1 Important Points about Rule-based Systems

1.1 Separation of Knowledge and Control

One of the most important aspects of rule-based systems is the separation of the knowledge (assertions + rules), from the control (procedures by which we find new conclusions from what we currently know). The control can be implemented via forward or backward chaining. The rules helps us add new assertions to the working memory in deduction systems, or add and delete assertions in production systems. Here is a figure that illustrates this point.

1.2 Why and How

Recall that by using a goal (and/or) tree, rule-based systems can answer questions about their behavior. In the ZOOKEEPER example we saw during recitation, you may ask the questions: Why did you show that Stretch was an ungulate? How did you show it?
1.3 Some Limitations

One limitation of rule-based systems is that they cannot conclude new assertions or handle questions outside their domain of expertise. Humans, on the other hand, can use their experience to transfer what they know about a problem to solve other similar problems.

Another limitation of the type of rule-based systems we saw in class is that they cannot handle uncertainty. For instance, in some cases we might want to state: “If A then often B.” Rule-based systems have been extended to try to handle such cases by using some numeric value quantifying the strength of the rule. This is sometimes given in terms of a probability value.