Assignment 8

Inference with FOL

1. Use Forward Chaining inference to show how it can be deduced that the city of Phoenix will have more CO2 produced in it due to the concrete glass building.

| Facts | Rules |
| --- | --- |
| MoreSunlightHeat(BuildingXYZ) | CGBuilding(x) ∧ In(x,c) ∧ In(c, Desert) ⇒ MoreSunlightHeat(x) |
| HigherTemperature(BuildingXYZ) | MoreSunlightHeat(x) ⇒ HigherTemperature(x) |
| UseAC(BuildingXYZ) | CGBuilding(x) ∧ HigherTemperature(x) ⇒ Use(x,AC) |
| MoreEnergy(BuildingXYZ) | HigherTemperature(x) ∧ Use(x,AC) ⇒ MoreEnergy(x) |
| ProduceMoreCO2(BuildingXYZ) | MoreEnergy(x) ∧ In(x,c) ∧ City(c) ∧ CGBuilding(x) ⇒ ProduceMoreCO2(c) |
| MoreCO2ProducedInIt(Phoenix) | ProduceMoreCO2(x) ∧ In(x,c) ⇒ MoreCO2ProducedInIt(c) |

* The city of Phoenix has a concrete, glass building called Building XYZ.
  + XYZ
  + Phoenix
  + CGBuilding(XYZ)
  + City(Phoenix)
  + In(XYZ, Phoenix)
* Phoenix is in a desert.
  + Desert
  + In(Phoenix, Desert)
* Cities in deserts have more sunlight and heat.
  + In(x, Desert) ⇒ MoreSunlightHeat(x)
* A concrete and glass building that is in a desert city receives more sunlight and heat.
  + CGBuilding(x) ∧ In(x,c) ∧ In(c, Desert) ⇒ MoreSunlightHeat(x)
* The more sunlight and heat a concrete and glass building receives, the higher its inner temperature becomes.
  + MoreSunlightHeat(x) ⇒ HigherTemperature(x)
* Concrete glass buildings with high temperature use AC to lower the temperature.
  + CGBuilding(x) ∧ HigherTemperature(x) ⇒ Use(x,AC)
* When a building has higher temperature and uses the AC, it consumes more energy.
  + HigherTemperature(x) ∧ Use(x,AC) ⇒ MoreEnergy(x)
* When the building consumes more energy, it produces more carbon dioxide.
  + MoreEnergy(x) ∧ In(x,c) ∧ City(c) ∧ CGBuilding(x) ⇒ ProduceMoreCO2(c)