ECE3073 Malaysia
Sem 1, 2024
Lab 2 Task

Name:

Student ID:

Date:

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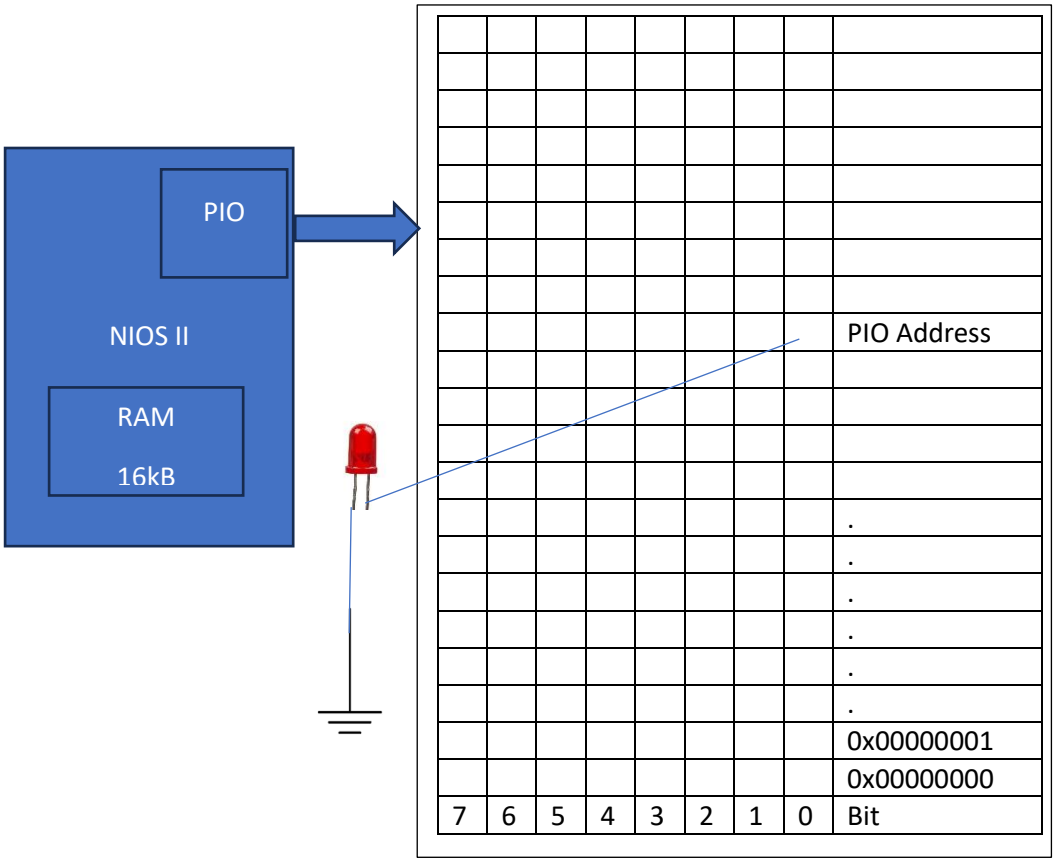
LAB 2: MY FIRST NIOS II COMPUTER AND INSTRUCTION TIMING CALCULATION

Using the demo video complete the task 1 to 4 for Lab 2 completion

1. **Task 1**

Setting up a NIOS II computer system with memory of 16KB RAM and a single LED (LED0) in DE10-LITE board is interfaced. Further we write a NIOS assembly code to keep it ON. Use Quartus 18.1 Prime edition and Eclipse to complete this task.



Demonstrated Single LED interfaced and LED is ON: YES/NO

Task 2

In addition to the above task , instead of one LED , now interface 8 LEDs in DE10-Lite board (LED0 to LED7) and display all the 8 LEDs to ON state.

Demonstrated 8 LED interfaced and LED is ON: YES/NO

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Task 3

Now, in addition to the above task, interface a general purpose pin GPIO- 3 to the NIOS -II controller. Connect this GPIO pin to oscilloscope and measure the time taken by NIOS to execute instruction "stwio".Using suitable NIOS assembly code and follow the video instructions to complete this task.

```
stwio r0, 0(r4)
```

```
practical value: 180 ns
```

```
theoretical value: 120 + delay
```

Task 4

In addition to the above task, using the same technique as above , practically identify the execution time of typical r – type, j-type and I- type instructions and fill the table below.

Instruction type	Instruction	Practical time taken by instruction measured using oscilloscope	Theoretical value from datasheet
R- Type	add r6,r7,r8	140 ns	120 ns
J-Type	Jmp 0x4000	140 ns	120 ns
I- Type	addi r8,r9,0x10	140ns	120ns