

SCHOOL OF ARTIFICIAL INTELLIGENCE

INTERNAL MEMORANDUM

To: DM, Maarten van Emden, Robert Ross, Soei Tien Tan, Dave Warren  
From: Austin Tate  
Date: 19th November, 1973  
Subject: KNOWLEDGE PROJECT MEETING OF TUESDAY, 20TH NOVEMBER AT 2.30 P.M.

I have been specifying (though not yet implementing) a system which is basically a means-end driven problem-solver which makes the provisional assumption:-

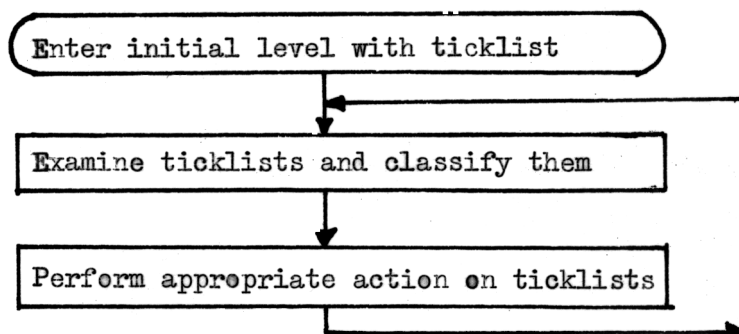
If there are many simultaneous (AND) goals, these can usually be achieved independently, and without interaction when they are arranged in some order.

Such an assumption is true in all problems of the STRIPS type. However, the system differs from STRIPS, and more closely resembles HACKER, in that when the above assumption is shown not to hold, a summary of the cause of this is made to the system. Knowing why a particular approach to a solution failed may enable the system to specify a probably useful approach to the problem.

The search for a situation in which the goals are true is split into two parts (as STRIPS):-

- i) the search across a space of situations by finding appropriate action sequences
- ii) the question-answering within any one particular situation. For efficiency different mechanisms can be used for these widely differing tasks.

The search for an action sequence is recorded in a tree in which arcs are actions and nodes are "levels". The main data structure of a "level" is a "ticklist". A ticklist keeps a record of which goals or subgoals (which act as preconditions for actions) have been shown to be true or false in some situations, and holds the action sequences which have been found to transform situations into others. The top level flow of control of the search mechanism is:-



Thus the effects of the system can be specified by writing a set of pairs of a function which recognizes some pattern of ticks and crosses in a ticklist, and a function which edits the ticklists if the classification function works.

It would be possible to write many different problems solvers using this formulation. The system I have specified, which I believe can cope with the main point of the Keys and Boxes problem, is just one example.

In my talk I hope to describe the particular problem solver I have considered and work through a couple of examples. An understanding of STRIPS would be useful.