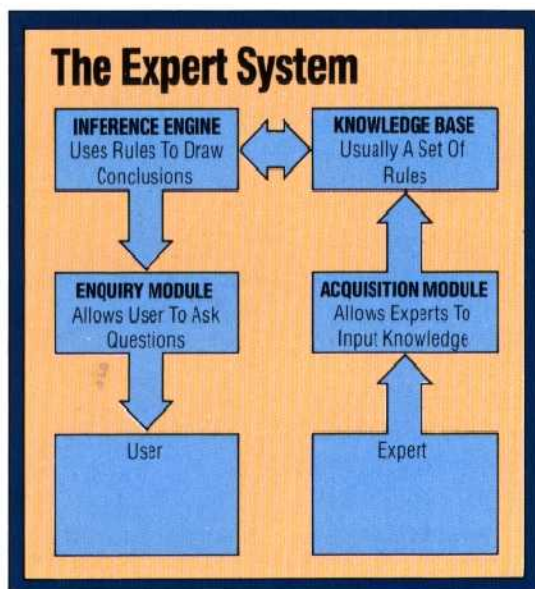
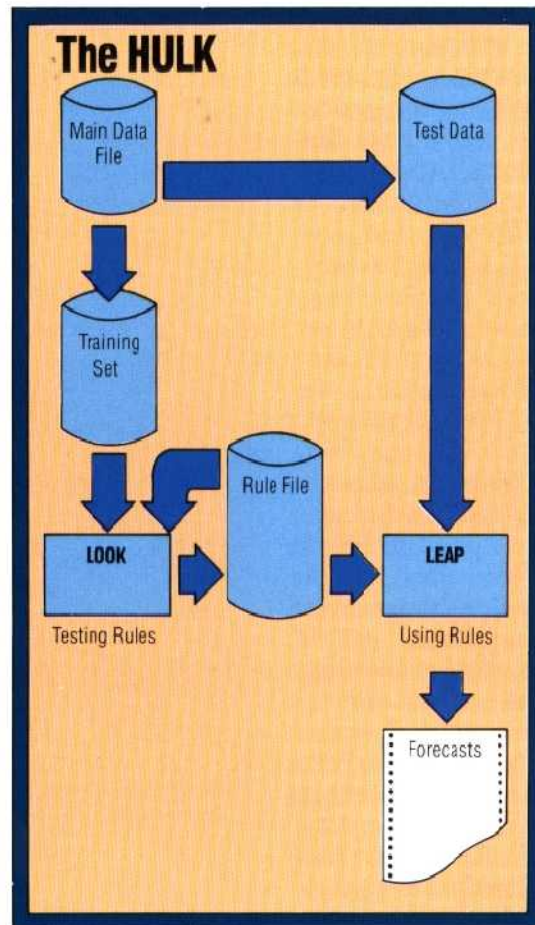


THE AMAZING HULK

The word *engineering* is undergoing a shift in meaning. In the 19th century an engineer was someone like Brunel (1806–59), who transformed iron and steel into ships and bridges. Nowadays the term has been appropriated by a variety of deskbound professions engaged in ‘engineering’ raw materials such as ‘knowledge’.



A knowledge engineer is someone who knows how to build an *expert system*. An expert system (often abbreviated to ES) embodies organised knowledge about some area of human expertise. Consider, for example, the case of medical diagnosis: a doctor has a large store of factual knowledge about illnesses and their signs and symptoms — the doctor's expertise lies in the ability to relate a patient's condition to the textbook descriptions of typical conditions. In doing this, the doctor establishes which symptoms are present and weighs their significance against that of the absent symptoms, all in the light of past experience of other patients with these symptoms and/or the suspected illness. The better the doctor is at combining textbook knowledge with actual observations, the better the diagnostic technique will be. The limiting factors are the ability to remember organised data, the ability to relate observed cases to the pattern of existing data, and the ability to apply this knowledge in cases where the data is incomplete or does not quite match previous cases. These first two factors — organisation and classification of data — are what computers are good at; the last factor is what human experts are good at. If a computer system



Economy HULK

In a traditional expert system a series of IF...THEN rules, held in the knowledge base, are applied by the inference engine in response to users' enquiries entering the system via the enquiry module. The knowledge on which these rules are based is input to the system by experts via the acquisition module. With HULK a set of decision rules are built up from a main data file containing observations input by the user. Two separate programs are necessary: LOOK, which requires a training set of data for trying out rules and a test set of data for testing their usefulness, and LEAP, which uses the rule file and test data to produce a probability forecast. HULK has been described as a poor man's expert system.

can substitute statistical analysis for the human expert's 'feel' or 'flair', then its superior data-organising powers may enable it to out-perform an expert.

Such systems are most relevant where human judgement is needed because a complete theory does not exist, as in medical diagnosis. They can also be usefully applied where, even though the requisite knowledge is publicly available and completely organised, it is too complex for most people to apply (for example, tax legislation or the regulations determining entitlement to social



Practical Project

The HULK was initially conceived of as a practical project by Richard Forsyth for his post-graduate diploma students at the Polytechnic of North London. Although the program was only two weeks in the writing, a further six months were necessary improving and refining it in terms of 'user-friendliness'. A QL version is promised in the near future.