Question one:

The LED Pmod has 8 logic level transistors and 8 LEDs. It has three modes of operation.

Mode 0: Full Off

* In this mode, all of the LEDs are not illuminated
* When a logic signal for a high value is given to any one of the transistors on board, it enters mode 1

Mode 1: Partially On

* -In this mode, at least one of the 8 LEDs is illuminated.
* As long as the logic signal corresponding to an LED is given a logic high value, it remains illuminated.
* If all the logical signals are at low state, the controller moves back to mode 0.

Mode 2: Fully On

* In this mode, all 8 of the LEDs are illuminated.
* As long as all logic signals sent to the board remain at logic high value, they all remain illuminated.
* If all 8 of the logic signals move to the low logic value, the controller will move back to mode 0.
* If some number(less than 8) of the logic signals to the LEDs move back to the logic low value, the controller will move back to mode 1.

Question two:

The LED pmod must be plugged into pmod port JB. The ports used are as follows:

|  |  |
| --- | --- |
| Pmod Pin | MCU Port bit |
| JB-01 | RG-9 |
| JB-02 | RG-8 |
| JB-03 | RG-7 |
| JB-04 | RG-6 |
| JB-07 | RB-15 |
| JB-08 | RD-5 |
| JB-09 | RD-4 |
| JB-10 | RB-14 |

Question three:

The template solves the “bouncing” effect problem by defining a debounce time in the program. When the button is pressed, the template runs through a null for loop through the number of times given by the debounce time constant. This causes the program to ignore the bouncing inputs from the switch during that debounce time.

Question four:

When the button is pressed, it sets the variable buttonLock to 1, or true. The state transition logic can only be activated under the condition that there is an logical high value input from button 1 and that the button is not locked. When the button is released, it gives a logical low value input. In order for the button to then be unlocked, the button must both be released and locked, in order to trigger the if statement which sets the buttonLock value to false, or a logic low value.