Railbot (3/4)

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2009 Fall

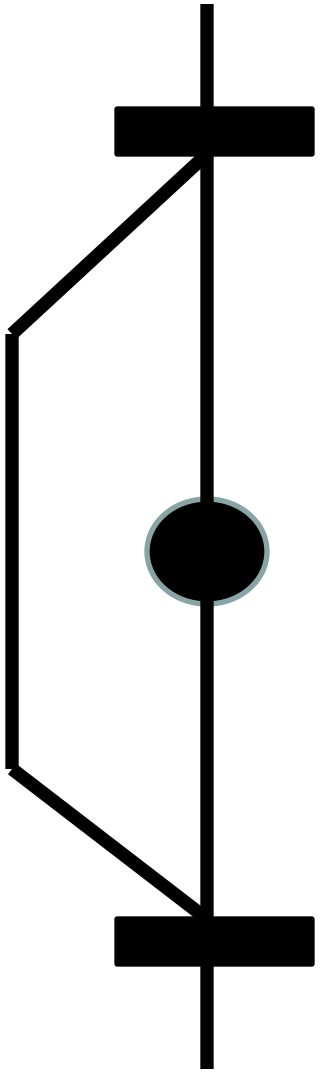
(I) Branch detection

Content

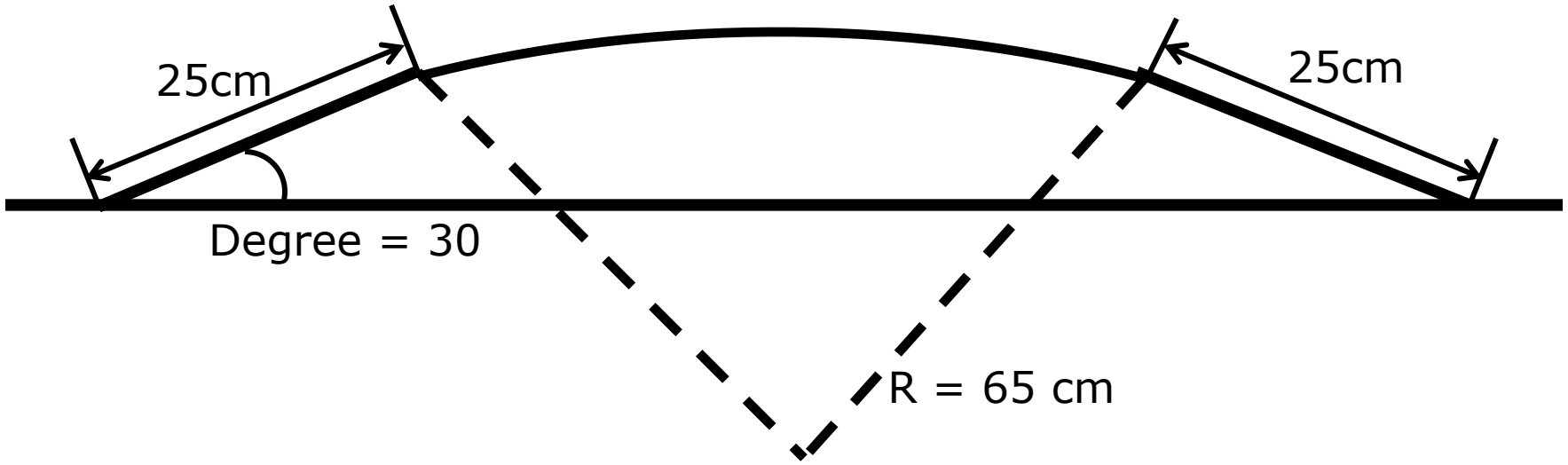
- While there are trains with different speed on track, the slower one will eventually rear-ended by the faster one.
- **Branch** is designed for the faster railbot to safely PASS the slower one.
- Before implementing the Passing mechanism, railbot should be able to recognize the start point.

Strategy

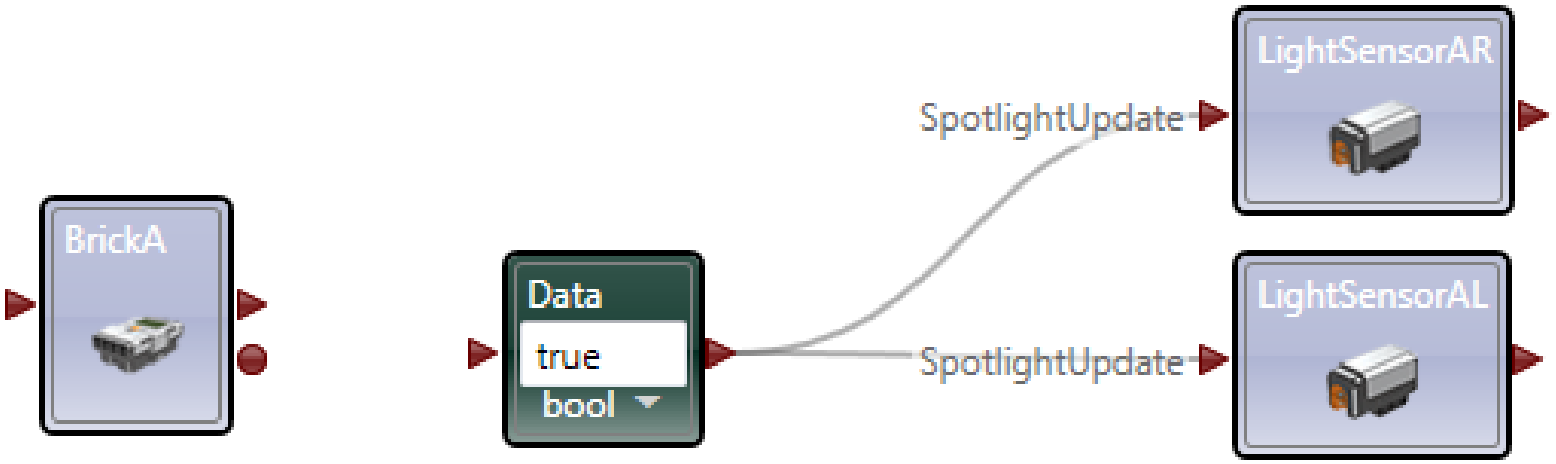
- Add tapes on both side of branch.
- The tapes indicate the entrance and exit of the branch. Control center therefore is able to recognize railbot's position.
- You may choose other strategy you want.



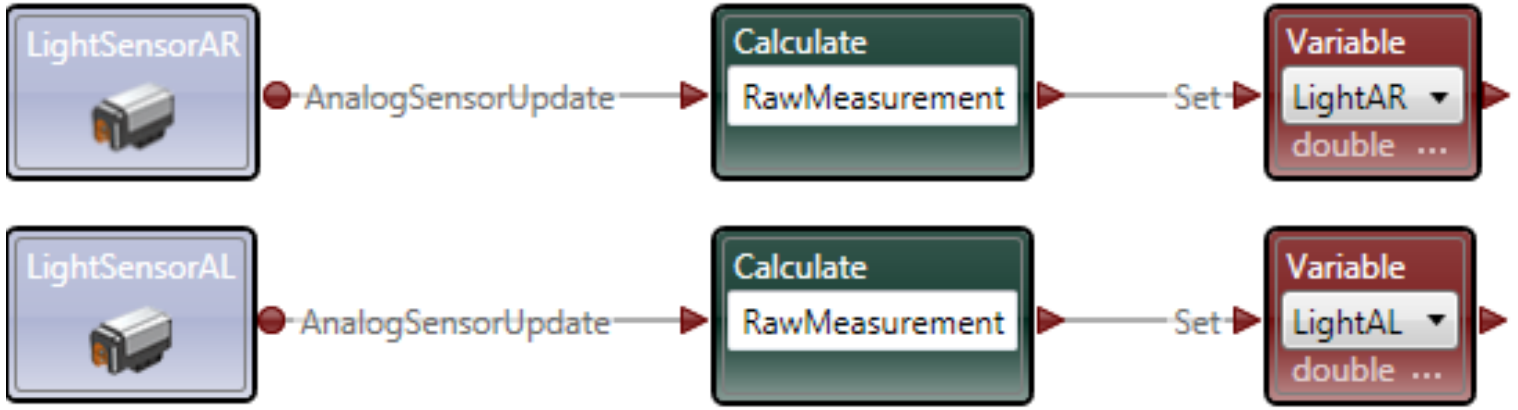
Scale



Step 1: Set initial configuration

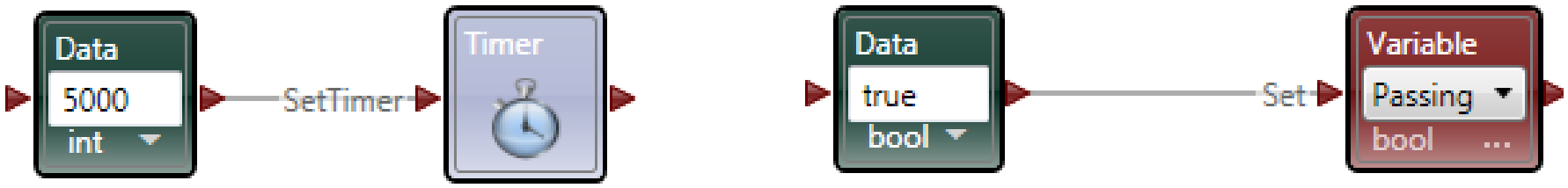


Step 2: Retrieve the sensor measurements



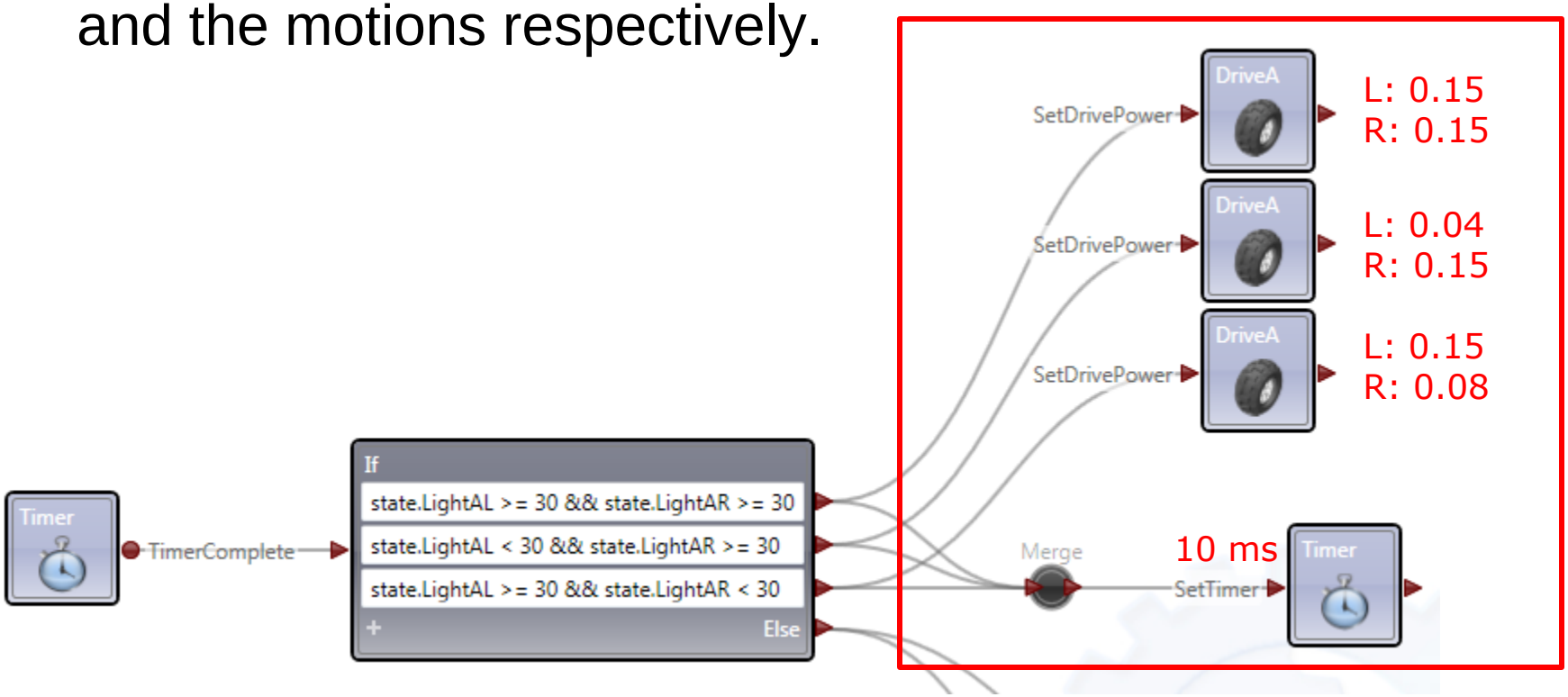
Step 3: Initialize timer and passing flag

- The passing flag is for us to determine whether passing behavior should be executed or not. In this case, we can assign both value (true or false) to see the difference situation.



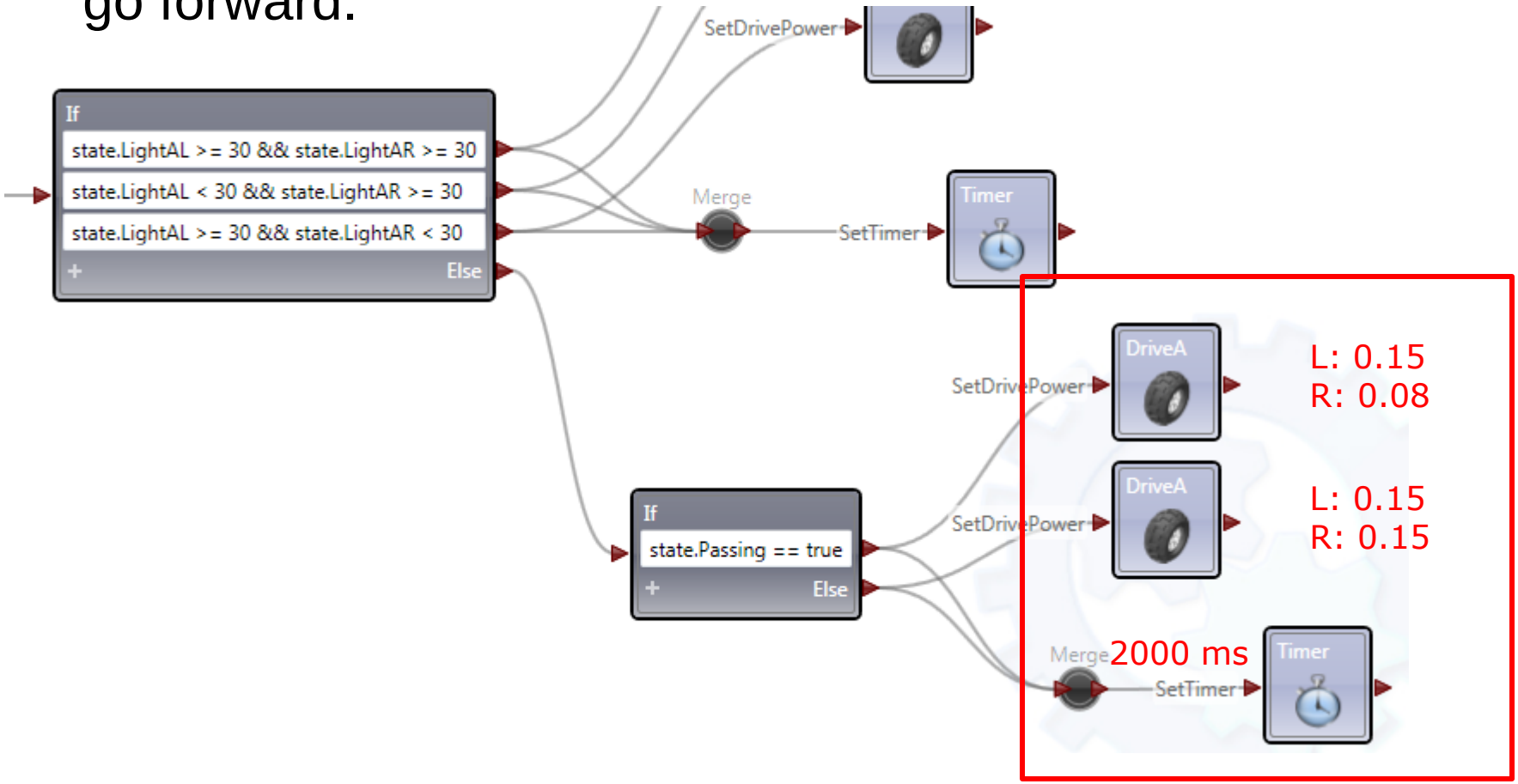
Step 4: Setup the motion of following lines

- Setup the first three situation (1W4B, 1W4W, 1B4W) and the motions respectively.

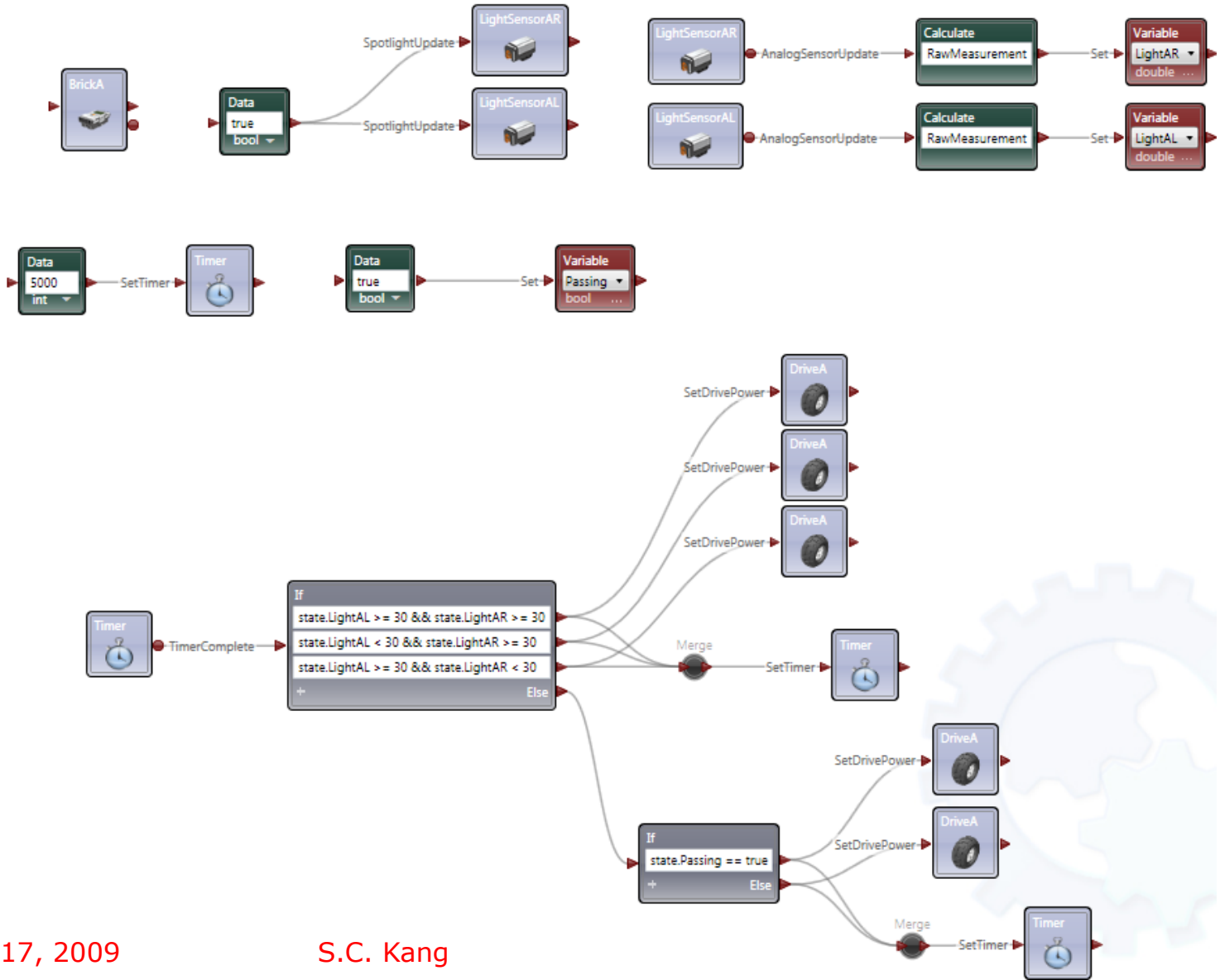


Step 5: Set the motion of branch detection

- If the railbot encounter the situation, 1B4B, check the flag. If it is true, do the passing behavior. Otherwise, go forward.



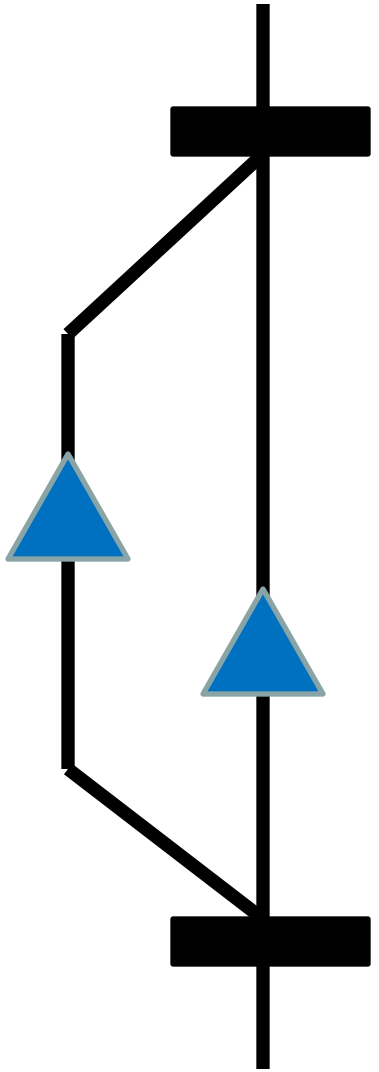
Finish!


BrickA
Data
true
bool
SpotlightUpdate
SpotlightUpdate
LightSensorAR
LightSensorAL
LightSensorAR
AnalogSensorUpdate
Calculate
RawMeasurement
Set
Variable
LightAR
double
LightSensorAL
AnalogSensorUpdate
Calculate
RawMeasurement
Set
Variable
LightAL
double
Data
5000
int
SetTimer
Timer
Data
true
bool
Set
Variable
Passing
bool
SetDrivePower
DriveA
SetDrivePower
DriveA
SetDrivePower
DriveA
Timer
TimerComplete
If
state.LightAL >= 30 && state.LightAR >= 30
state.LightAL < 30 && state.LightAR >= 30
state.LightAL >= 30 && state.LightAR < 30
Else
Merge
SetTimer
Timer
SetDrivePower
DriveA
SetDrivePower
DriveA
If
state.Passing == true
Else
Merge
SetTimer
Timer

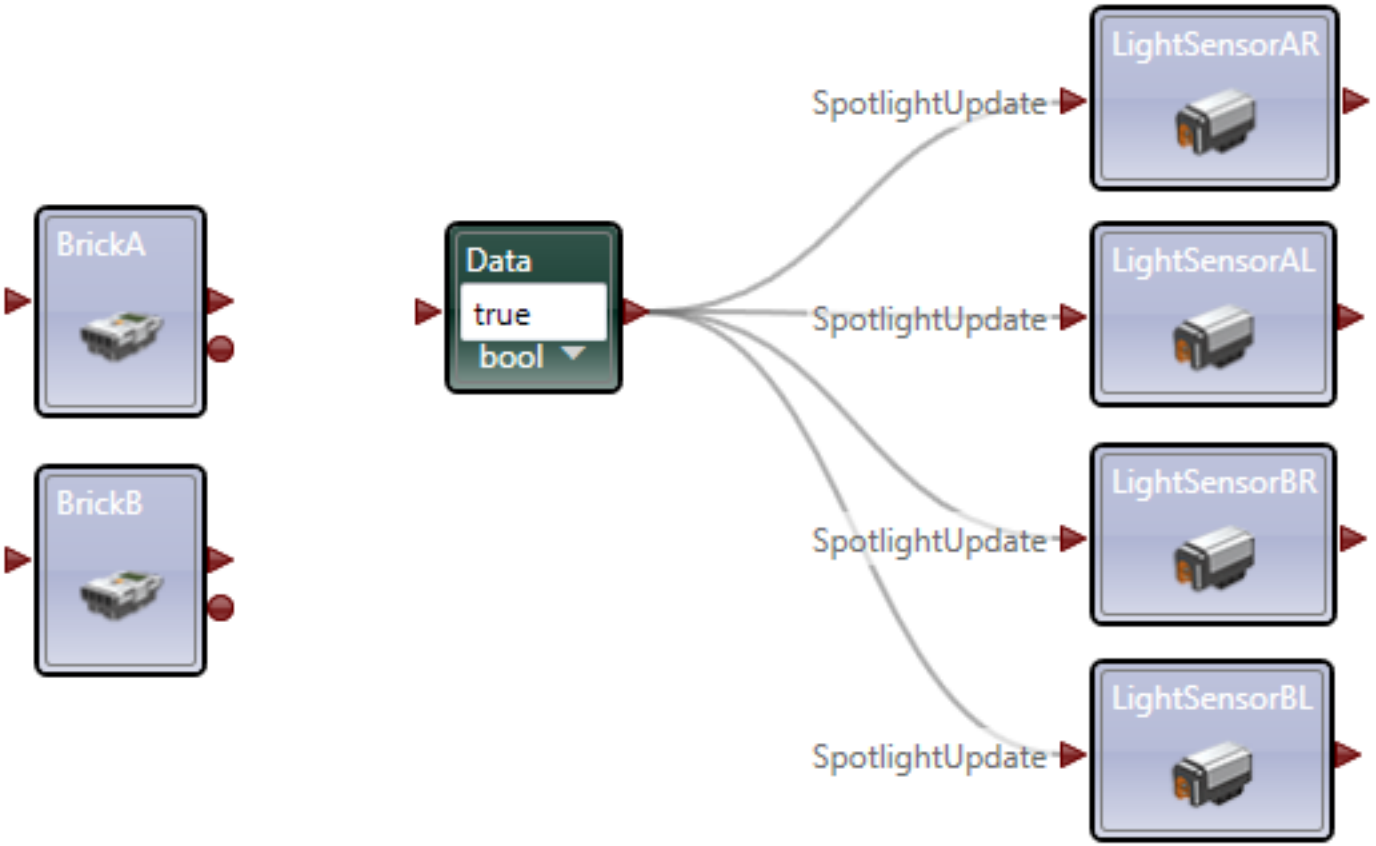
(II) Passing

Strategy

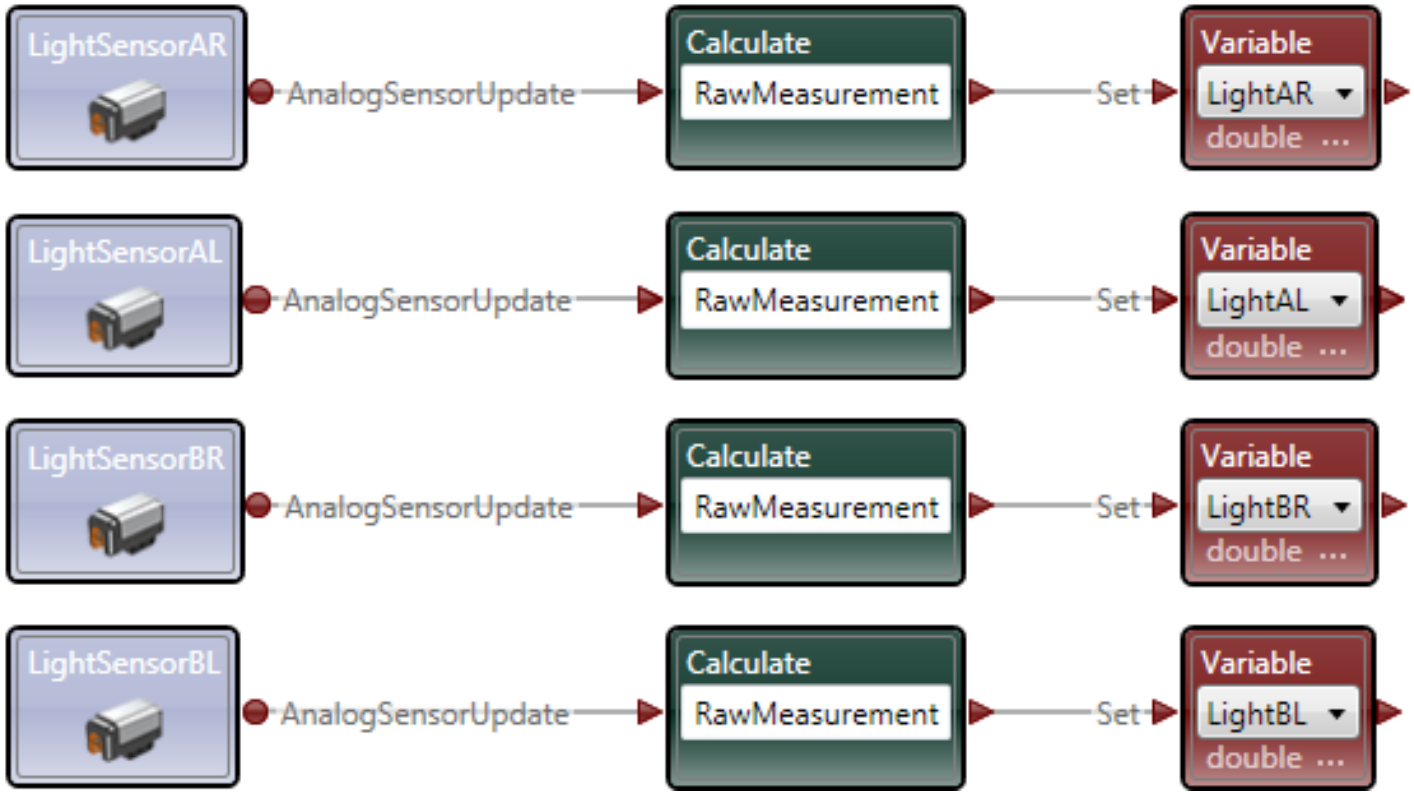
- Add two railbot on the track.
- If one railbot entered the waiting zone(the middle track), then the other one need to pass it.
- Control center therefore is able to recognize railbot's situation according to the passing flag.
- You may choose other strategy you want.



Step 1: Set initial configuration

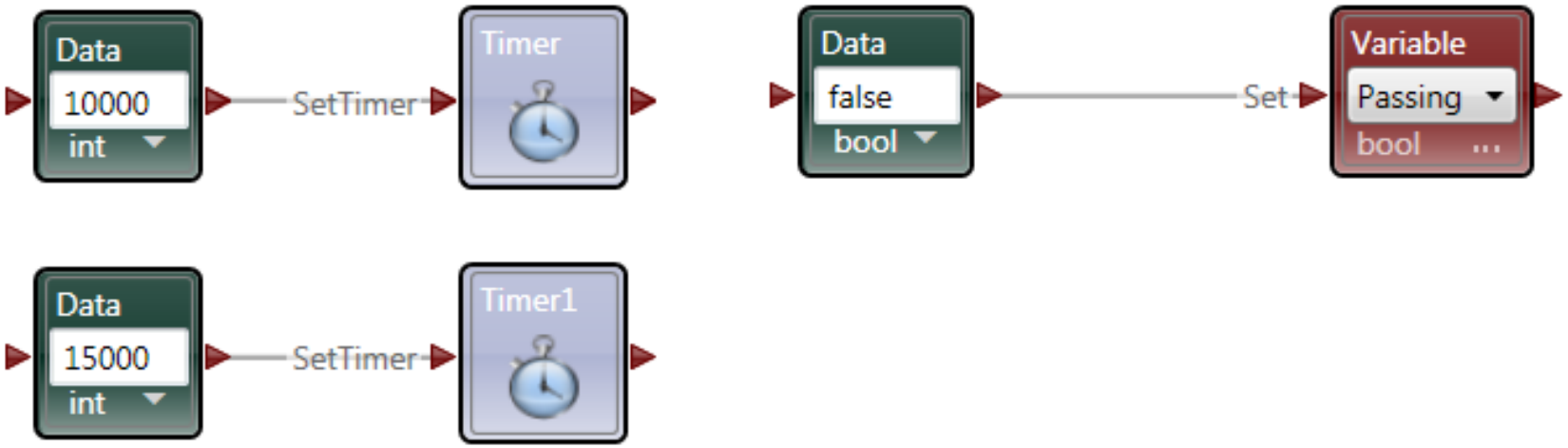


Step 2: Retrieve the sensor measurements



Step 3: Initialize timer and passing flag

- In this case, the passing flag will be changed when the first railbot entered the waiting zone.

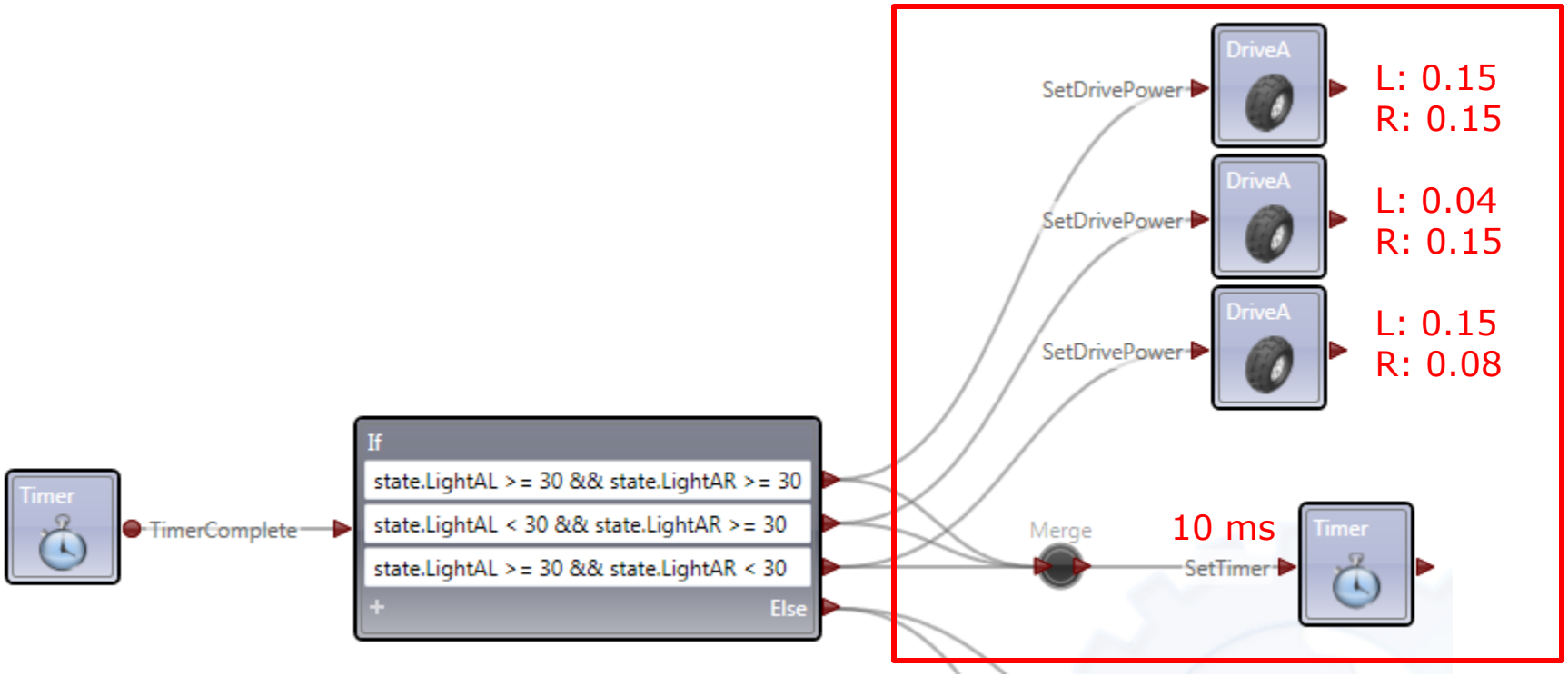


Step 4: Initialize a checker

- Also, we need a counter for determining whether the passing behavior is completed or not.

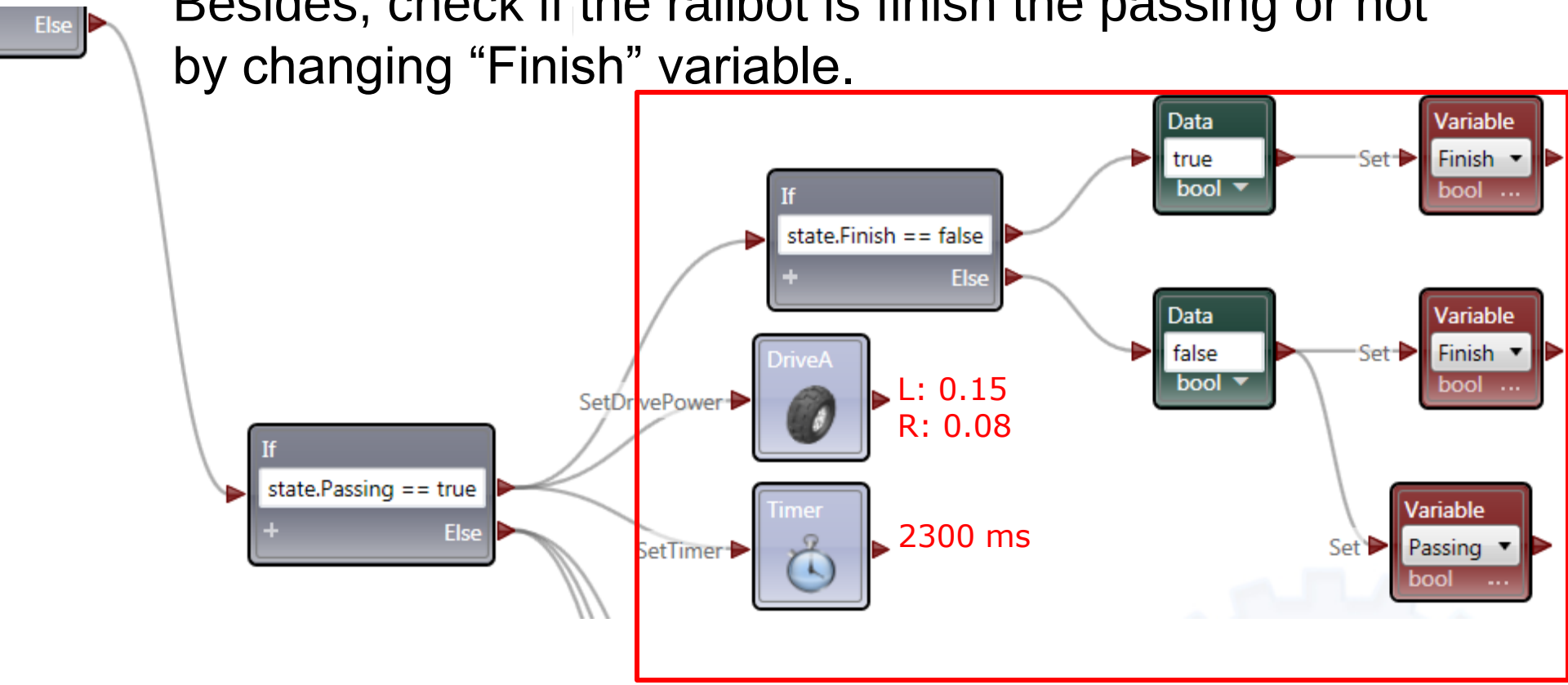
Step 5: Setup the motion of following lines

- Setup the first three situation (1W4B, 1W4W, 1B4W) and the motions respectively (for both railbot).



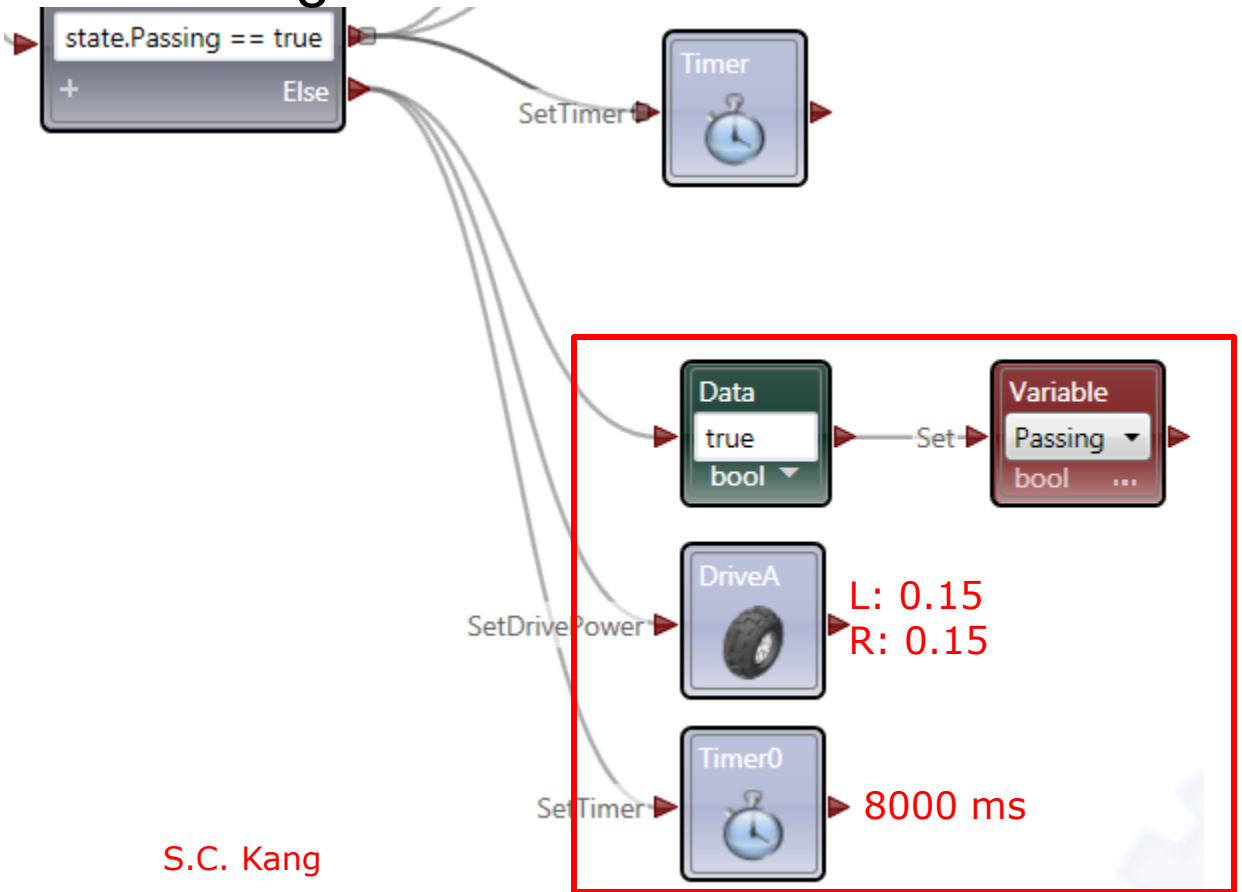
Step 6: Passing detection (1/3)

- If the railbot encounter the situation, 1B4B, check the flag. If it is true, means the railbot needs to go through the passing track. Do the passing behavior (turn right). Besides, check if the railbot is finish the passing or not by changing “Finish” variable.



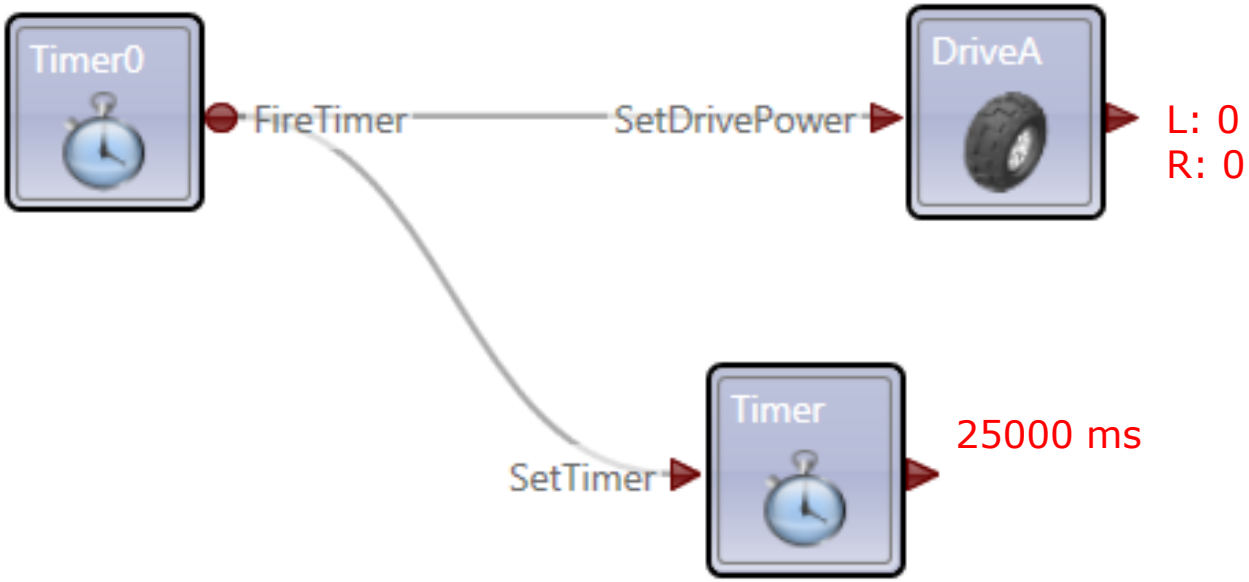
Step 6: Passing detection (2/3)

- If the passing flag is false, it mean this railbot should enter the waiting zone. Go forward and switch the passing flag to “true.” Also, setup another timer for pause in the waiting zone.



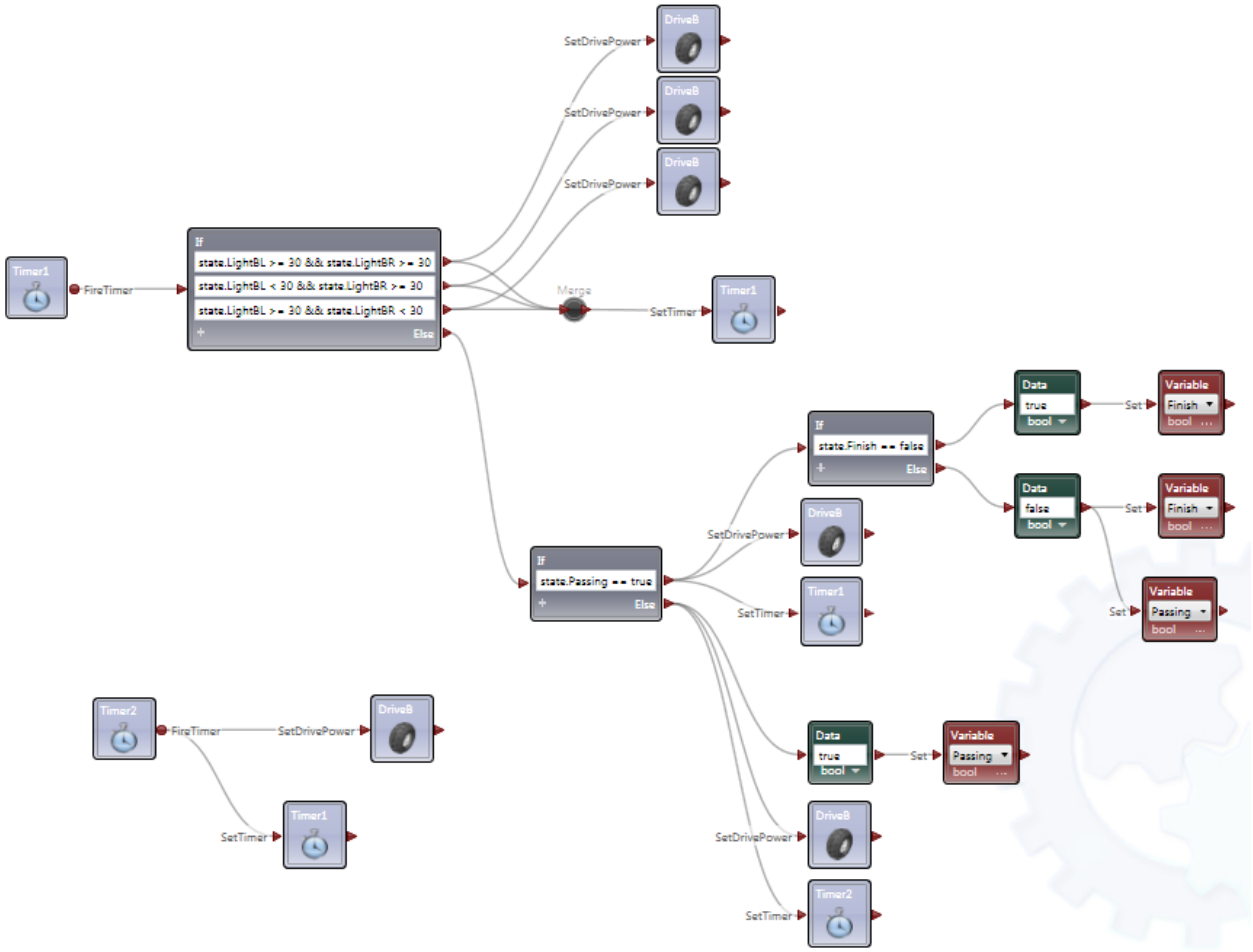
Step 6: Passing detection (3/3)

- In the waiting zone, stop the railbot for 25 sec until the other railbot almost passed the branch. Then restart the original timer.

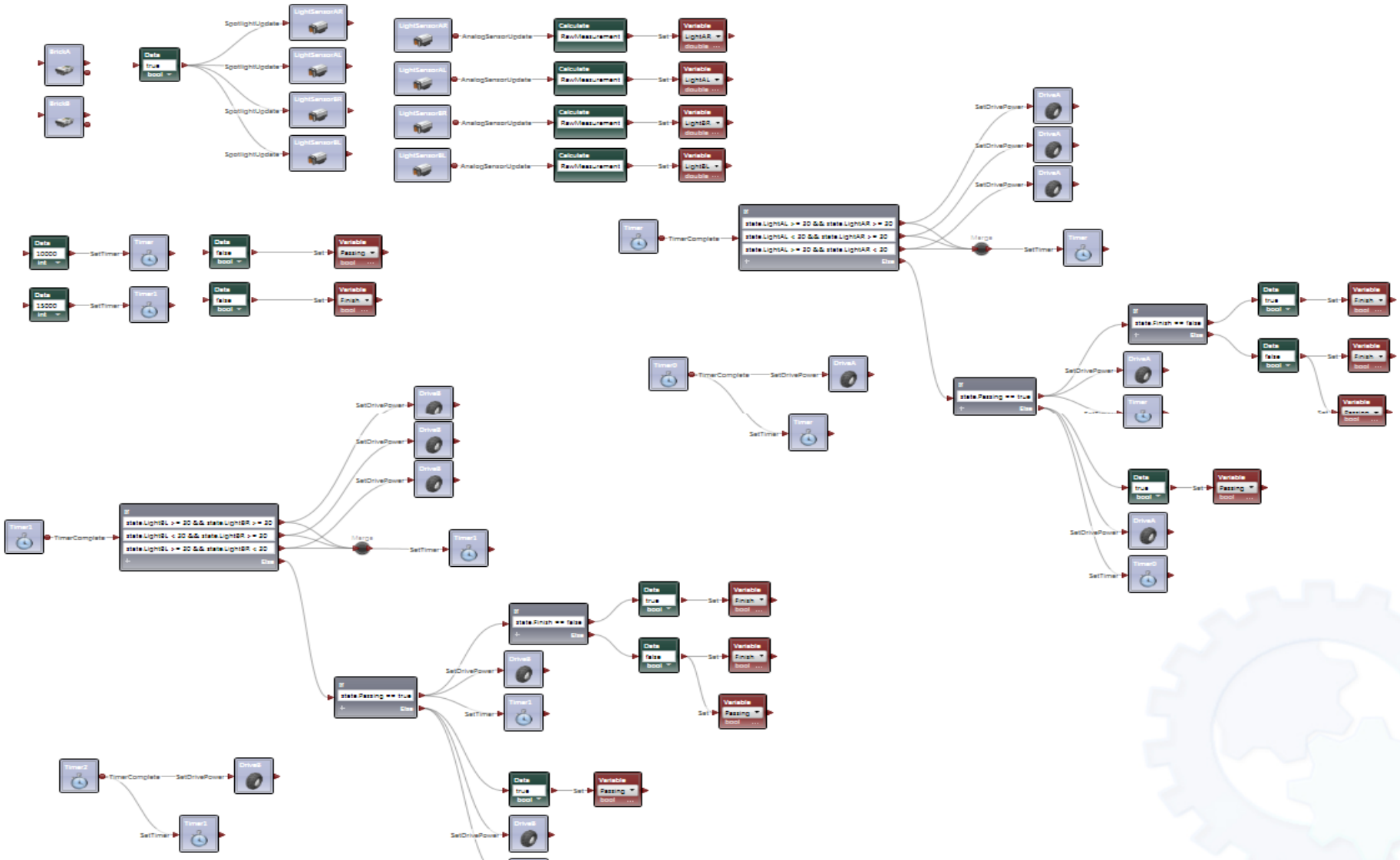


Step 7: Copy the same program

- Copy the same program (from step 5 and 6) for another railbot, make sure that all timers, drivers and IF expressions are relative with another railbot.



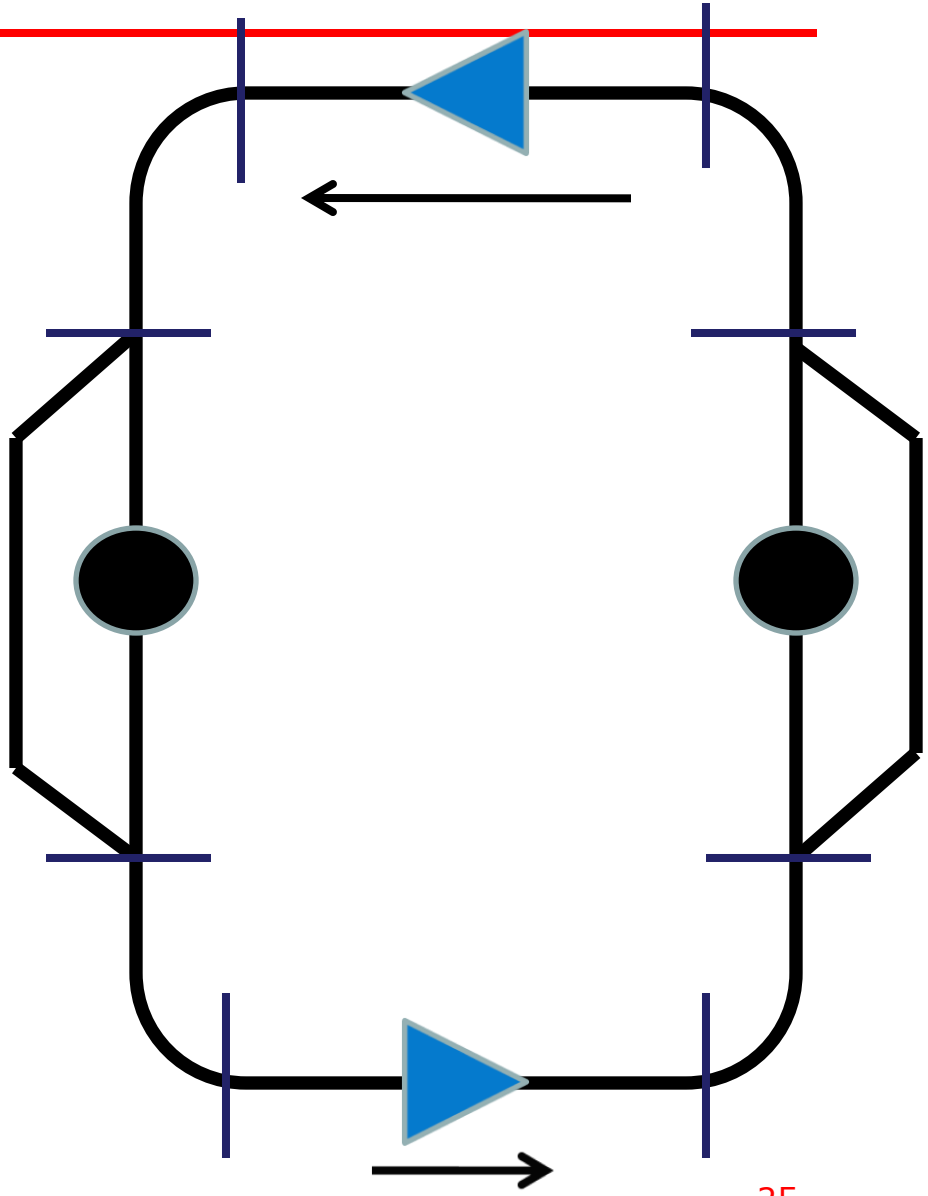
Finish!



(III) Passing in a circle track

Content

- Two railbots, faster one and slow one must move along the track and stop at the station for 3 seconds.
- **Faster one should PASS the slow one correctly.**
- **Block signal mechanism of course 2 must be applied.**



Try it!

Question?

Course website

http://robot2009.caece.net