Chapter 8: Introduction to Rules-Based Systems

In this chapter, we'll look at one of the original symbolic AI systems, the knowledge-based system. These systems are also called expert systems (or production systems), where knowledge is encoded in rules. Knowledge (or facts) is stored in a working memory, and the rules are applied to the knowledge to create more knowledge. This process continues until some goal state is reached. We'll investigate a simple rules-based system in this chapter along with an application in the domain of fault tolerance.

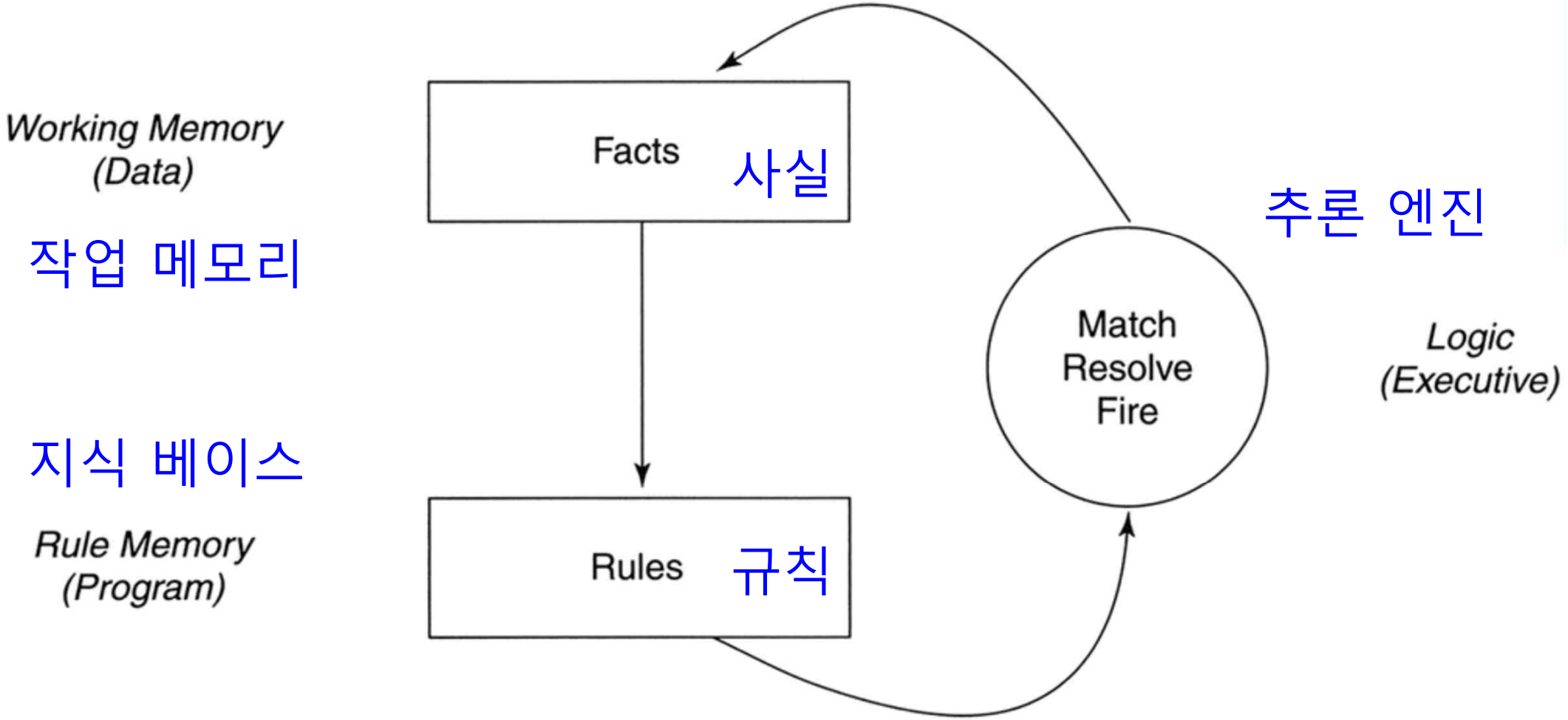
Introduction

연역 시스템

While a number of different types of rules-based systems exist, we'll focus on a combination of two particular kinds called the deduction system and the reaction system. A deduction system consists of rules representing antecedents and consequents. An antecedent is a condition (an "if" statement, if you will) while the consequent represents the resulting action (the "then" portion). By deduction, the rules insert new facts into the working memory that were "deduced" (reasoned by deduction) from the existing working memory by a given rule. A reaction system includes "actions" that are performed as part of the consequent, such as issuing a command in an embedded system to alter the environment.

반응 시스템

8장 규칙 기반 (전문가) 시스템, Anatomy of a Rules-Based System



Backward Chaining 역방향 추론

The backward chaining system is an inference strategy that begins with a hypothesis (a goal state) and works backwards through the rules to generate a new hypothesis and ultimately the currently known set of facts. By arriving at the initial set of facts from the hypothesis, the hypothesis is proven. 가설 증명

Forward Chaining 전방향 추론

The forward chaining system is an inference strategy that begins with known facts. The rules memory is then consulted to identify the rules that match the given set of facts, which may introduce new facts into the working memory. This process continues until either no new facts may be derived, or a goal state is reached. This is a deduction process, which simply uses the known facts to flow through the working memory (and rules) to generate new facts.

새로운 사실 생성

This chapter will focus on forward chaining in both the examples and sample implementation.

8장 규칙 기반 (전문가) 시스템, Phases of a Rules-Based System, 처리 단계

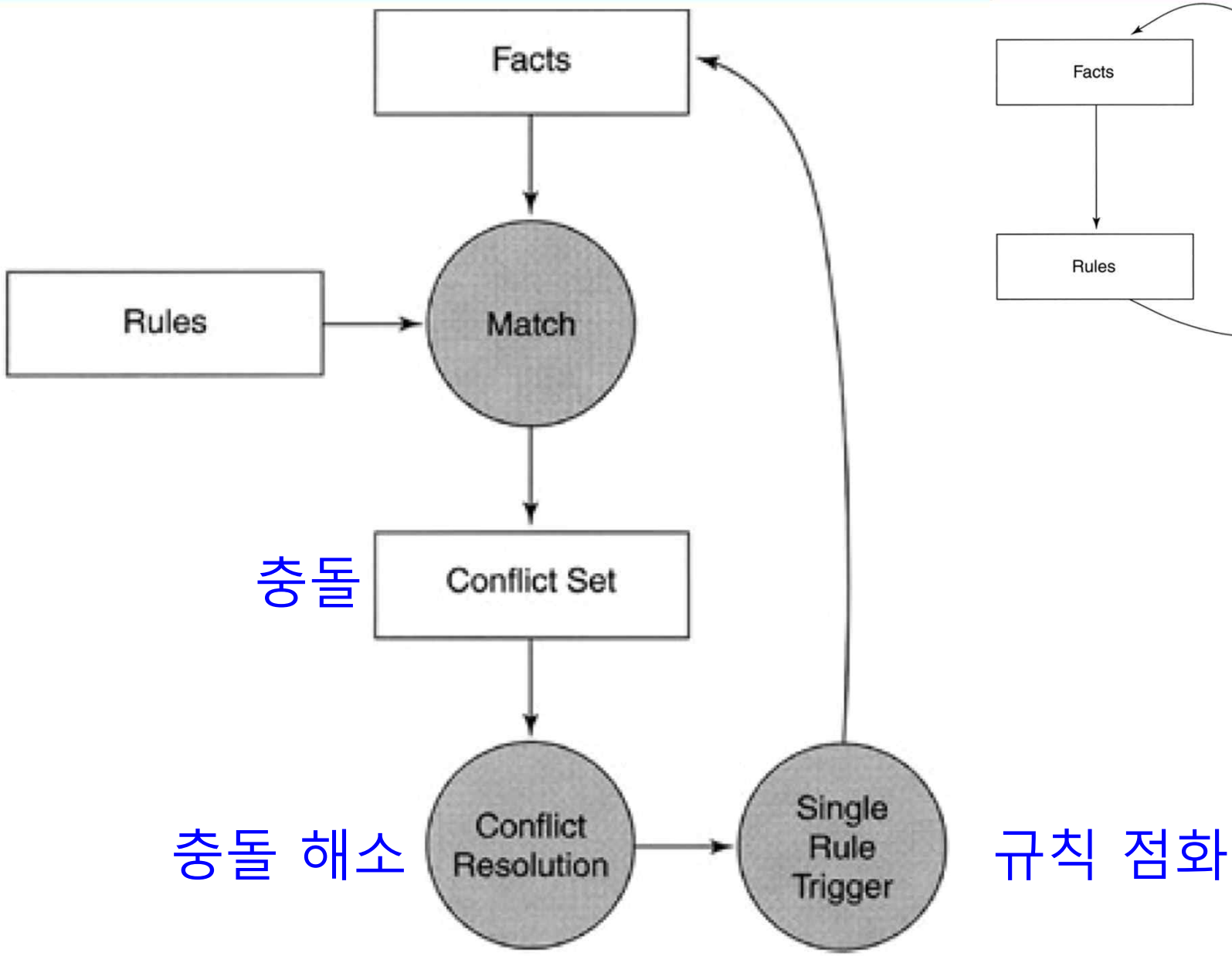


Figure 8.2: Rules-based system phases.