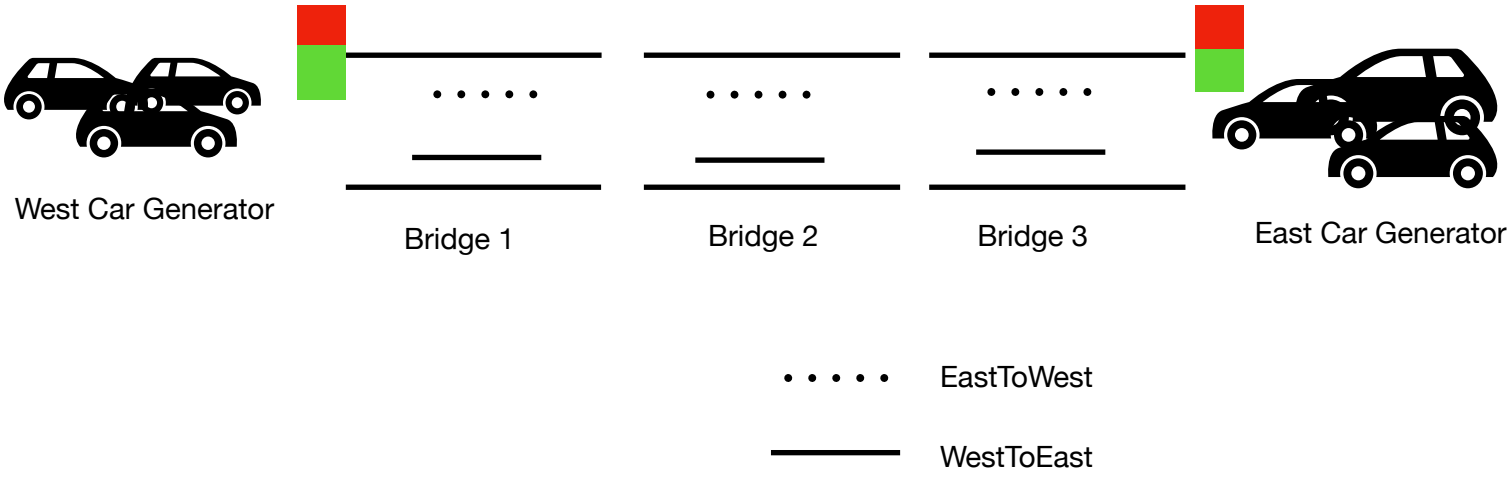
Homework 1 - Bridge System Model

Bridge Segment



westcarGenr - West car generator generates car to come from West side of Bridge segment.
eastcarGenr - East car generator generates car to come from East side of Bridge segment.

Bridge Segment - Create Bridge segment and pass car from West to East or East to West based on Traffic light duration and Queues.

Bridge System - Overall model with couplings between three bridge segments, two car generators and a transducer.

Variables used in the program:

eastq - DEVSQueue for the cars from East direction.
westq - DEVSQueue for the cars from West direction.
carTravelTime = Time taken by car to cross the bridge.
trafficlighttime = Time allotted for green signal.
stateofbridge = Bridge state like initial, West_To_East, East_To_West, WtoE, EtoW.

(West_To_East, East_To_West - Phases when there is no car on the bridge.
WtoE, EtoW - Phases when there is car on the bridge.)

Functions:

init() - Initialize variables like CarTravelTime, CurrentCar. Declare queue variables.

deltext() - Check the message on port whether it is EastCarIn or WestCarIn and check for the corresponding phase (East Car - Phase should be East_To_West or EtoW, similarly for West Car).

Case 1 : if CurrentCar==null

Case a : If the corresponding queue is empty (Check q2 for East Car In and q1 for West Car In) then, check for traffic light time . If there is more traffic light time to pass the car, get the input car and holdin phase as EtoW or WtoE for CarTravelTime. If there is not enough traffic light time to pass the car, get the car from input port and add it to the queue.

Case b : If the corresponding queue is not empty, Get the car from input port and add it to the queue.

Case 2 : If CurrentCar!=null (or) Queue is not empty

Get the car from Input port and add it to the queue.

out() - Send the CurrentCar to EastCarOut or WestCarOut based on its phase.

deltint() - Check for car on bridge

Case 1 : If there is a car on bridge and check for the phase

Case a : If the signal remaining time is more than car travel time and the queue is not empty, then get the first car out from the queue. HoldIn to that phase for carTravelTime.

Case b : If the signal remaining time is more than car travel time but the queue is empty or the signal remaining time is less than car travel time, then HoldIn to that phase for signal remaining time and CurrentCar as null.

Case c : If the signal remaining time is less than zero, then HoldIn to that phase for signal remaining time and CurrentCar as null.

Case 2: If there is no car on bridge

Case "East_To_West" : If the West Car Queue is empty, HoldIn "West_To_East" phase for traffic light time. Else remove the first car from west queue and holdIn "WtoE" for Car Travel Time.

Case "West_To_East" : If the East Car Queue is empty, HoldIn "East_To_West" phase for traffic light time. Else remove the first car from east queue and holdIn "EtoW" for Car Travel Time.