1. What is a fuzzy rule base system?

A fuzzy rule base system is basically a problem solver, which uses Fuzzy Logic, which can also be referred to as multi-valued logic. Fuzzy logic makes use of IF THEN statements:

IF something happens THEN do this action

However, this can be advanced further:

IF something happens AND/OR something else happens THEN do this action

The use of these IF THEN statements allows fuzzy logic to reason with the real world and create outcomes based on this reasoning. Because of this, we can make real world outcomes without even having to use any maths at all. For each rule in a rule base, it adds more knowledge about the corresponding mappings from the real world, into the model we created to reason with. Rules can be simple or complicated to fit the needs of the system.

A simple rule can be for example:

IF the room is hot AND the windows are closed THEN turn on the air-conditioning

For this rule, we can compare it with simple Boolean logic Hot ^ Closed 🡪 AirCon(On). This can show us how we could create a system that could tell us if we need to have the air-conditioning on or off. From this, we also must take into account conditions where the Air-conditioning would be off, for example if the room is cold and the windows are open, so we would have to create more than one rule to represent all possible outcomes with all possible conditions in our system.