

# **LabVIEW Course**

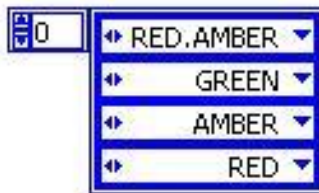
## **Exercise 15**

**G Boorman 2011**

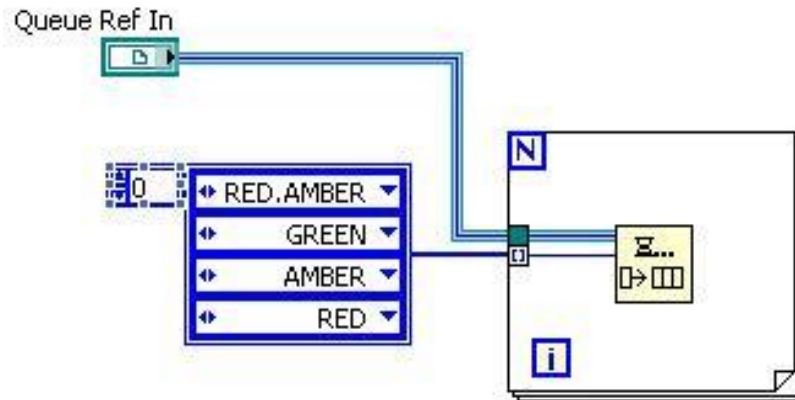
## Exercise 15 – Queuing Multiple Elements

This exercise takes the *Queued Pedestrian Lights.vi* produced at the end of Exercise 14 and queues states (messages) in just one state.

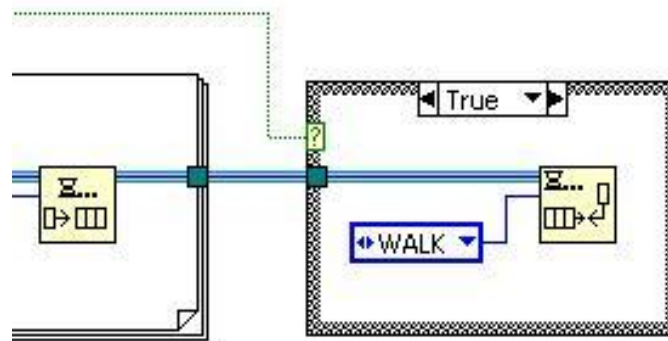
- 1) Make a copy of *Queued Pedestrian Lights.vi* and name it *Multiple Queued Pedestrian Lights.vi* and add to the Traffic Lights project.
- 2) Create a sub-VI with two controls – a reference to the Queue and a Boolean control. To create the Queue Ref control, right-click on the Queue Ref on the diagram of *Multiple Queued Pedestrian Lights.vi* and do Create>>Control. This adds a control on the front panel. Delete it from the front panel and add it to the front panel of your new sub-VI, renaming it 'Queue Ref In'. Make a copy of the 'Walk?' control and move it to the new sub-VI. Wire the two new controls to terminals on the connector pane.
- 3) On the new sub-VI diagram create an array constant and copy the *Traffic Light States.ctl* constant into the array constant. Drag the lower edge of the constant to show four elements of the array.
- 4) Make each element take the following value: RedAmber, Green, Amber, Red. You may need to enlarge the size of the element to display each element fully.



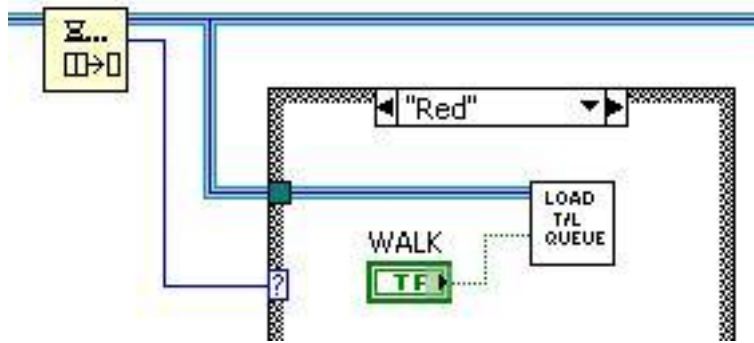
- 5) Create a For loop and place an 'Enqueue Element' function within it. Wire the *Queue* terminal to the 'Queue Ref In' control. Wire the Array Constant from outside the For loop to the *Element* terminal of the Enqueue Element. The *indexing* should remain enabled.



- 6) Add a Case structure, and wire the 'Walk?' control to the Case Selector. Add 'Enqueue Element at Opposite End' function to the 'True' case, and wire the *Queue* terminal from the 'Enqueue Element' *Queue Out* terminal. Disable indexing on the tunnel created. Create a constant on the *Element* terminal, and make it the 'Walk' item. Leave the 'False' case empty.



- 7) Edit the icon to something meaningful and save the VI as *LoadTrafficLightsQueue.vi*.
- 8) On the diagram of *Multiple Queued Pedestrian Lights.vi* remove the 'Enqueue Element' from within the While loop and the constants wired to it from each sub-diagram of the Case structure. Remove the Selector from case 'Red' and add the *Load Traffic Light Queue.vi* instead. Wire the Queue Reference and 'Walk?' to this VI.



- 9) Ensure the Queue reference still goes through the While loop to the 'Release Queue' outside.
- 10) Check the VI works as expected and save it.
- 11) Notice how the 'Walk' button cannot be pressed repeatedly to make the State Machine cycle between the cases 'Red' and 'Walk' indefinitely.

**End of Exercise**