Implementation plan

1.Implement and test each process separately

Implement: we firstly write the code of the calculation parts of each process. For example the formula of energy producing and consuming of homes themselves plus/minus the other factors like weather(temperature decreases—> energy consuming increases), politics(wars happen—> energy consuming increases), economics(carbon price increases—> energy consuming increases) and so on.

Test: Enter the arguments manually to have the numerical results by formula.

2. Implement and test each Inter-process communication

Implement: according to our diagram, we will have the communication between market and homes via message queues(to exchange information) , which is also the communication way between home and home(to know whether other homes need to be given energy or give energy) . Then we need to add the code of sending signal from economic and politics parts and receive signal by market (for example, if wars occur, politics sends signal to market. If fuel shortage occurs, economics sends signal to the market). Thirdly we should have shared memory between market and weather, home and memory (to achieve the impact of weather on market price and home consuming energy).

Test: test separately in 3 parts: message queues, signals, shared memory. It may have the problems like homes and market keep sending message when the message queue is already full which will cause the error, also for the shared memory, if both market and homes want to enter in the shared memory, it will have the same problems as the last td (the dining philosophers) and problems of deadlock. So we need to apply semaphore or locks.

3. Implement and test simulation.

implement: finally we have to create the multi-threads for transactions between market and homes. Each thread is responsible for one transaction (selling or buying). We set the limitation of the amount of simultaneous transactions as 5. Then set the parent-child relationship between market and economics, politics.

test: put all processes together and firstly circulate for one circle. Then for 5 or more circles. At last let the circles become a “timer”, to simulate one month then one year. After the simulation, release the memory and stop the child then parent process.