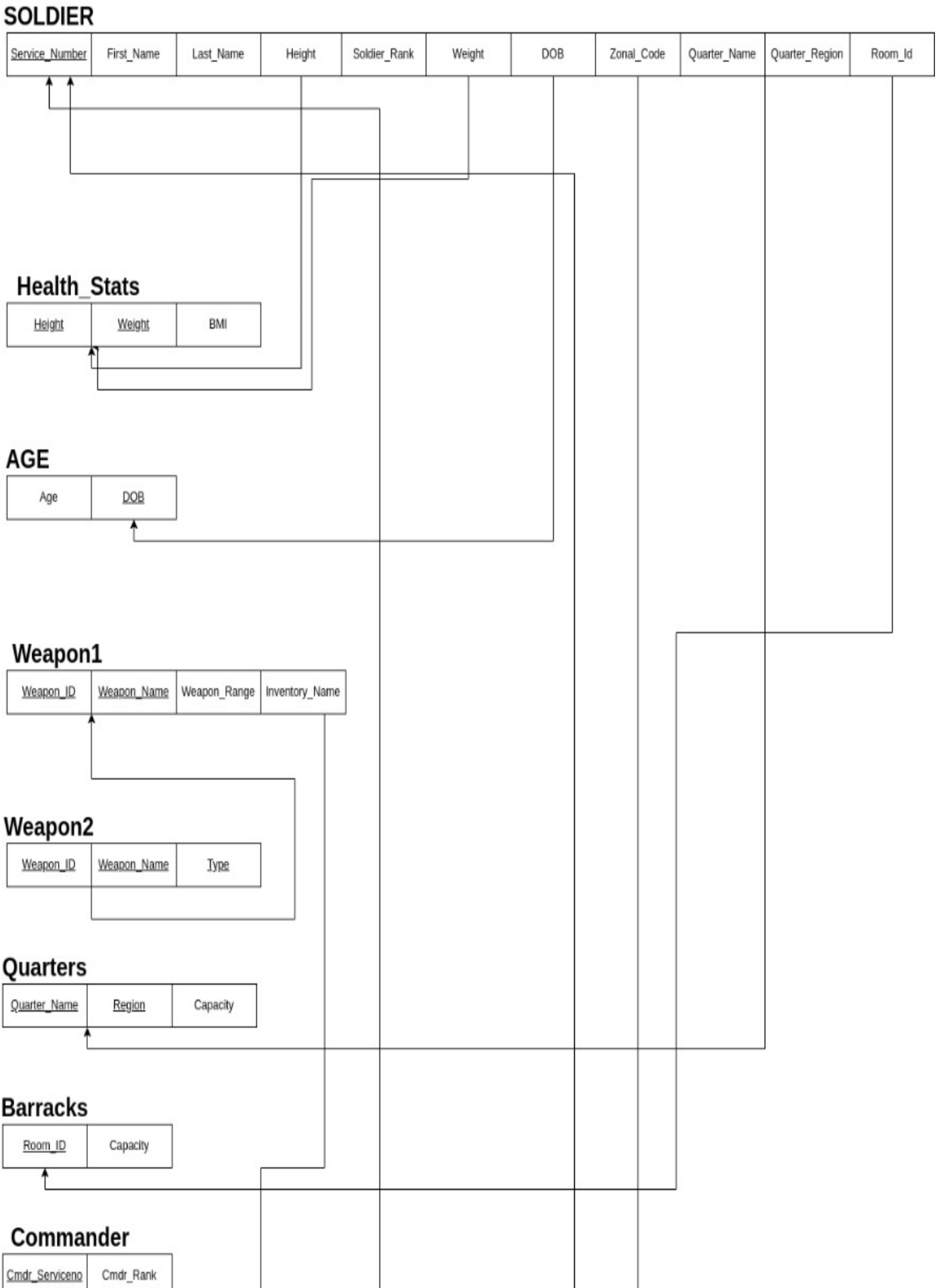


Hence it should be changed and the whole relational model looks as follows


SOLDIER
Service_Number
First_Name
Last_Name
Height
Soldier_Rank
Weight
DOB
Zonal_Code
Quarter_Name
Quarter_Region
Room_Id
BMI
Age
Weapon1
Weapon_ID
Weapon_Name
Weapon_Range
Inventory_Name
Weapon2
Weapon_ID
Weapon_Name
Type
Quarters
Quarter_Name
Region
Capacity
Barracks
Room_ID
Capacity
Commander
Cmdr_Serviceno
Cmdr_Rank
Inventory
Inventory_Capacity
Inventory_Name
Zone
PIN_Code
Capacity
Zone_Name

Part 4: 3NF

BMI is fully functionally dependent on {Height,Weight} and {Height,Weight} is fully functionally dependent on Service_Number. This makes it a transitive dependency. So, a new table called HEALTH_STATS was made with the columns Height,Weight and BMI and BMI is removed from the original table. Similarly, Age is fully functionally dependent on DOB and DOB is fully functionally dependent on Service_Number. As there exists no transitive dependency in 3NF, we have to make a new table by removing Age in the original table. The new table is called AGE and has Age and DOB as the attributes.


SOLDIER
Service_Number
First_Name
Last_Name
Height
Soldier_Rank
Weight
DOB
Zonal_Code
Quarter_Name
Quarter_Region
Room_Id
Health_Stats
Height
Weight
BMI
AGE
Age
DOB
Weapon1
Weapon_ID
Weapon_Name
Weapon_Range
Inventory_Name
Weapon2
Weapon_ID
Weapon_Name
Type
Quarters
Quarter_Name
Region
Capacity
Barracks
Room_ID
Capacity
Commander
Cmdr_Serviceno
Cmdr_Rank

Missing parts in phase 2:

1. Foreign Key for soldier: {Quarter_Name,Quarter_Region} and Room_id
2. Foreign Key for Weapon: Inventory_Name
3. Composite attribute: dependent name.
4. Attribute for soldier: DOB
5. New attribute for Dependent: RelationwithSoldier.