1981 Winter Simulation Conference Proceedings
T.I. Ören, C.M. Delfosse, C.M. Shub (Eds.)

ADVANCED TOPICS IN SLAM

A. Alan B. Pritsker

Pritsker & Associates, Inc.
P.O. Box 2413
West Lafayette, In. 47906

In 1979, the state-of-the-art in simulation languages was extended with the introduction of SLAM,™ the first language that provided three different modeling viewpoints in a single integrated framework.(5) SLAM permits discrete event, continuous, and network modeling perspectives and/or any combination of the three to be implemented in a single model. SLAM represented a significant breakthrough in simulation methods development, as it provided the flexibility to use the most appropriate world view for the system being studied. This improved upon the more traditional situation in which simulation modelers were restricted to the modeling perspective embodied in the language they were using.

The success of this new approach was readily apparent. In 1980 alone, SLAM was installed by more than 100 industrial, academic, and governmental organizations. This response by the simulation community was evidence that SLAM met the needs of practicing simulation modelers by:

* making it possible to model a wider variety of systems using the most effective modeling perspective;
* allowing rapid model development using network modeling concepts; and
* supporting models that combine modeling perspectives through well-defined, carefully designed interfaces.

However, as experience with the use of SLAM increased, the need for enhanced capabilities within SLAM became apparent. For this reason, Pritsker & Associates, Inc. has refined and expanded SLAM capabilities to produce SLAM II™.

SLAM's modeling power and flexibility have been enhanced by adding several functional capabilities. Specifically, SLAM will now:

* compute statistics on GATE status automatically;
* permit blocking or balking from AWAIT nodes;
* allow user-provided resource allocation strategies at AWAIT nodes, replacing complicated network construction by user-coded logic;
* detect crossing of threshold values by variables whose values change discretely over time;
* permit user-provided SELECT criteria for queues and servers (when SLAM selection rules do not suffice); and
* compute statistics on resource availability.

SLAM's input error messages have been improved. These improvements will expedite the modeling and debugging process and allow the modeler to more quickly move to the task of system evaluation.

SLAM has been upgraded to include a binary search algorithm that improves the efficiency in performing file manipulations for large problems.(3,4) The technique has been shown to significantly reduce processing time in most cases. In addition, SLAM now employs linear interpolation to reduce the processing time required to detect threshold crossings of continuous variables.

Output reporting flexibility has been increased with the addition of optional 72 column output allowing the convenient use of all computer terminals. In addition, SLAM now provides an automated interface with SIMCHART, an interactive computer graphics package also available from Pritsker & Associates. SLAM will generate simulation data that can be used by SIMCHART to prepare graphics plots, histograms, pie charts, and pie graphs. (1)

81CH1709-5/81/0000-0197$00.75

In summary, SLAM has been improved to provide additional efficiencies in the simulation modeling process. Ease of model design, speed of implementation, and clarity of outputs are all enhanced. With these additions, the application of SLAM can result in lower development costs, shorter run times, and lower computing costs.

All improvements made to SLAM have been made so that existing SLAM models are upwards compatible. That is, all models that previously executed in SLAM can be run in SLAM II without any changes. The SLAM user simply adds data cards or additional user code to invoke the new capabilities. With this design, the existing user can upgrade his or her modeling efficiency with little or no loss in time.(2)

REFERENCES

1. Duket, S.D., A.F. Hixson, and L. Rolston (1981) The SIMCHART User's Manual, West Lafayette, Indiana: Pritsker & Associates.

2. Duket, S.D., J.J. O'Reilly, and R.J. Hannan (1981), SLAM II™ Enhanced Simulation Capabilities, West Lafayette, Indiana Pritsker & Associates.

3. Henriksen, J.O. (1977) An Improved Events List Algorithm, Proceedings of the Winter Simulation Conference, pp 554-557.

4. McCormack, W.M. and R.G. Sargent, Analysis of Future Event Set Algorithms for Discrete Event Simulation; To be published in COMMUNICATIONS of the ACM (Association for Computing Machinery).

5. Pritsker, A.A.B. and C.D. Pegden (1979) Introduction to Simulation and SLAM, West Lafayette, Indian: Systems Publishing Company.