FORMULATING AND SOLVING CSPs
Section Handout - CS 188

PROBLEM
Courtesy of Martha Palmer, Ph.D., from University of Colorado, Boulder

Tony has his birthday party at Chuck E. Cheese's. Aside from playing lots of video games and eating lots of pizza, he and his guests had a private room with four games all to themselves. Each of the four games was a table game that was arranged along one wall of the room. Table 1 is on the far left, table 2 is next to it, table 3 is next, and table 4 is the farthest to the right (see the diagram).

Left-to-right arrangement of tables:

TABLE 1   TABLE 2   TABLE 3   TABLE 4

You have to decide what game and what person is at each of the four tables based on the following facts:
1. Tony and his three best friends (Steven, Donna, and Randy) were each at a different table.
2. There's only one game (foosball, billiards, air hockey, ping-pong) at each table.
3. The game at table 1 is foosball, and it is not being played by Steven.
4. The billiards table is somewhere to the left of the air hockey table.
5. Randy is playing the game at table 2 or table 4.
6. The ping-pong table is two tables to the left of where Donna is playing.

SOLUTION

FORMULATE AS A CONSTRAINT SATISFACTION PROBLEM
Variables –

Constraints –

BACKTRACKING SEARCH
For each constraint propagation procedure below, diagram the steps that the backtracking search algorithm would take to solve this problem. Use the Minimum Remaining Values (MRV) and Least Constraining Value (LCV) heuristics to guide your search.

1. Backtracking search with Forward Checking

2. Backtracking search with Arc Consistency (Use back)