**Lab Sheet 1: Introduction to Keil μVision**

Submit before the end of your week 3 lab session

# Answer Sheet

*This sheet should be printed out and handed in during the lab session. It can be completed either electronically or by hand.*

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| **Name** | Bruno Luiz da Silva |
| **Student number** | 150724708 |
| **Date submitted** | 02/10/2015 |

## Questions from The Lab

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| **Question** | | **Answer** |
| 1 | What is the address (in hex) of the data output register for the green LED? | 400F\_F040 |
| 2 | Which GPIO port is used for the green LED? | Port B |
| 3 | Which bit number in the relevant GPIO port controls the green LED? | 19 |
| 4 | Copy the C code statements used to light the red and blue LEDs only (2 lines).  Briefly explain how the code works. | PTB->PDOR = ~ MASK(RED\_LED\_POS);  PTD->PDOR = ~ MASK(BLUE\_LED\_POS);  First it turns on the RED LED at GPIO port B, setting the bit 18 only. After it turns on the BLUE at GPIO port D, setting the bit 1 only.  After that, the LED became some kind of pink. |

## Viva Record

Task 1: Demonstrate the program flashing multiple lights.

Task 2: Demonstrate the use of the variable to count flashes in the debugger.

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| **Viva comment (completed by TA / lecturer)** | Name: |
| **Name:** |  |

## Question about concepts

Answer the following questions concisely:

1. Explain what is meant by memory mapped I/O. [***Between 5 and 30 words***]
2. Using memory mapped I/O what instructions are used for output, in both C and assembly code. (Note: no need to state a specific ARM instruction code). [***Between 5 and 30 words***]

## Feedback

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| **Marker** | **Date** | **Grade** |
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