

Computer Simulation

CSCI 423

Fall Semesters

T, Th, 75 min

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Digital Simulation of Every Last Neuron in the Human Brain

By the year 2030 digital brains may be able to represent the inner workings of a single brain cell or even the whole brain.

A sim brain can act as a stand-in for the genuine article, thus fostering a new understanding of autism or permitting virtual drug trials...

www.scientificamerican.com/...

Computer Simulation Suggests Best Investment Strategy is a Random One

Counterintuitively, the random investing strategy was much less volatile than the others. In other words, while on a given day, the strategy might not gain as much as another, it wouldn't lose as much, either. The swings were much more manageable. That means, they conclude, "the random strategy is less risky than the considered standard trading strategies, while the average performance is almost identical..."

www.forbes.com/...

CSCI423 *Computer Simulation* is a 3 credit hour course in the CSM Computer Science curriculum and is an acceptable CSCI elective for majors and minors. Topics covered will include

- Pseudo RNGs¹: theory, design and tradeoffs
- Monte Carlo simulations
- Discrete Event simulations
- Stationary arrival time input modeling
- Random variates for non-invertable CDFs
- Non-stationary arrival time input modeling
- Non-trivial accept-reject schemes
- Statistical pitfalls of simulation results
- RNG streams for variance reduction in complex simulations
- Discrete and continuous RV truncation
- Formal learning groups: daily group work keeps you focused on the learning and accountable to your peers.
- Projects coded in **your** language of choice

Selected readings from the popular press² and journal articles may augment some topics.

Prerequisites: *Software Engineering* (CSCI 306), *Probability and Statistics* (MATH 323 or MATH 201), *Linux* (CSCI 210 or CSCI 274).

¹"The generation of random numbers is too important to be left to chance." — R. Coveyou

²OK, the popular "geeky" press — you don't get to read *People Magazine* for credit.

Assessment through non-trivial programming projects, three quizzes, a midterm exam and **either** a final exam or prescribed final project (**student's choice**).



Download this flyer from cs.mcprogramming.com/sim/ and see what you think about random investment with your own digital brain ;)