A. Questions regarding the theory in the textbook

Instead of chapter 6 in the text book, we are focusing on the ODD-protocol as the standard since 2006 for describing individual-based and agent-based models (ABMs). (No questions asked regarding the textbook).

B. Questions regarding research articles

Referring to two articles about using the ODD-protocol to describe ABMs.

B.1 Read about the 7 elements under chapter '3 The ODD protocol: an updated definition' in the paper by Grimm et. al (2010). Which of these 7 elements are used in C. Lemos description of their agent-based modeling of social conflict, and how are the relevant elements described? Answer this question by first mentioning which elements are not used and why not. Then, summarize the content of the relevant elements in the ABM-description of Lemos.

The seven elements are:

1 Purpose, 2 Entities and state variables and scales, 3 process overview, 4design concepts, 5 initiolization, 6 input data, 7 submodels.

The elements that are not used properly are element 3 and 5-7.

Purpose gives a short introduction to the paper and what it is all about.

Entities, state variables and scales. This section gives a shorter explanation of how the goal was achieved and how it was implemented and follow that up by deeply explaining the key parts of the project such as the agents, environments and networks. This goes into detailed explanations and tables of all variables and some code snippets to give a greater understanding of the project and building blocks used in the project. This also explains all attributes

The Process overview gives a brief explanation of who does what but in this case we instead get a explanation of the setup and go part of the code and then what the cops do. This part of the paper should also include the citizens and what they do aswell as the order could be switched so we first get the who does what question answered and then after that has been answered we can get into the details of how time is simulated with ticks and what happens during these ticks. This segment should go into incredible detail and it simply doesn't do that. The go procedure explains the order stuff happens but a lot of detail of how they move for example is missing.

The advance clock tick step is also inconclusive since the model calls for a description of how time increments or if it is a continuous clock.

Design concept has one of the better implementations in this paper, it takes up all the important and asked for information in a neat and structured way. The problem with this part of the paper is that elements 5-7 don't get their own headers instead these are viewd as a part of the design concept and this does not agree with the standard however they still do adhere to the standard since these elements still are in the right order in the paper.

Initialization is supposed to give the reader an overview of how things look at time = 0 but the table the text points to doesn't give us any interesting information instead it just points us to different tables however these are explained properly there.

Input Data starts off by telling us that no external data is required. The sentence is not word for word correct but it is there and it is all that is needed but the paper also explains quickly that a netlogo tool was used for parameter sweeping.

Sub model follows the protocol and goes into detail of the three important sub models listed by the author using equations to explain how such things as arrest probability are calculated.

C. Questions regarding the implementation in the project

Our project differs from the ABM of Lemos et. al. and we therefore need to write own ODD-project descriptions as we go along with the implementation in the project. We start by describing an ABM for the normal lives of citizen agents in a democracy:

C.1 You have already sketched a finite state machine regarding the everyday life of such a citizen. Try to describe this everyday life with help of the relevant elements from ODD. Which information is missing to make such a description complete? (Answer this question by trying to write the content to each of the relevant elements and to note which information that is missing).

1 Purpose, 2 Entities and state variables and scales, 3 process overview, 4design concepts, 5 initiolization, 6 input data, 7 submodels.

Purpose:

The goal of this project is to simulate the lives of many many citicens in a democratic state where they have lives and hobbies and follow a daily routine with some variation.

Entities and state variables and scales:

The citizens are a type of agent that strives to live a free life in a democracy where the agent can chose what to work with and what to do in its free time, also the ability to freely communicate with other citizens. They have attributes such as active, happy, arrest probability.

The cops just run around and arrest active citizens (activists/rebels/anarchists) putting them in jail for a set amount of time. They look at the citizens arrest probability and if they are active

The active citizens run from the cops and group up with other active citizens to convert other citizens to active and to organise rebellions and demonstrations.

There should also be a bunch of building for the citizens to interact with such as universities, schools, town squares, jails and police and job offices that the citizens freely can use while the activist demonstrate on the town square.

Process overview:

Explaining the process overview for something that doesn't yet exist is not very easy but it would probably go like first we tick the clock and reduce all jailed timers by 1, then all agents move as long as they aren't jailed, to the next patch that they want to go to in order to proceed them to the next step in their day so on and so forth until the citizens go home and go to bed or something.

Design concepts:

We cant go into design concepts since we don't know what models have been used and what files of data have been read so on so forth. So initiolazation, input data cant be answered right now

Submodels would be the statemachines for the citizens, active citizens and cops.

C.2 Focus on the ODD-element 'Entities, state variables and scales':

A. **Which are the agent's beliefs, desires, intentions and goals as discussed so far in class?**

   Agents beliefs are they view their surroundings. I believe this could be easiest implemented by checking a time variable and this time variable descides when its time to go to work and stuff like that, their beliefs should also be affected by the government state and if there are nerby riots since these can affect the individual and make it so that it instead maby joins the

rioting. Intentions and desires are sort of the same thing in our case and could be stuff like completing their education or getting a promotion at work or finding a job, for the activists It could be to topple the government and for cops its just to rid the town of activists and keeping the city safe. Desires can however be implemented to make it so that citizens have a hobby of much that they wish to do from time to time so this can be visiting the town square or a church or stuff like that.

B. How can they be implemented with NetLogos BDI.nls-extension?

Using the extension we can set different intentions, beliefs and desires as text strings or as we spoke about during the discussion as a king of glass with a hole in it that regularly needs to be refilled to simulate a desire that turns into a bigger and bigger desire until it becomes a intention. Using the string method we can set different beliefs, desires and intentions for all agents or set them as the same for everyone with different priority to create some sort of individuality in our system.

C.3 Focus on the description of the 'Environment' for the agent-based simulation. What kind of reasonable places and objects should it contain so that citizen-agents can live an everyday life where they can fulfill some of their most important desires and reach their goals?

In a democratic state citizens should have access to a lot of necessities such as a town square to interact with others, there should be different options for occupations such as many different job opportunities and studying should also be an option. There could possibly be other fun activities to do in the spare time such as a skate park and such however I think a more realistic scenario is keeping it simple and all spare time activities occur at the town square and other activities take place at work. And all should have a home so a few neighbourhoods where people can create social networks could also be a good addition aswell as the social media functionality we have talked about during the discussions and this I believe would be the easier solution.