Artificial intelligence

The bulk of current Artificial Intelligence research is focused on methods for achieving goals within partially understood environments. In such environments the bodies of knowledge which exist are quite varied; some are systematic and well validated, others are judgemental. Characteristically, there are no known optimal ways of applying the knowledge in the environment to achieve the desired goals. The challenge of AI is to develop methods for handling problems in such environments and to aid the development of a better understanding of these environments, which may in turn lead to more powerful ways of achieving goals within it.

The development of Artificial Intelligence has been marked by two rather distinct periods. In the first, the basic structure of the field emerged, centered on the notion of general purpose mechanisms and general-purpose problem solvers, theorem provers, and semantic nets. Once the limitations of such general purpose mechanisms were generally recognized, the second period of development began. It was, and is, marked by the attempt to incorporate and effectively utilize special purpose knowledge appropriate for some task. Issues such as acquiring such special purpose knowledge from experts, representing it in a useful form, and effectively using it to control a problem solving activity became paramount.

These NCC sessions will focus on this latter period through two invited papers. The first, presented by Professor Edward Feigenbaum, chronicles the development of the specialized knowledge period through the activities of the Stanford Heuristic Programming Project which has long been a leader in the development of expert-level performance programs. The second invited paper is the lecture presented by Professor Douglas Lenat upon his selection for the 1977 Computers and Thought Lecture for outstanding contributions by a young researcher to Artificial Intelligence. Lenat's talk and research describe a system for discovering new mathematical concepts and conjectures involving those concepts. This fascinating work indicates the potential feasibility of providing operational models of the process of mathematical discovery.

These two invited papers, which comprise the first AI session, will surely initiate a rash of questions. Therefore, they will immediately be followed by a
session entirely devoted to answering questions from the audience on these and other AI issues. Joining Feigenbaum and Lenat on the panel of AI experts will be Professors Raj Reddy and Saul Amarel, and Dr. Peter Hart. The final session will present several state-of-the-art applications which have achieved expert-level performance.