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School of Computing, Engineering and Mathematics

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| **Assessment Brief Form** |

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| Module Title: | Embedded Architecture & Programming |
| Module Code: | CI116 |
| Author(s)/Marker(s) of Assignment | Saeed Malekshahi |

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| Assignment No: | 2 |
| Assignment Title: | **Traffic Light Simulation** |
| Assignment weighting: | 35% |
| Module Learning Outcome/s Covered: (Refer to module syllabus) | This assignment Meets and examines the learning outcomes of the Course as state in the module specification namely **LO5, LO6, LO7** |

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| Assignment Brief and Assessment Criteria: |
| **Assessment Criteria**  The University Grading Criteria is used to mark your work.  At the end of the period allocated to this assignment, you will be assessed and a verbal feedback on the work will be provided to you. You need to submit the report electronically using student central (blackboard). The work will be e-marked and e-feedback will be provided to you. You are also required to attend a viva session where you are asked questions which relate to the assignment. This is in your benefit as it enable you to explain your algorithm and help me to assess your understanding of the program. Your submission will not be marked if you do not attend viva. |

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| Date of issue: | 19 February 2018 |
| Deadline for submission: | 10 March 2018 11:55 PM |
| Method of submission: | E-Submission |
| Date feedback will be provided | 09 April 2018 |

1. A copy of your coursework submission may be made as part of the University of Brighton’s and School of Computing, Engineering & Mathematics procedures which aim to monitor and improve the quality of teaching. If a copy is made, it will be kept only for this purpose and will be destroyed once this purpose has been fulfilled. You should refer to your student handbook for details.
2. All work submitted must be your own (or your team’s for an assignment which has been specified as a group submission) and all sources which do not fall into that category must be correctly attributed. The markers may submit the whole set of submissions to the JISC Plagiarism Detection Service.

Traffic light simulation

In this lab activity you are requested to simulate a real traffic light environment.

The task required:

* Obtain an Arduino Uno Board and connect it to the PC.
* From the computing programmes select Arduino program.
* Using Microsoft Visio, draw a flow chart of a simple four-phase traffic light.

You can install Visio on your home devices using Microsoft Imagine. Use the link below.

<https://e5.onthehub.com/WebStore/ProductsByMajorVersionList.aspx?ws=51e53aff-ba8b-e011-969d-0030487d8897&JSEnabled=1>

* Write the programme in “C” and test its functionality.

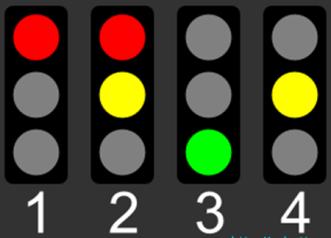


Figure 1 - four phase traffic lights

* Modify your flow chart to show the operation of a junction with *two* four-phase traffic lights.
* Write a program in “C” to show its operation.

* Include in the flowchart a pedestrian crossing, using a single green LED (or both RED and green if you prefer). Requirements:
  1. Write a function to control each of the traffic lights

E.g. **void TrafficLight1 (int red, int amber, int green);**

* 1. Use the serial port to simulate the pedestrian pressing the button
  2. Both sets of traffic lights should be red in order for the pedestrians to cross safely.
  3. The pedestrian green LED should flash as a warning that the main lights are about to start up
  4. The main lights should sequence to and from pedestrian crossing mode in a safe and tidy sequence.
  5. The state of the lights should be written to the serial port

E.g. “L1 = ON ON OFF L2 = OFF ON OFF PED = ON OFF means traffic light 1 is RED/AMBER, traffic light 2 is AMBER, pedestrian crossing is RED

* Write a “C” program to implement the flow chart.

You need to write up the work performed and submit it including source code, flow charts and reflection during the time specified.