

## CSCI 3352 – Test 1 Review Sheet

Basically, this test covers everything that we have done so far in the class. I'm listing those things out here along with the major points that I expect to put on the exam. I can't claim this list is exhaustive, but it can help give you some direction for studying. The format of the test is at least slightly in question though odds are good that it will resemble the quizzes with just more questions.

One of the big things here is that I should be able to ask you to build a model of something using a certain technique and you should be able to do it. The model doesn't have to be great, but it needs to follow the rules for that type of system.

- I. Observables and Statistics
  - A. Know the difference between differential and cumulative distributions. Know the advantages of disadvantages of each.
- II. Definition of a Model
  - A. Know the basic components of a model and how that becomes a simulation.
  - B. Part of this is the philosophy of modeling and how we picture the activity of a simulation.
- III. Serial Execution
  - A. Know the basics of both timestep methods and queued events. Know when you use each one and how you implement it in code.
- IV. Conceptual Models
  - A. This includes written descriptions, pictures, and concept graphs. Be able to translate between them and know what the weaknesses and strengths of conceptual models are.
- V. Declarative Modeling
  - A. Know what declarative models are and what types of systems lend themselves to declarative models.
  - B. State-Based Declarative Modeling
    - i. Understand FSAs, both deterministic and non-deterministic.
    - ii. Be able to translate a conceptual description or model to an FSA.
  - C. Event-Based Declarative Modeling
    - i. Know what these are and when you might use them.
  - D. Hybrid Declarative Modeling
    - i. Know what these are and the advantages they can have over the simpler declarative model styles.
- VI. Functional Modeling
  - A. Know what functional models are and when you want to use them.
  - B. Function Based
    - i. You need to know how to set up/draw a function based functional model.
    - ii. If given a description of a problem, possibly in equation format, be able to draw a model.
    - iii. Know what types of standard diagrams are examples of function based models.
  - C. Variable Based
    - i. Be able to run through an example of system dynamics or apply it on a sample problem.
- VII. Constraint Based Modeling
  - A. Difference Equations
  - B. Differential Equations
    - i. Understand how we solve differential equations by converting them to difference equations.
  - C. Physical Models
  - D. Graphs for Constraint Based Models
    - i. Read the page on Bond Graphs that I've linked to.