

Schema:

username_password: (username, password, user_type)

chain: (stock_id, name, year_founded, ceo)

location: (address, city, state, zipcode, stock_id, manager_name, phone_no)

pharmacist: (username, name, location_address, location_zipcode, location_stock_id,
phone_no, salary, sex, hired_date, home_address)

hospital: (name, address, city, state, zipcode, phone_no)

doctor: (username, name, specialization, sex, phone_no, address, dob, hospital_name,
hospital_address, hospital_zipcode)

customer: (username, name, dob, phone_no, sex, address)

visits: (location_address, location_zipcode, location_stock_id, customer_username)

manufacturer: (stock_id, name, year_founded, ceo)

drug: (ndc, name, ingredients, side_effects, price, dosage, manufacturer_stock_id)

disease: (name, symptoms, disease_type)

treats: (disease_name, drug_ndc)

diagnosis: (customer_username, doctor_username, disease_name, diagnosis_date)

prescription: (customer_username, doctor_username, disease_name, diagnosis_date,
no_of_fills, fill_frequency)

prescribed: (ndc, customer_username, doctor_username, disease_name, diagnosis_date)

filled: (pharmacist_username, customer_username, doctor_username, disease_name,
diagnosis_date, filled_date)

stock: (address, zipcode, stock_id, drug_ndc, amount)

4NF analysis

username_password: Each username is unique, and every username is associated with one and only one password and user_type, so it doesn't contain MVD. username >> password, user_type. Since username is its primary key, it is in BCNF as well as 4NF.

chain: Each chain has its unique stock_id. stock_id >> name, year_founded, ceo. Each chain has only one name, year_founded and ceo, so it doesn't contain MVD. Thus it is in BCNF as well as 4NF.

location: Address, zipcode, stock_id >> city, state, manager_name, phone_no. So it is in BCNF and since it doesn't contain MVD, it is also in 4NF.

pharmacist: username >> name, location_address, location_zipcode, location_stock_id, phone_no, salary, sex, hired_date, home_address. Thus it is in BCNF. Since it doesn't contain MVD, it is also in 4NF.

hospital: address, zipcode >> city, state, phone_no, name. It is in BCNF. Since it doesn't contain MVD, it is also in 4NF.

doctor: username >> name, specialization, sex, phone_no, address, dob, hospital_name, hospital_address, hospital_zipcode. It is in BCNF. Since it doesn't contain MVD, it is also in 4NF.

customer: username >> name, dob, phone_no, sex, address.

visits: Since every attribute is a key, it is in BCNF. Since it doesn't contain 4NF, it is in 4NF.

manufacturer: stock_id >> name, year_founded, ceo. It is in BCNF. Since it doesn't contain 4NF.

drug: Since ndc is the only key, ndc >> name, ingredients, side_effects, price, dosage, manufacturer_stock_id. It is in BCNF. Since it doesn't contain MVD, it is also in 4NF.

disease: Disease name is unique and name >> symptoms, disease_type. It is in BCNF. Since it doesn't contain MVD, it is also in 4NF.

treats: Since every attribute is a key and there are only two attributes, it is in BCNF and 4NF.

diagnosis: Since every attribute is a key, it is in BCNF. Since it doesn't contain MVD, it is in 4NF.

prescription: customer_username, doctor_username, disease_name, diagnosis_date >> no_of_fills, fill_frequency. Thus it is in BCNF. Since it doesn't contain MVD, it is in 4NF.

prescribed: Since every attribute is a key, it is in BCNF. Since it doesn't contain MVD, it is in 4NF.

filled: pharmacist_username, customer_username, doctor_username, disease_name, diagnosis_date >> filled_date. Therefore, it is in BCNF. Since it doesn't contain MVD, it is also in 4NF.

stock: address, zipcode, stock_id, drug_ndc >> amount. Therefore, it is in BCNF. Since it doesn't contain MVD, it is also in 4NF.