Solution of the Expanding the Housing Stock case (EN)

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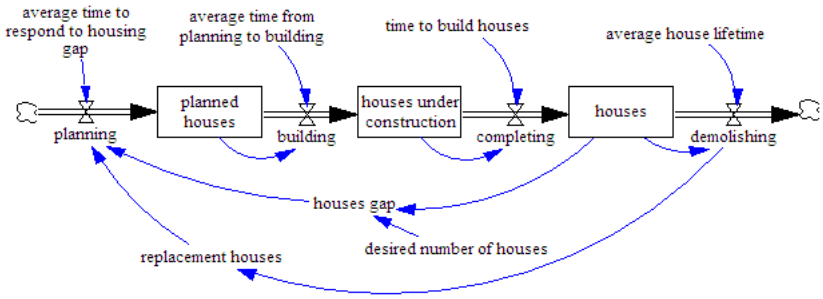
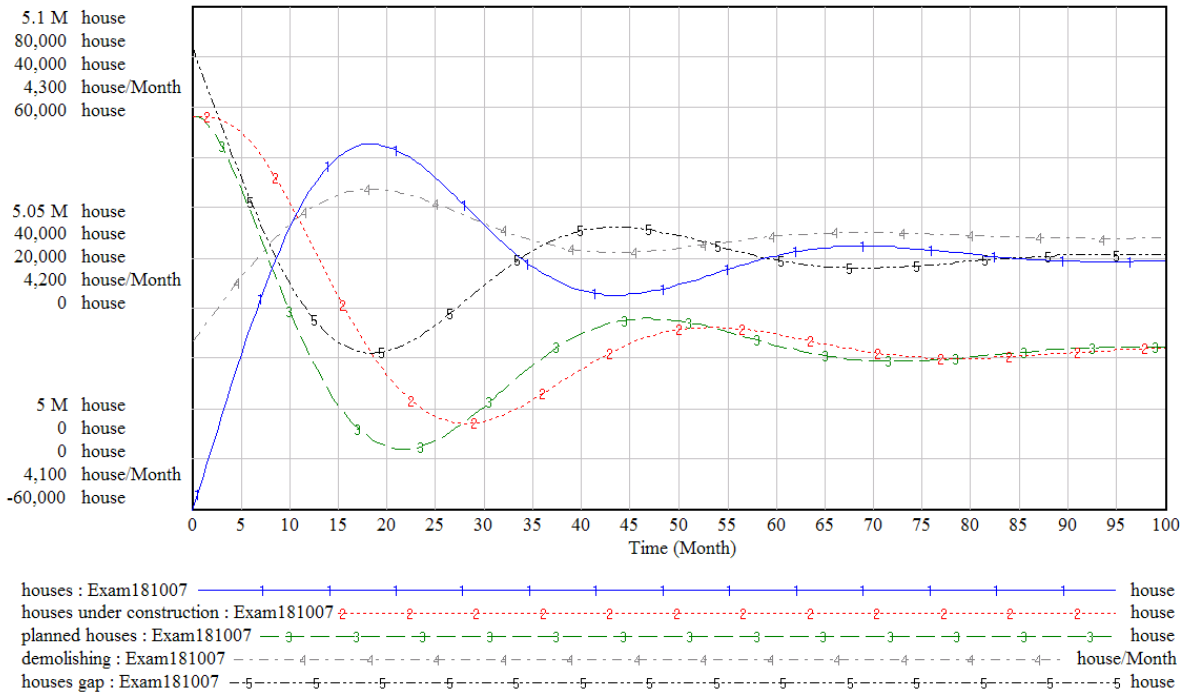
1. Make a simple continuous simulation model on your computer, simulate it and assess the dynamics of the system. How long (more or less) does it take before the system is back in dynamic equilibrium?

   E.g. simulation model in Vensim: [/3]

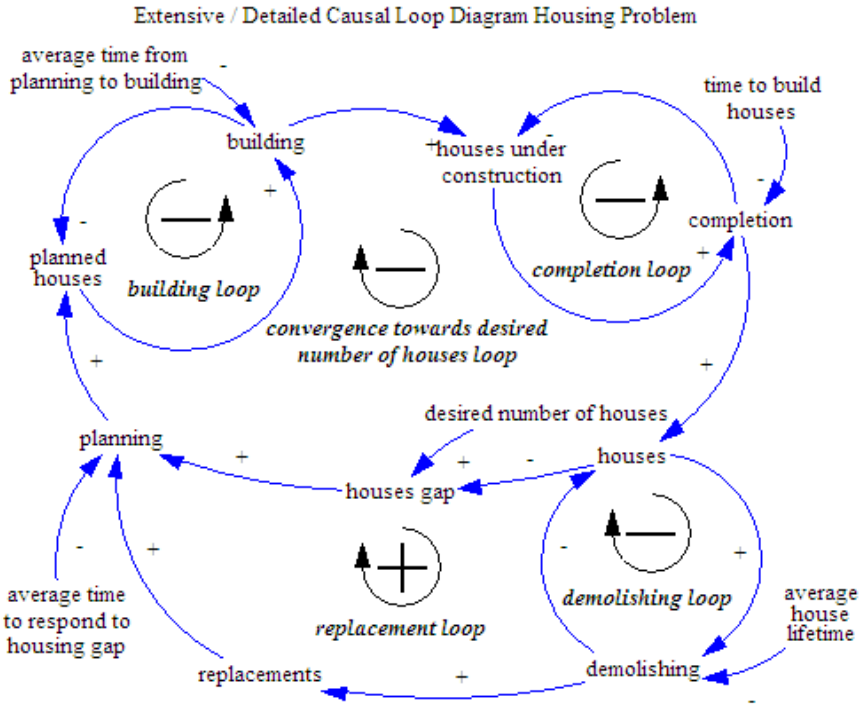


2. Make graphs for the number of *houses*, the *demolishing* flow, the *houses gap*, the number of *planned houses* and the number of *houses under construction*. Sketch the trajectories on this paper as well.



[/1]

3. Draw a simple causal loop diagram of the system.



BUT A MUCH SMALLER / AGGREGATED CLD WOULD BE MUCH BETTER BECAUSE THE THREE SMALL NEGATIVE LOOPS ARE REALLY JUST DELAYS. See lecture slides.

4. Briefly explain the link between the structure and the behaviour of the system. Or in other words: how could this behaviour be generated by its structure?

Normally, the small negative feedback loops (the building loop, the completion loop, and the demolishing loop) fully balance the positive *replacement loop*. In case of an increase of the *desired number of houses*, the number of *houses* needs to converge to a new equilibrium. This means first of all a positive pulse through the system. However, the building loop and the completion loop delay the convergence of the number of houses to the desired number of houses which leads to an overshoot and damped oscillation towards the new equilibrium. The increased demolishing is caused by the 1st order delay structure (houses). [/2]

5. How do you call such a particular stock-flow structure?

An aging chain... [/1]

6. Suppose that you want to make a distinction between big and small houses by means of this simple stock-flow structure. How would you do that? (You do not need to model it...)

Either by means of an additional stock-flow structure or by means of subscripts/arrays/... or by means of a co-flow structure. [/1]