

**Extra-points Project**  
**Part 1**

Expected delivery of **extrapoint\_01.zip** must include:

- The zipped folder of your project
- A 4 minutes video (.mp4 or .avi) showing a running software debug session with significant peripheral windows shown.

Purpose of Part 1: to acquire full confidence in the usage of the KEIL software debug environment to emulate the behaviour of the LPC1768 and the LANDTIGER Board.

This part is evaluated to assign at maximum 2 extra-points for qualified students getting an examination mark  $\geq 18$

Start from the 16b\_sample\_BUTTON\_LED\_NVIC\_PCON\_TIMER project to develop the controller of a pedestrian crossing semaphore.

You are asked to write a program for the LandTiger Board that permits to reproduce the behaviour of a simple semaphore on a pedestrian crossing. An example is provided in figure 1. The crossing is regulated by

- 2 types of traffic lights:
  - o 2-lights pedestrian traffic light (see figure 2)
  - o 3-lights pedestrian traffic light (see figure 3)
- Pushbutton panels for pedestrian request see (figure 4)

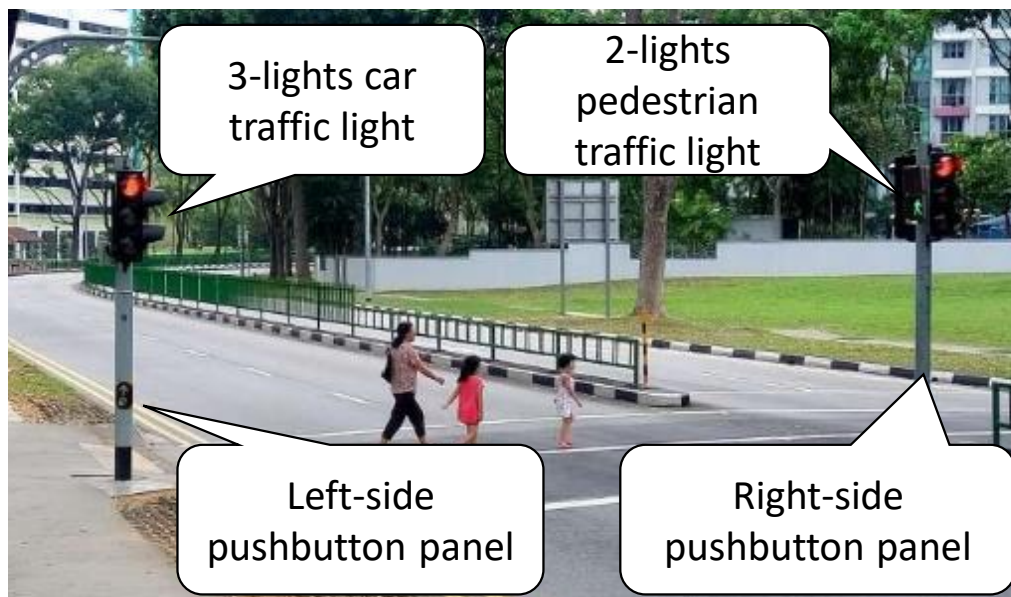


Fig 1: general view of the scenario



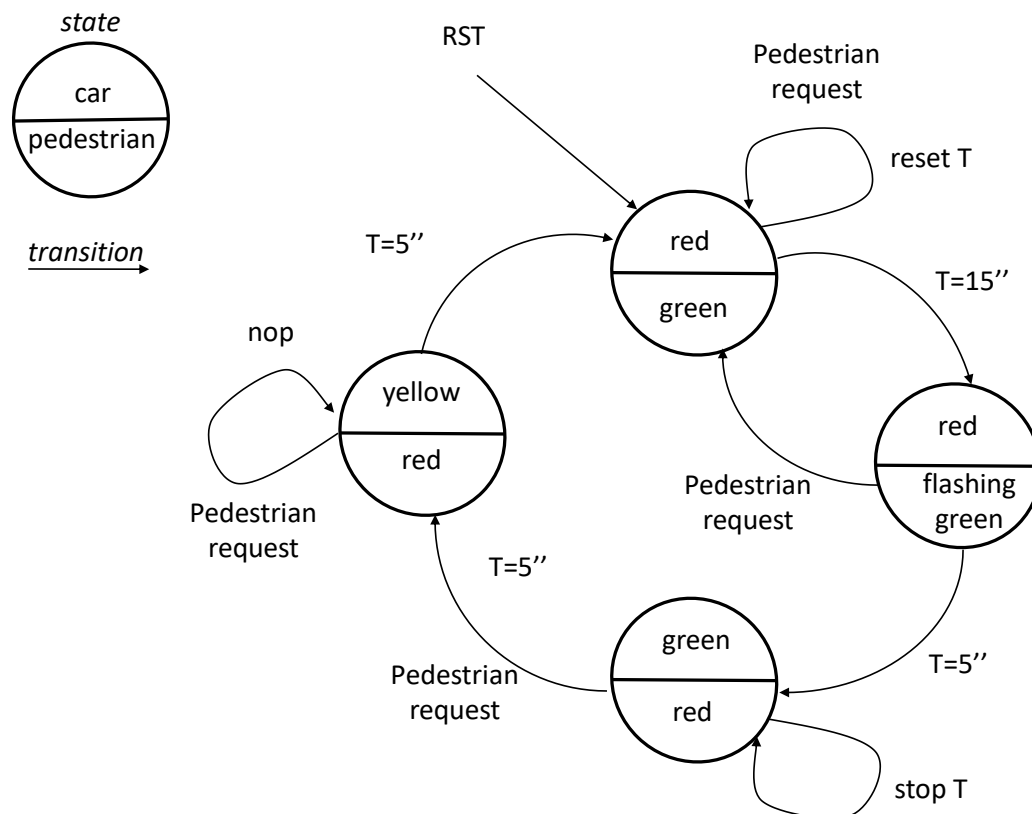
Fig. 2 pedestrian traffic light

Fig.3 cars traffic light

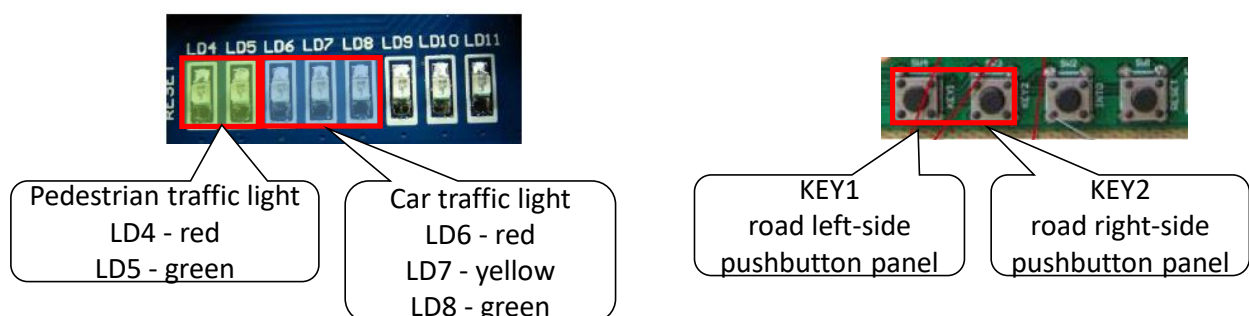
Fig.4 pushbutton panel

The state diagram of the traffic light behaviour is depicted below. It describes a night condition of traffic where the pedestrian crossing is rare and a reduced number of cars is expected. The traffic light has to ensure to pedestrian a maximum wait time of 10 seconds and 20 seconds of crossing time.

You are required to implement the following state and transition diagram. T indicates the time to move from a state to another state if not immediately.



Use the LEDS and BUTTONS to reproduce the various components of the traffic light as indicated below.



Led 5 flashing is performed at 2 Hz frequency (repeatedly 0.5 sec on/0.5 sec off).  
Leds 9/10/11 are not used.