

Adaptive Behavior and Objectives

EES 4760/5760

Agent-Based & Individual-Based Computational Modeling

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Class #12: Monday, Feb. 19 2018

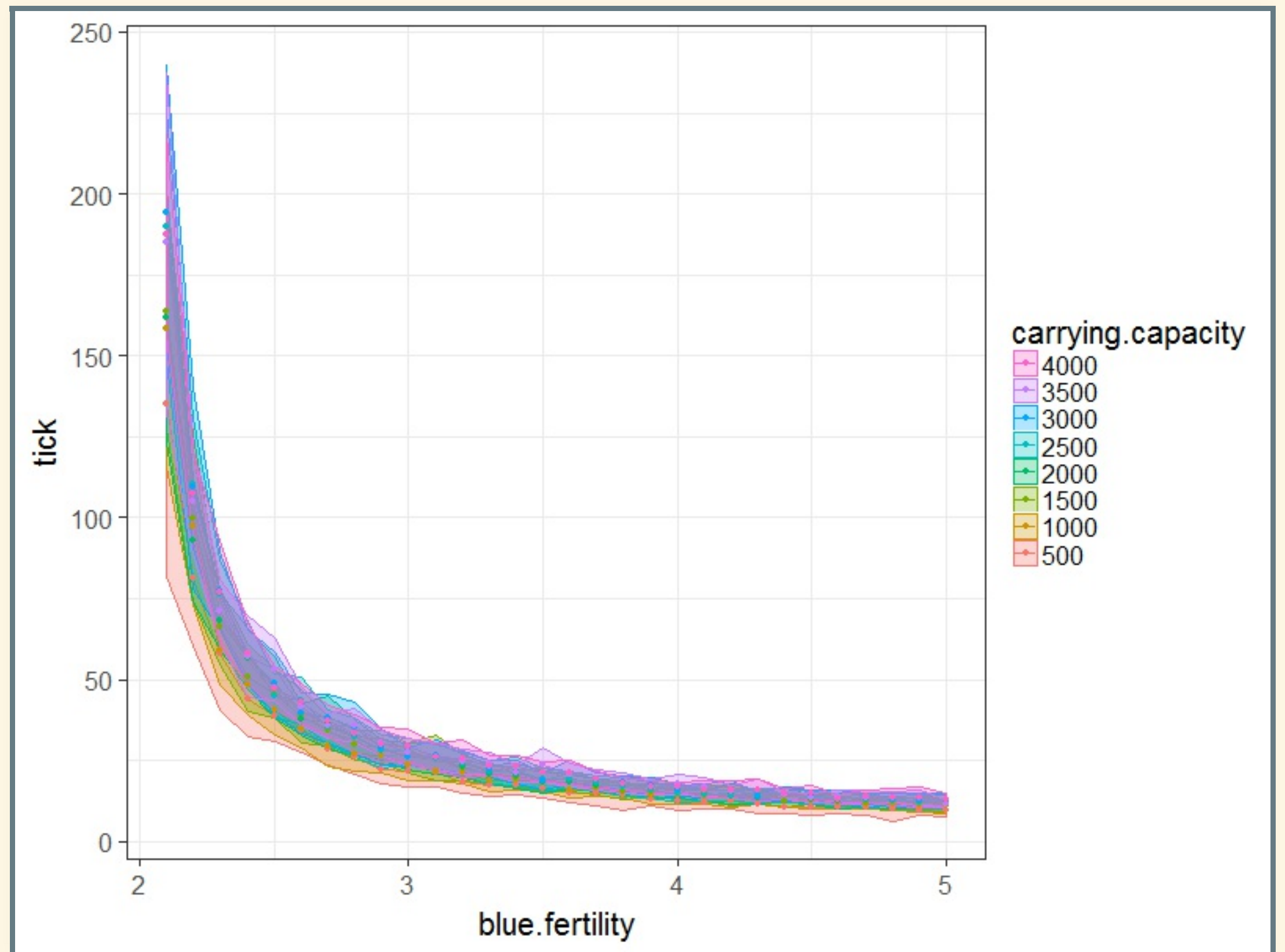
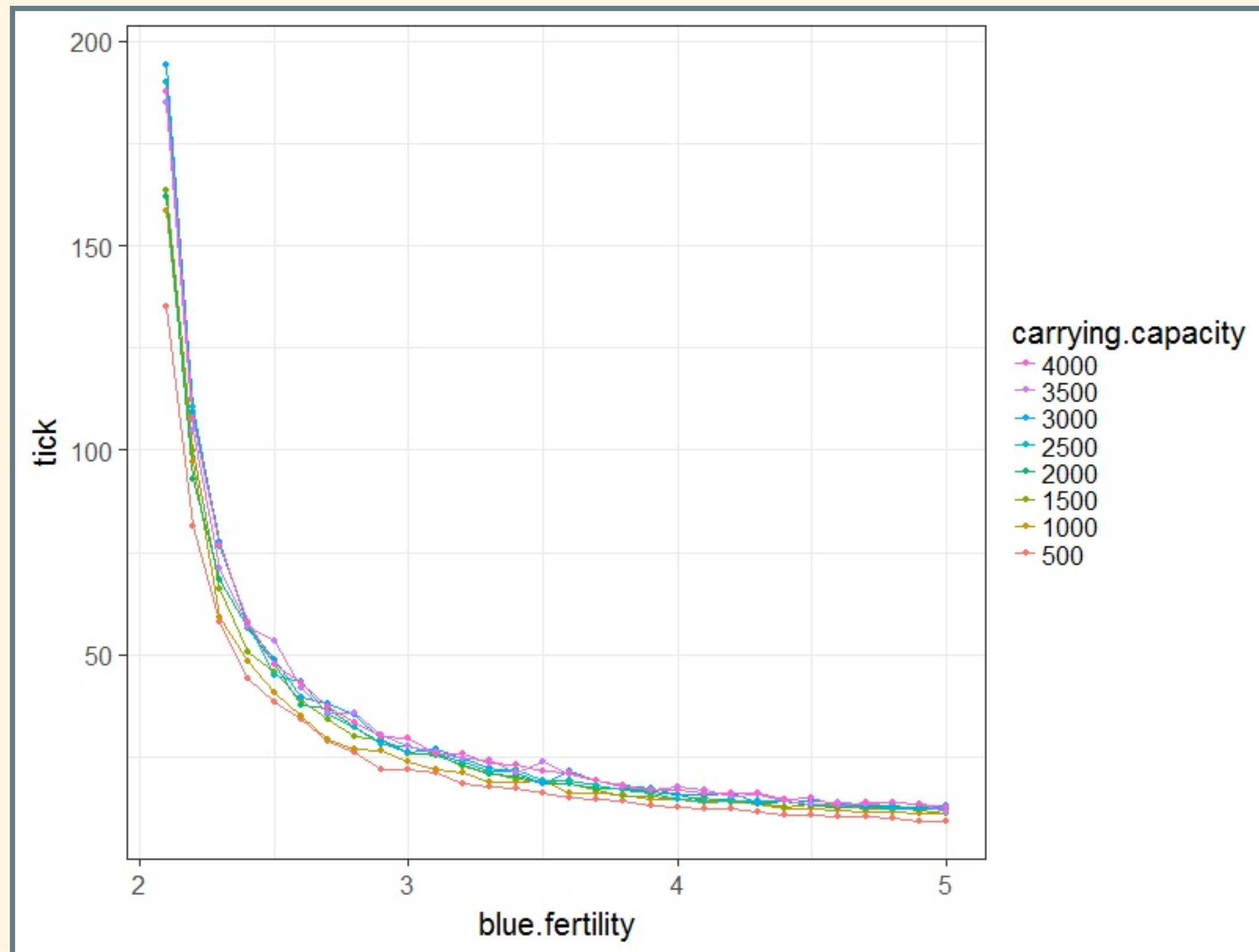
Announcements

- Analysis of the published model: Due date extended to next Sunday (Feb. 25)
- From here on, no further homework from the book.
 - Focus on working on your team project and individual project.

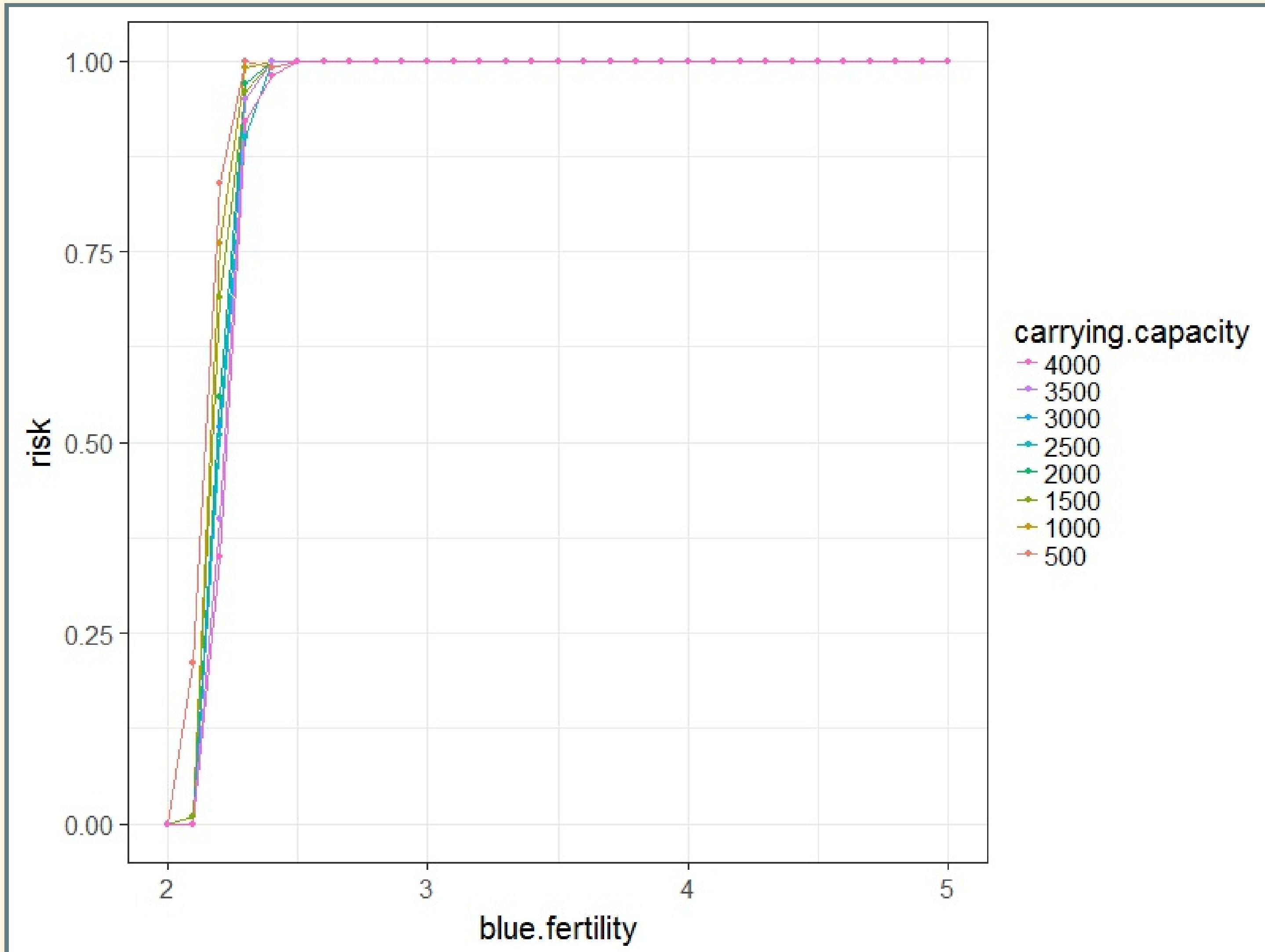
Reviewing Homeworks

- Homework 8.1, 8.2
 - Vary birth rate and carrying capacity in birth-rate models.

Exercise 8.1



Exercise 8.2



Sensing

- Options for sensing:
 - Omniscience: `max-one-of [expected-utility] patches`
 - Neighbors: `max-one-of [expected-utility] neighbors`
 - Limited radius: `max-one-of [expected-utility] patches in-radius 5`
 - Social network: `max-one-of [expected-utility] my-social-network`
- Context:
 - NetLogo has **four** types of entities:
 1. Patches
 2. Turtles
 3. Links
 4. The Observer

Social Networks and Links

- Links
 - Connect turtles
 - Directed (`create-link-from`, `create-link-to`) or undirected (`create-link-with`)
 - Can have properties (color, size, etc.)
- Using links:
 - `my-links`, `my-in-links`, `my-out-links`
 - report agent-sets of **links** connected to a turtle
 - `link-neighbors`, `out-link-neighbors`, `in-link-neighbors`
 - report agent-sets of **turtles** connected to a turtle.
 - **Lots** more you can do with links (read NetLogo dictionary)
- **But** links can be slow if you have a big model with lots of links.
 - Sometimes it's better to use turtles-own variables to keep track of connections

Adaptation and Objectives

- Making decisions:
 - Perfect rationality:
 - Pick a goal (objective function)
 - List possible actions
 - Calculate how well each will satisfy goal
 - Choose action that will best accomplish goal
 - Imperfect rationality:
 - Goal may be unclear or inconsistent
 - May not list all possible actions
 - May not calculate results of actions
 - May not act on best option
- Real-life agents may not act rationally

Bounded Rationality

- Perfect rationality and chess ...
 - Evaluating all possible moves may not be possible
 - Limited time, memory, computing power
 - Cost of rationality
 - Getting, processing information
 - It may be more rational to be slightly irrational

Satisficing

- Define goal (objective function)
- Define criteria for *good enough* result
- Evaluate possible actions until the first one that is *good enough*.
 - Do that action.