Stochastic Simulation
Simulation software

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Simulation languages

One way to understand/view/illustrate the importance of the field is through the abundance of commercially available simulation packages

- General purpose simulation languages
  - Arena - commercial
  - Enterprise Dynamics - commercial
  - SAS - Simulation Studio
- Dedicated software
  - Vissim, Paramics, AIMSUN (Road traffic simulation)
  - Opnet (Simulation of communication systems TCP/IP)
Desirable software features (from Law and Kelton)

- General capabilities (including modeling flexibility and ease of use)
- Hardware and software considerations
- Animation
- Statistical features
- Customer support and documentation
- Output reports and plots
General capabilities

- Modelling flexibility
- Ease of use
- Hierarchy
- Debugging aids
- Execution speed
- Possibility for constructing user-friendly “front ends”
- Data import
- Possibility for writing external routines
Hardware and software considerations

- What computer platforms the software is available for
- Compatible across platforms
- RAM required
- Supported operating systems
Animation

- Communicating the essence of a simulation model also to non-technical people
- Debugging
- Showing that a model is not valid
- Suggesting improved operational procedures for a system (triggering your powerful neural network!)
- Training operational personnel
- Promoting communication among the project team
**Statistical capabilities**

- Good random number generator(s)
- Standard probability distributions
  - Normal, exponential, geometric, Poisson, gamma, Weibull, empirical, ...
- Independent replications
- Automatic generation of confidence intervals
- Determine value of warmup period
Customer support and documentation

- Public training (courses)
- Customized training
- Technical support
- Good documentation
Output report and graphics

- Standard reports
- Customized reports
- Histograms
- Time plots
General-purpose simulation packages

- Arena
- Extend
- GPSS
- Simula
- ...
Miscellaneous

- AMS - semiconductor planning
- Call Center SIMUL III - Call center work force staffing
- COMNET - Data communications, telecommunications, network design, network planning
- MIDSIM - Transportation, air traffic, military, logistics, telecommunications
Traffic simulation

- Vissim, Germany commercial
- Paramics, UK commercial
- Aimsun, Spain commercial
- MITSIM, MIT research
- many more ...

Health

- MedModel
- Micro Saint