

(as opposed to processed) agent data is saved onto database, thus, on playback, any relevant statistic can be recreated.

## 5.6 An Extended Example

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Returning to Figure 8, while each tool described above is useful as a debugging aid when used in isolation, when used in combination with the other tools they provide even greater debugging and analysis support by giving the user a multi-perspective viewpoint of the agents' behaviour. By way of illustration, an extended example of using different tools to assess different aspects of agents' behaviour in a debugging problem is described below.

Consider a multi-agent society comprising seven agents A-G as shown in Figure 8. The user believes that the agents have been configured such that given job J to agent A, the decomposition of the job across the society would proceed as illustrated; i.e. J1 to agent B, J2 to agent C, J12 to agent D etc. However, when job J is given to agent A, it reports a failure in planning out the job.

To debug this problem, the user might for example use the society tool, particularly the message storage, video-style playback and filter facilities to review the coordination activities of agents when job J was presented to agent A. The user notes, for example, that as expected, agent A sends out a request (*Propose* message) to agent B to achieve J1 and another request (*Propose* message) to agent C to achieve J2. Again, as expected agent B sends out a request to agent D to achieve J12. Agent C however sends out no requests, although it had been expected to send out three.

In a rerun of the scenario, using the micro tool to view the internals of agent C, it is noted from the trace of its coordination graph for job J2 that J2 was successfully decomposed into J21, J22 and J23, but the coordination process failed when no candidate agents could be found to subcontract J22 to. Using the control monitor tool to review the organisational relations and knowledge of agent C, it is noted that no entries specifying agents that could achieve J22 were listed in agent C's organisational knowledge-base — thus, an entry is added to agent C's organisational knowledge-base to fix this 'bug'.