

Advanced Diploma of Remote

Engineering, Mechatronics

and Robotics

(DMC - 52872WA)

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| --- | --- | --- | --- | --- |
| **Student full name:** | |  | | |
| I certify that the attached assessment is my own work and that any material drawn from other sources has been acknowledged.  Copyright in assessments remains my property, however  I grant permission to the Engineering Institute of Technology (EIT) to make copies of assessments for assessment, review and/or record keeping purposes.  I note that the EIT reserves the right to check my assessment for plagiarism.  Should the reproduction of all or part of an assessment be required by the EIT for any purpose other than those mentioned above, appropriate authorisation will be sought from me on the relevant form. | | | | |
| Please place a tick (☑) in the box below to indicate that you have read, understood, and certify the above statement.  Please include this page in/with your submission.  Any electronic responses to this submission will be sent to your Moodle account.  **AGREEMENT**       **DATE:** | | | | |
|  | | | | |
| Achieved / To be Achieved: | | | | |
| Assessor: |  | | Date: |  |
| Overall feedback: |  | | | |

**Guidelines for Students**

**How is this unit assessed?**

After completion of this assessment, you will be given a result of ‘Achieved’ or ‘To be Achieved’. The assessor will give you feedback via Moodle and you will have an opportunity to submit additional evidence if you have received a ‘To be Achieved’ result.

You will be allowed one (1) opportunity to resubmit the same assessment task, if required.

Once all assessment tasks for this unit have been completed, you will be given a final unit result of ‘Competent’ or ‘Not Yet Competent’. If you are deemed ‘Not Yet Competent’ in a unit after all resubmission attempts, you will be required to re-sit the unit.

**How is this assessment task assessed?**

For a result of ‘Achieved’ in this assessment, all unit elements must be completed to a satisfactory standard.

At Advanced Diploma level a ‘satisfactory’ standard, as stipulated by the Australian Qualifications Framework, means that you will demonstrate the application of knowledge and skills:

* with depth in areas of specialisation, in contexts subject to change
* with initiative and judgment in planning, design, technical or management functions with some direction
* to adapt a range of fundamental principles and complex techniques to known and unknown situations
* across a broad range of technical or management functions with accountability for personal outputs
* personal and team outcomes within broad parameters

Assessors also make decisions based on the following considerations:

* all parts of this assessment have been completed to a standard that satisfactorily meets the requirements set out in the assessment criteria (as per the unit outline).
* the assessment evidence provided is the student’s own work, except as appropriately acknowledged by the use of referencing.
* the evidence is recent and the student’s knowledge is up-to-date.

**Assessment Instructions:**

1. You must answer ALL questions.
2. Please ensure you complete your answers in a blue font (not red or black).
3. The best marks can be earned by giving concise, brief answers that address the questions.
4. You must reference all content used from other sources including course materials, slides, diagrams, etc. Do not directly copy and paste from course materials or any other resources.   
   Refer to the referencing section of the EIT eLibrary on Moodle for referencing guides.
5. Use this document for completing your answers by typing the answers after each question without deleting the question. Make sure that you preserve the original question number format.
6. Do not add extra pictures, etc. as annexures; instead, paste them directly into this answer sheet. Hand-drawn sketches can be inserted after scanning but please ensure that the file size does not become big (more than 10 MB). You must refer to all diagrams and pictures, etc. that you have drawn or pasted in.
7. When saving your document (must be Word format), ensure you include your name in the title: COURSECODE\_MODULE#\_ASSESSMENTTYPE\_VERSION#\_YOURNAME

**E.g. DMC\_DMCKPL612\_PracticalAssessment\_v1\_JohnSmith**

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| --- | --- |
| **Unit no. and name:** | **DMCKPL612: Create control functions for robotics programming languages** |
| **Assessment type:** | **Practical Assessment** |

**Elements covered in this assessment:**

Element 1: Develop a program to implement a given robotics control function

Element 2: Develop a PLC program

Answer all questions.

This first part of the practical requires you to download and install the Arduino IDE software. Please go to http://www.arduino.cc/en/Main/Software and download Arduino IDE for your computer. The latest version is Arduino 1.0.5. Install and launch the software.

This final part or question of this practical requires you to download and install the Arduino IDE software. Develop and Compile the PLC program using Ladder logic on Codesys or Logix Pro for the Traffic light change over as described in the Problem statement.

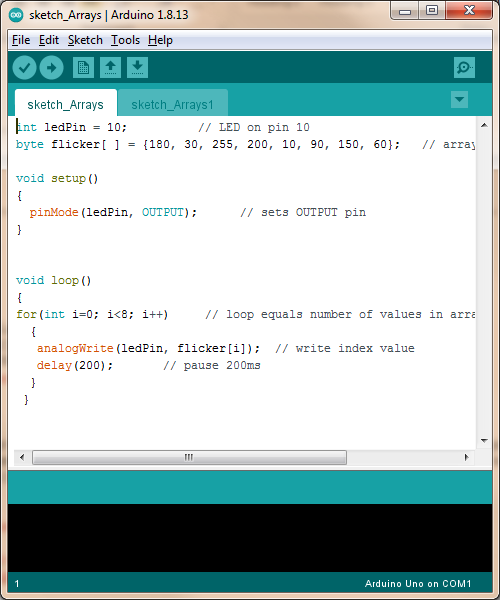


Figure 1 Arduino IDE interface.

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| **Q1** | **Blinking**  We want to create a program that continuously turns pin 13 ON waits for 1second then turns pin 13 OFF, then waits 1 second and turns pin 13 back ON. Write the Arduino code with comments to control the pin 13. | | | |
| **A1** | Student Answer | | | |
| **F1** | Assessor Feedback | Achieved | |  |
| To be achieved | |  |
|  |  | | | |
| **Q2** | **Turning ON/OFF a list of pins**  We want to create a program that repeats the following sequence continuously:  Turn pin 5 ON  Wait 1 second  Turn pin 5 OFF  Wait 1 second  Turn pin 6 ON  Wait 1 second  Turn pin 6 OFF  … // do the same for pins 7, 8, 9  Turn pin 10 ON  Wait 1 second  Turn pin 10 OFF  Write the Ardiuno code with comments and compile the program by using arrays and for loops. Take a screen shot of your code and paste it below. | | | |
| **A2** | Student Answer | | | |
| **F2** | Assessor Feedback | Achieved | |  |
| To be achieved | |  |
|  |  | | | |
| **Q3** | **Create a flowchart**  Below is a list of suggested websites and software programs that you can use to create a flowchart:  http://www.code2flow.com [website]  https://www.draw.io [website]  http://www.flowgorithm.org [software]  http://raptor.martincarlisle.com [software.  Use any flowchart software or website in order to create the flowchart for the following pseudocode:  while(1)  {  Strobe light;  Capture image;  Analyze image;  if(size > 10)  {  Accept product;  }  elseif(size>5)  {  Mark as low quality product;  }  else {  Reject product;  }  }  Paste the flowchart that you created below. | | | |
| **A3** | Student Answer | | | |
| **F3** | Assessor Feedback | Achieved | |  |
| To be achieved | |  |
|  |  | | | |
| **Q4** | **Traffic light control sequence flowchart**  A typical traffic light control sequence for a 4 road junction has been described below (for a road system where the vehicles keep to their left while driving i.e. Australia, UK, South Africa etc).  The light changes as per the sequence listed below:   1. Before switch ON, all 4 roads should get ‘flashing yellow’ so as to enable them to look around and cross the road junction. 2. When switched ON, Main roads 1 & 3 should get green signals G1/G3 to go straight. This signal remains on for 30 seconds. 3. The above signals should be changed over to go right GR1/GR3 for 15 seconds only if any sensor S1/S3 of vehicles waiting to turn right is detected in the right turn lane . This will take place after a brief yellow signals Y1/Y3 in between. 4. In case no vehicle is waiting for right turn, the roads 1 & 3 should be closed with red signals R1/R3 and interim yellow signals Y1/Y3 for 2 seconds. 5. The above procedure steps B-D should be repeated for side roads 2 & 4. 6. The signalling continues from steps B-E till switched off. 7. The timings for straight or right turns should all be programmable. For all changes from Green to Red, interim Yellow signals should be used.   Draw a simple flow chart that describes the process requirement for the Traffic light change over as listed in the problem statement. | | | |
| **A4** | Student Answer | | | |
| **F4** | Assessor Feedback | Achieved | |  |
| To be achieved | |  |
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| **Q5** | **Compile the PLC program**  Compile the PLC program using Ladder logic on Codesys or Logix Pro for the Traffic light change over as described in the Problem statement. Capture the Screenshots of the Ladder logic program as well the run sequences of the program and list it below with the explanation of the actions in line with the requirements for the Traffic light problem statement. | | | |
| **A5** | Student Answer | | | |
| **F5** | Assessor Feedback | | Achieved |  |
| To be achieved |  |

**END OF ASSESSMENT**