Intersection Problem Statement

You will be simulating automobile traffic flow/traffic signals at a typical intersection. Traffic flows in both directions on each of the cross streets. Cars form into eight different queues at the intersection: N: from the north, headed straight south; NL: from the north, headed east (left at intersection); E: from the east, headed straight west; EL: from the east, headed south (left at intersection); S: from the south, headed straight north; SL: from the south, headed west (left at intersection); W: from the west, headed straight east; WL: from the west, headed north (left at intersection).

- When a car enters the intersection, if the queue there is empty and the light is green, they can clear the intersection. Else, they join the appropriate queue.
- When the system is initiated, the traffic signal allows traffic to flow from NL and SL. Next it allows traffic to flow from N and S. Then, it allows traffic flow from EL and WL. Lastly, it allows traffic to flow from E and W -- then starts again with NL and SL and so forth.
- When a signal light changes it can allow up to five cars to pass through the intersection (get out of the queue).

Here is a use case diagram:
Fill in the subflows in the flow of events for the Car Queue use case.

5 Flow of Events for the Car Queue Use Case

5.1 Preconditions
None.

5.2 Main Flow
This use case begins by initializing the queue (S-1). Cars may be added to the queue (S-2) or released from the queue (S-3). Alternatively, the use case may report status (S-4) on how many cars are in the queue.

5.3 Subflows

- S-1 Initialize
  The queue is initialized with zero cars.

- S-2 Add to queue
  Receives a message from the Join a Queue subflow of the Clear Intersection use case. Adds car to queue.

- S-3 Release from queue
  Release up to five cars from the queue. Send a message to the Go subflow of the Clear Intersection use case.

- S-4 Report status
  Send a message indicating how many cars are in the queue.

5.4 Alternative Flows
None