Modeling and Simulation

Dr. G.H.J. Lanel

Lecture 1

Outline

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What is A model?

A representation of an object, a system, or an idea in some form other than that of the entity itself.
(Shannon)

Types of Models:

- **Physical:** Scale models, prototype plants, . . .
- **Mathematical:** Analytical queuing models, linear programs, simulation.

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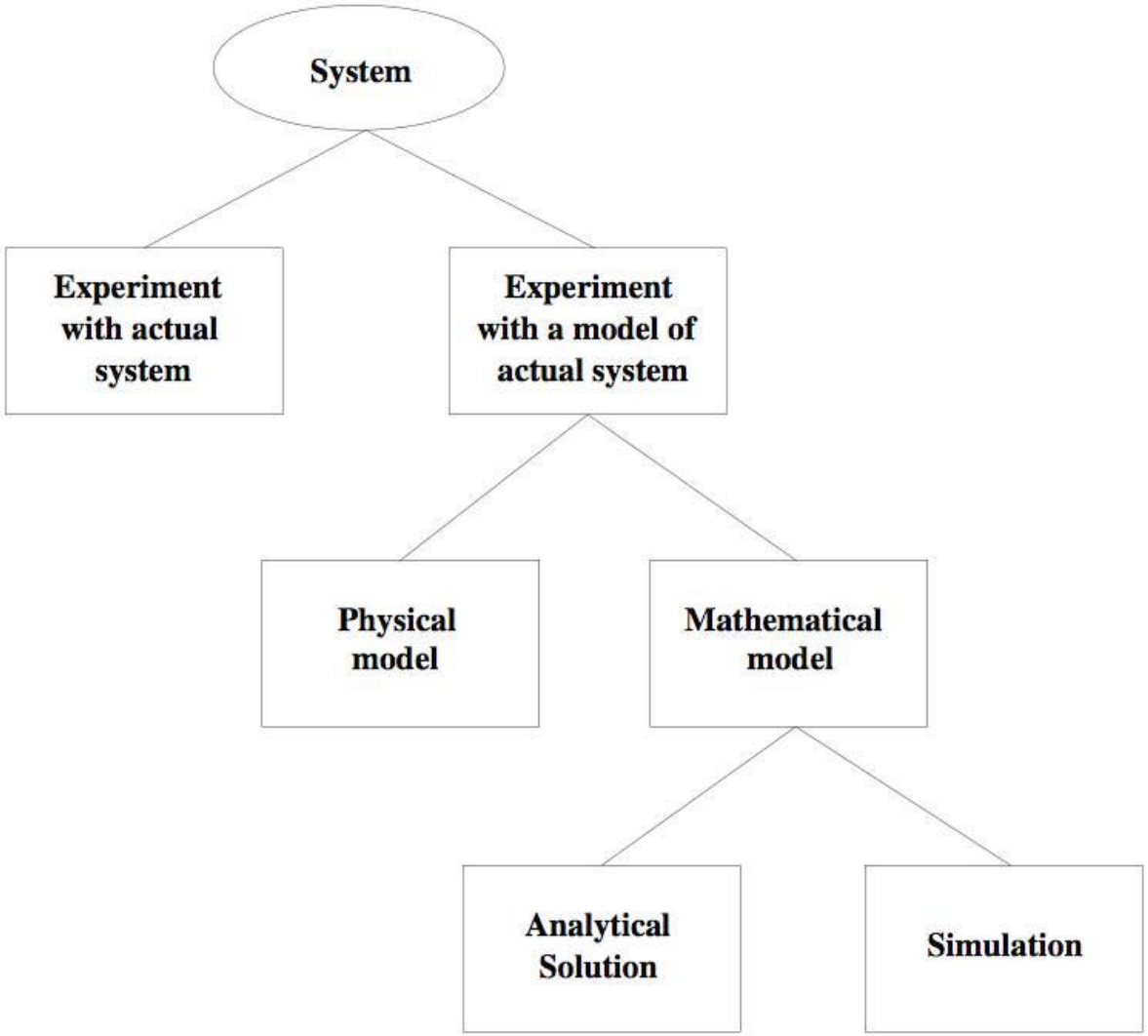

What is Simulation?

- A simulation of a system is the operation of a model, which is a representation of that system.
- The model is amenable to manipulation which would be impossible, too expensive, or too impractical to perform on the system which it portrays.
- The operation of the model can be studied, and, from this, properties concerning the behavior of the actual system can be inferred.

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- Designing and analyzing manufacturing systems.
- Evaluating H/W and S/W requirements for a computer system.
- Evaluating a new military weapons system or tactics.
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Steps in Simulation and Model building:

1. Define an achievable goal.
2. Put together a complete mix of skills on the team.
3. Involve the end-user.
4. Choose the appropriate simulation tools.
5. Model the appropriate level(s) of detail.
6. Start early to collect the necessary input data.

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8. Develop a plan for adequate model verification. (Did we get the "right answers?")
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- System analyst skills (model formulation).
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- Does anyone believe the results?
- Will anyone put the results into action?
- The end-user (your customer) can (and must) do all of the above BUT, first he must be convinced!
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  - Little or no additional software cost.
  - Universally available (portable).
  - No additional training (Everybody knows(language X)!)
- Disadvantages:
  - Every model starts from scratch.
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- PASCAL: Not as universal as FORTRAN
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  - Interpretive Execution
  - FORTRAN-based (Help blocks)
  - World-view: Transactions/Facilities
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  - No programming–minimal errors in usage
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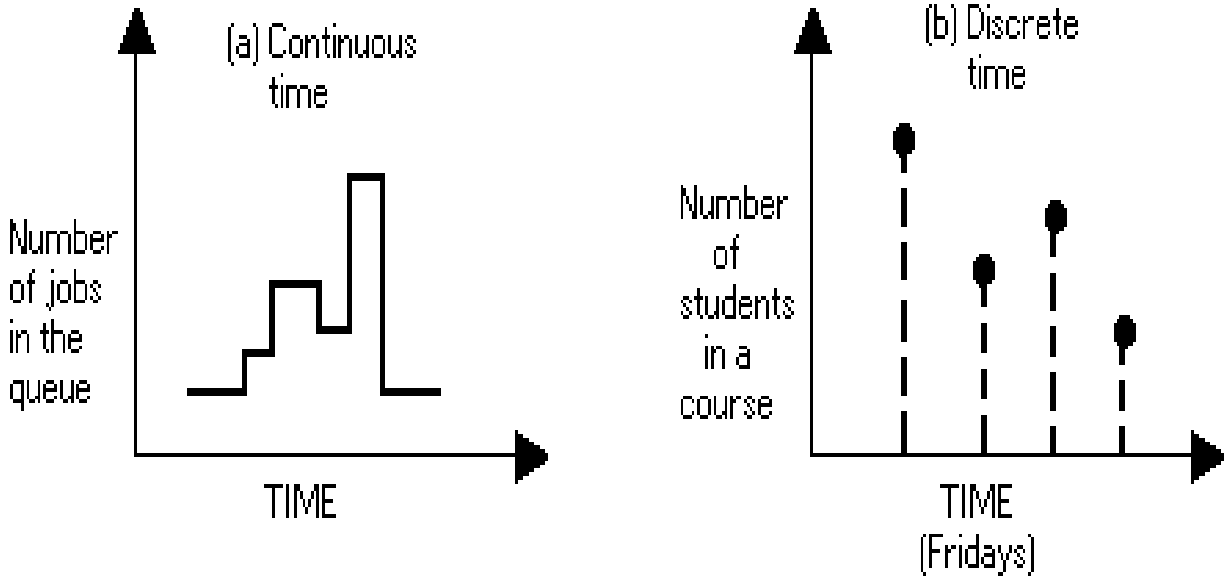

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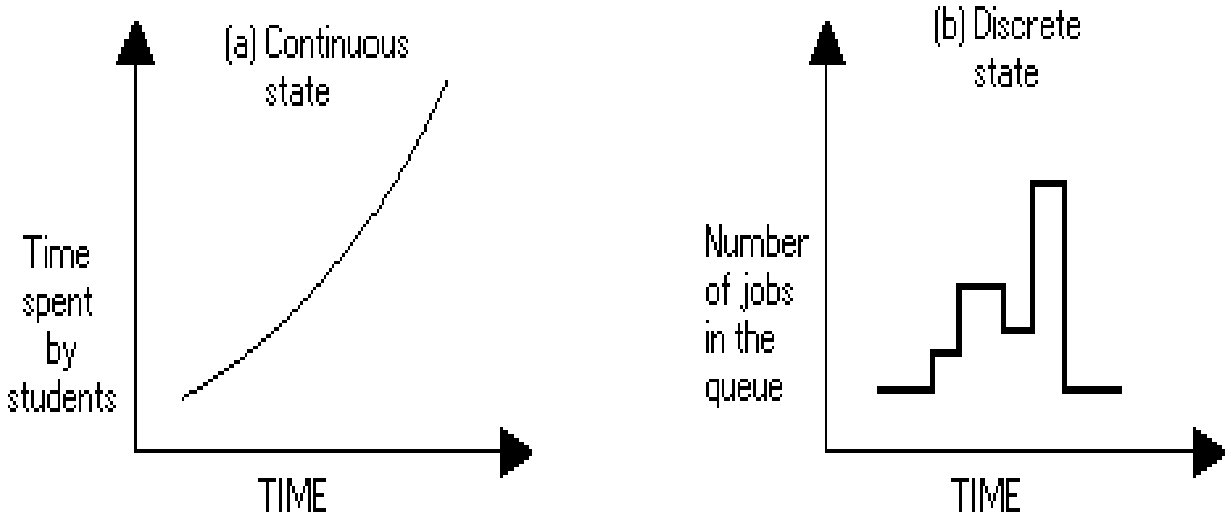

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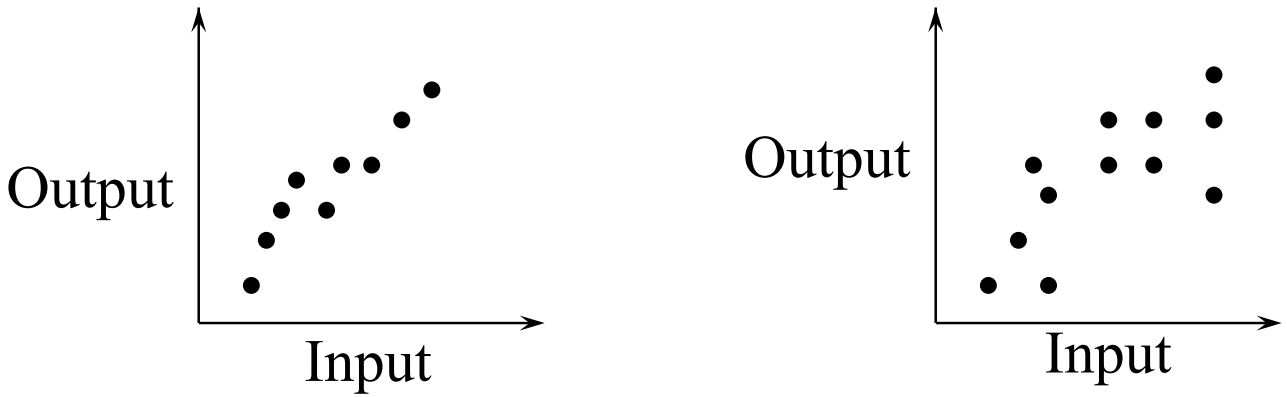

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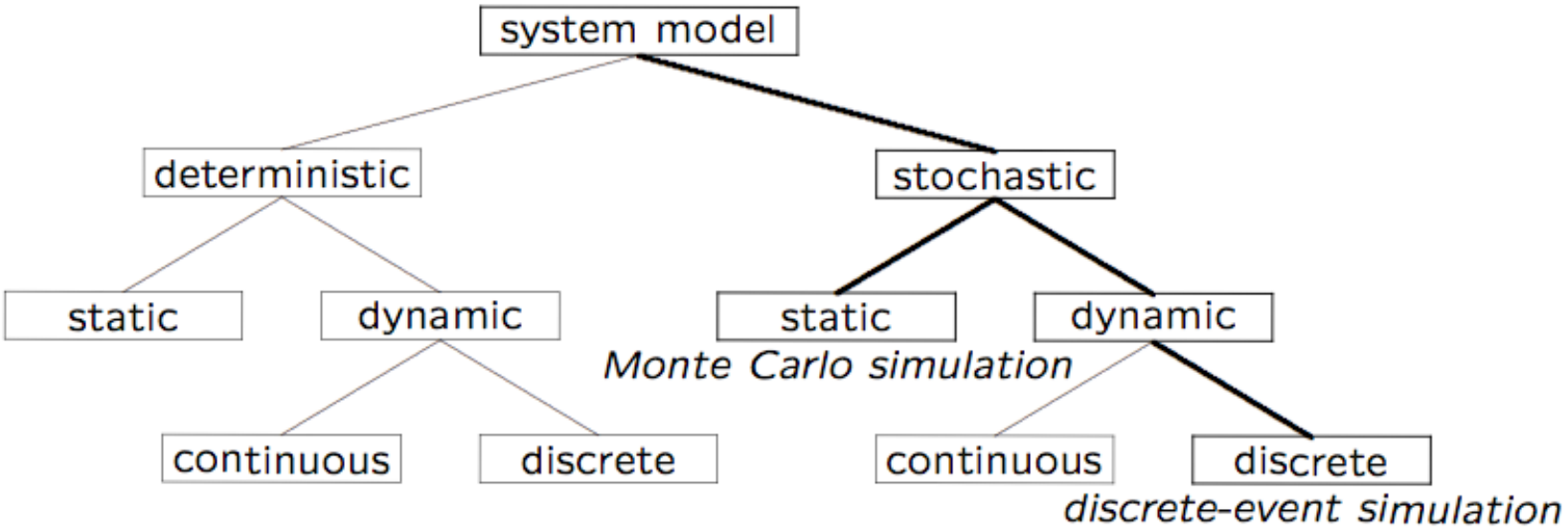

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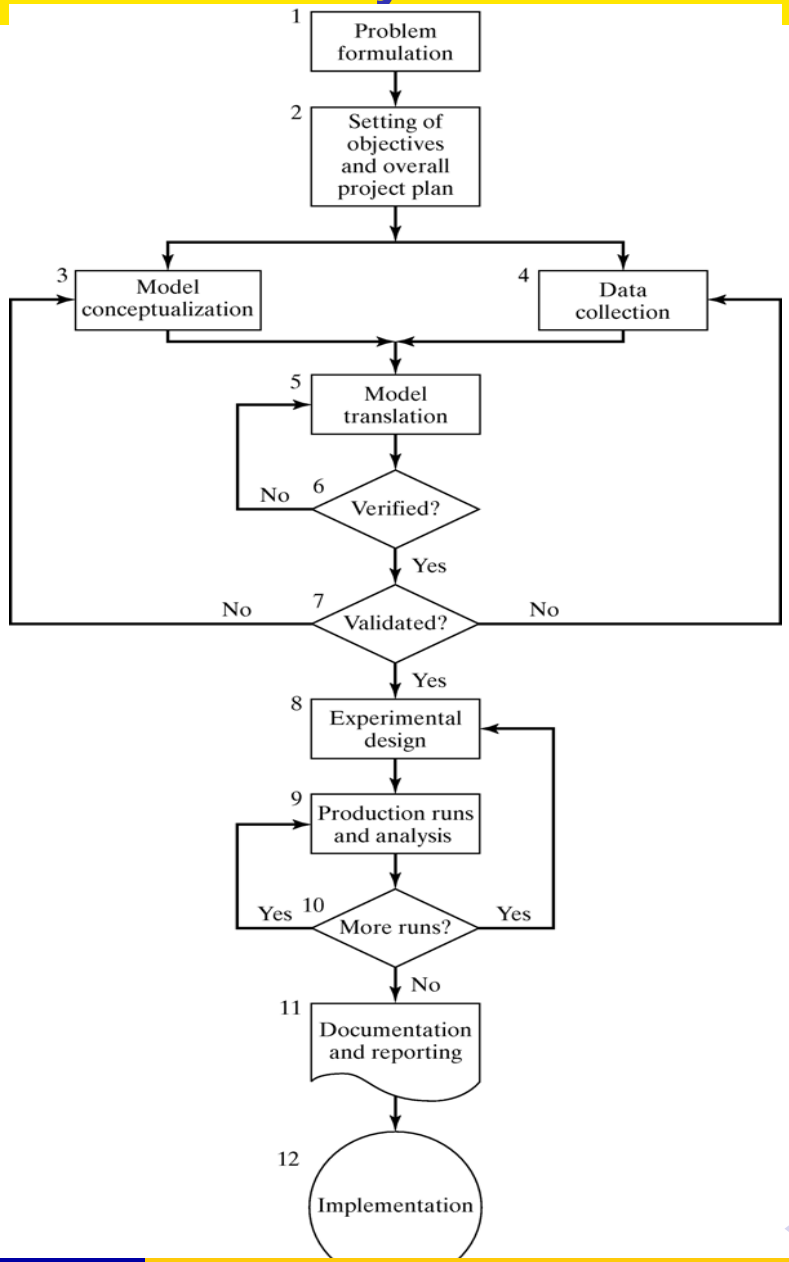

End!