Report

Laboration 3

Interrupt

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Contents

1 Task 1: First interrupt

Write a program that turns **ON** and **OFF** a LED with a push button.The LED will be extinguished when pressing the button.The program will use Interrupt.Connect the push buttons to PORT D.The program should have a main program that runs in a loop and wait for the interrupts. An interrupt routine is called when the push button is pressed. Each time the button is pressed, the lamp should switch from **OFF** to **ON**, or from **ON** to **OFF**.

1.1 Assumption

- We assume that user use SW0 that connected to PORTD when using interrupt.
- The switch on the board can buggy and make the LEDs light up in the wrong way

1.2 Flowchart

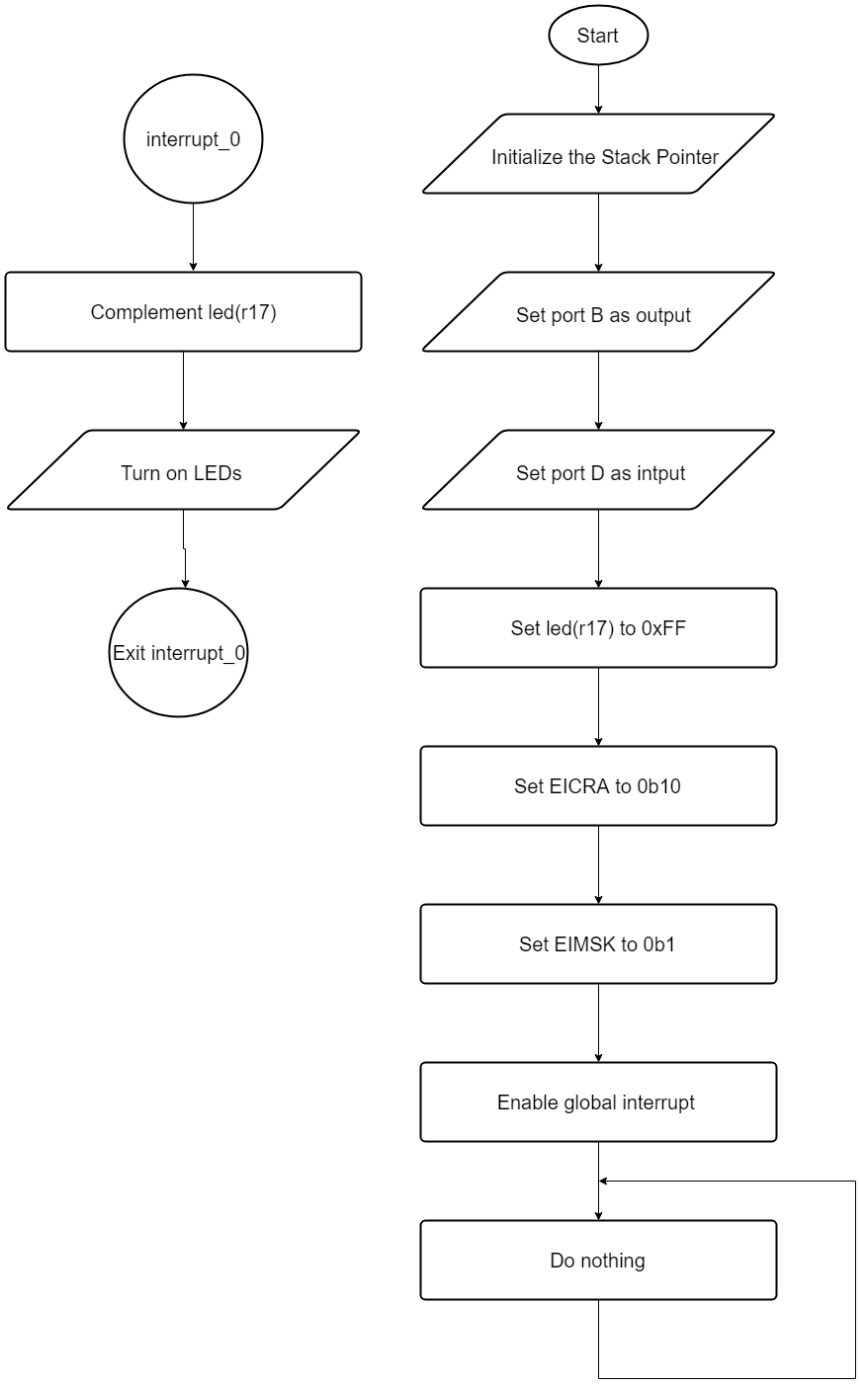

Figure 1: Flowchart for task 1

2 Task 2: Switch–Ringcounter/ Johnsoncounter, with interrupt

Write a program that by means of a switch can choose to flash 8 LEDs either in the form of a ring counter or in the form of a Johnsoncounter. Use the switch SW0 connected to PORTD to switch between the two counters. Each time the button is pressed, a shift between the two counters should take place.By using interrupts you'll swap directly with no delay.

2.1 Flowchart

see next page

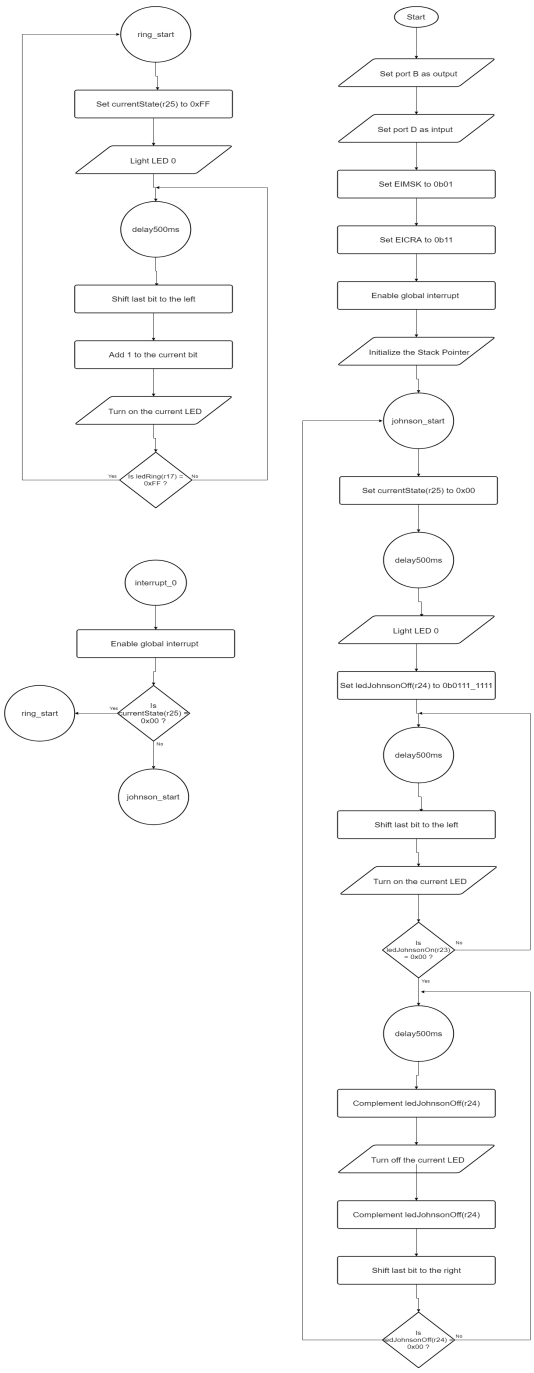

Figure 2: Flowchart for task 2

3 Task 3: Rear lights on a carInterrupt.

Program that simulates the rear lights on a carThe8LEDs should behave likethe rear lights.

Functions:
Normal light: LED 0, 1, 6 and 7 'ON'.
Turning right: LED 6–7 on, LED 0–3 blinking as RING counter.
Turning left: LED 0–1 on, LED 4–7 blinking as RING counter.

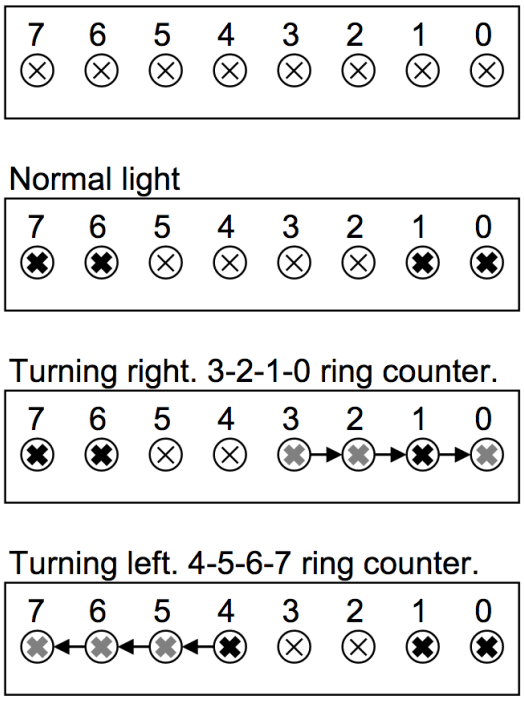

Figure 3: LEDs state

3.1 Assumption

We assume that user use:

- SW1 for turning right
- SW2 for turning left
- SW3 for go back to normal state(normal light)

3.2 Flowchart

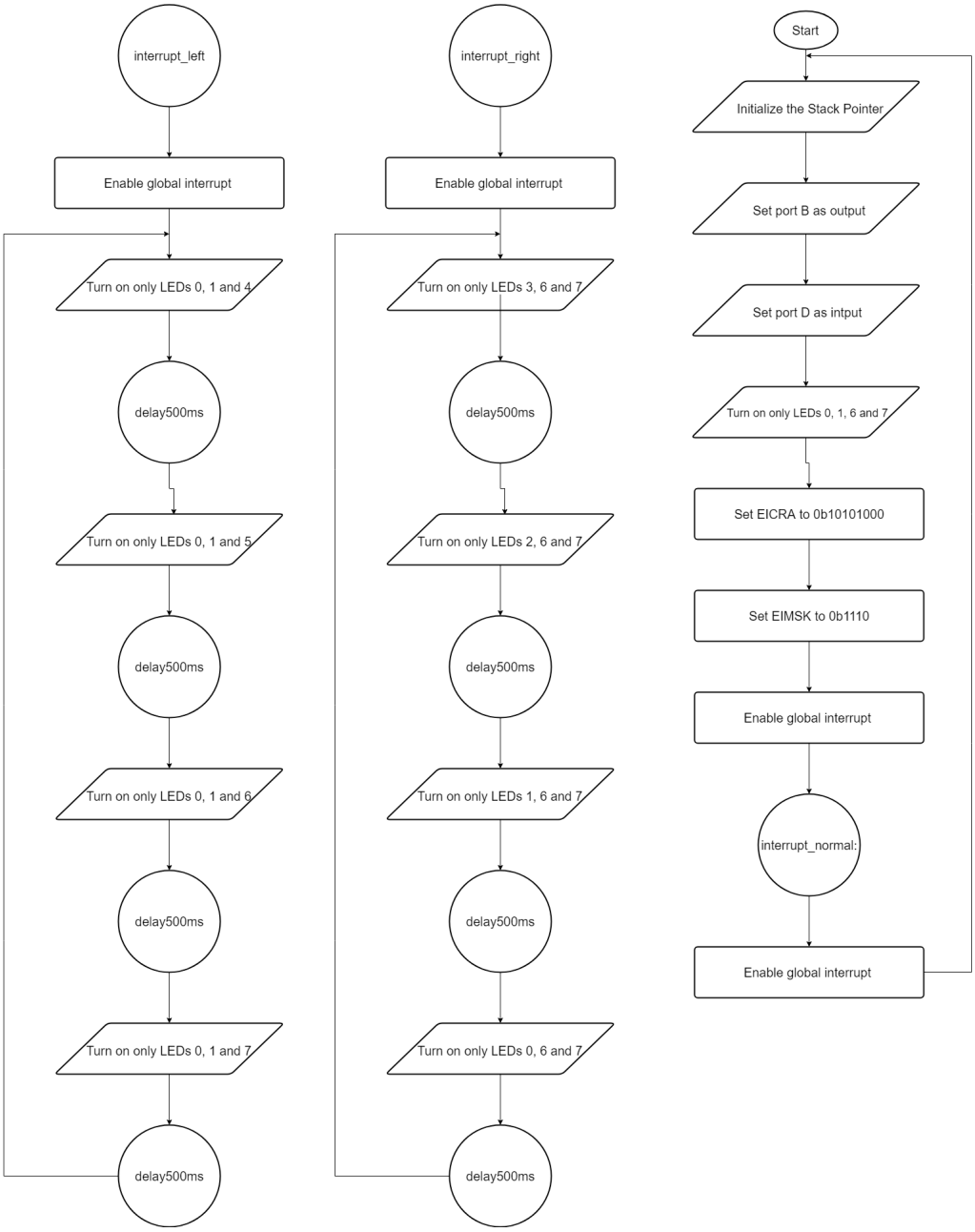

Figure 4: Flowchart for task 3

4 Task 4: Rear lights on a car, with light for brakes

Add function for the stop light to the previous task. When braking, all LEDs light up,if blink on the right or left is not going on.
Turning right and brake LED 4–7 on, LED 0–3 blinking as RING counter.
Turning left and brake LED 0–3 on, LED 4–7 blinking as RING counter.
Use INT2 for the Brake.

4.1 Assumption

- We assume that user use:

  SW0 for break

  SW1 for turning right

  SW2 for turning left

  SW3 for go back to normal state(normal light)

  SW0 then SW1 for turning right and brake

  SW0 then SW2 for turning left and brake

- When user SW3(normal light) Then SW3(brake) then SW3 or SW4. User might need to press SW3 or SW4 2 times before the lights will work the way it should be. This is Unknown issues that we try to fix, but we couldn't

4.2 Flowchart

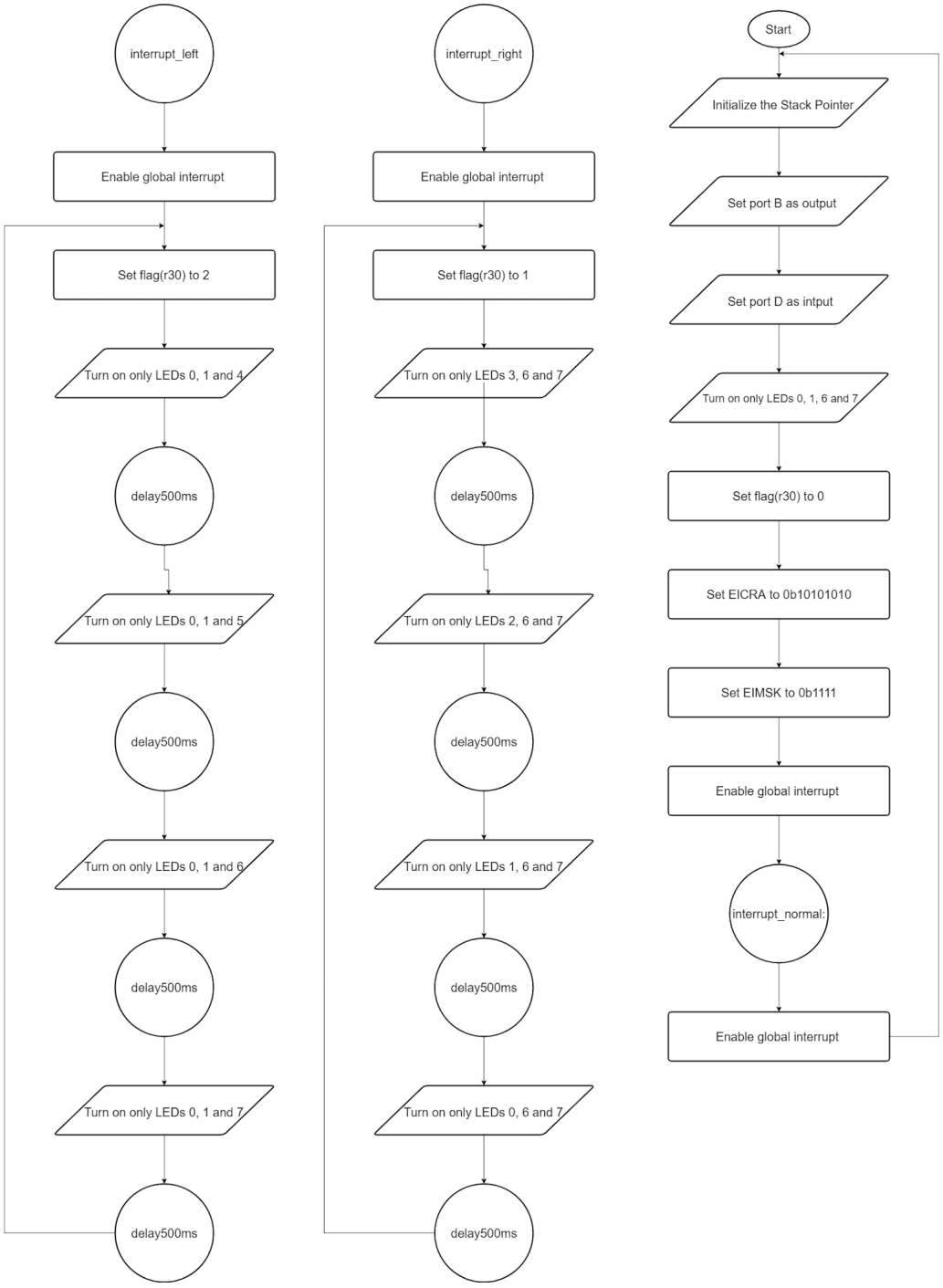

Figure 5: Flowchart for task 4 part 1

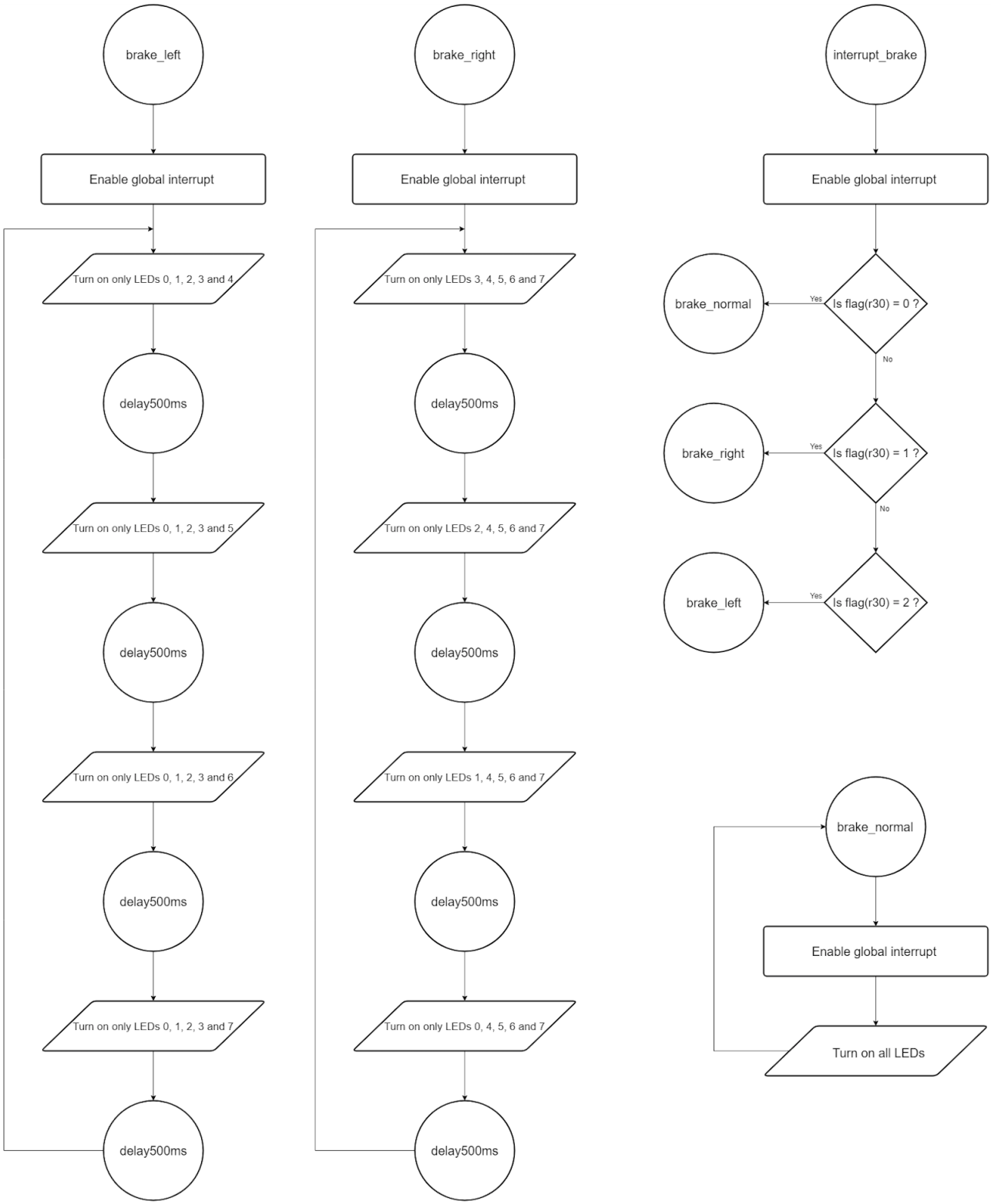

Figure 6: Flowchart for task 4 part 2