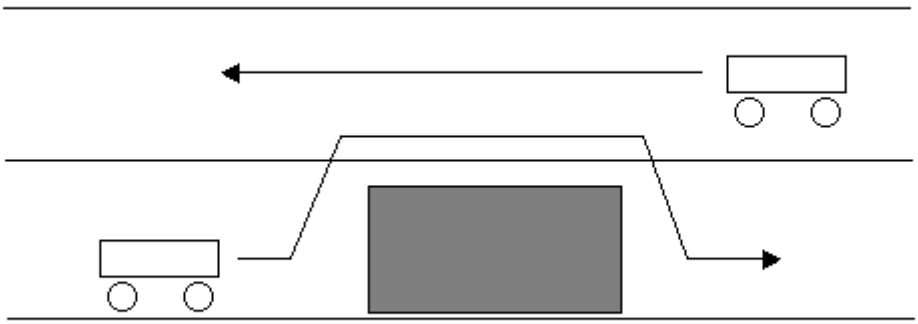
DS Lab - Homework Exercise

Exercise – Constrained car transit

Consider the following situation: a two-way street has a portion of a lane that is closed for maintenance work. In that stretch of road, therefore, only one passage is available, which must be used to allow the cars coming from both opposite directions to transit.



You are asked to model this situation by defining the appropriate classes, in particular:

- A class `Passage` to represent the free stretch of road, which must be traversed by the cars coming from both directions.
- A class `Queue` to represent a road lane in which the movement of the cars gets interrupted to regulate the transit through the only available passage. More in detail,
    - Every object of the class `Queue` must contain a list of cars that are waiting for a chance to traverse the passage as soon as it gets available.
    - Every object of the class `Queue` represents a thread which, if it contains a non-empty list of queuing cars, and the passage is free, it will make every queuing car to transit through the passage (without being interrupted).
    - Every transit operation should be identified by a print on standard output, with a statement of the type “Car number <car number> is passing from <direction>” (this specification should serve as a hint).
- A class `Start` that starts the program by building and activating two objects of type `Queue` which want to regulate the transit through the same `Passage`. The program must simulate concurrently the arrival of a certain number of cars in both directions.
- The main thread should provide the objects of the class Queue with 100 cars in total, 50 for each direction, at random time.