10 Computing Technologies

Task 2: Group Task Robomaster

Due Date: 24th June 2024

Task Distributed: 30/05/2024

Unit: Building Mechatronic Automated Systems

Task Type: Group Project

Task Weighting: 30%

Outcomes: C5-DPM-01, CT5-COL-01, CT5-OPL-01, CT5-THI-01

Task Description

In groups, you need to code **THREE** Robomaster EPs to complete one of the following tasks:

- The **Sorter 1 Robot** will need to pick up the cardboard box and place it on the Carrier Robot
- The **Carrier Robot** will need to navigate a course and deliver the payload to the third Robomaster
- The **Sorter 2 Robot** will need to retrieve the box from the Carrier Robot and place it in a designated zone.

In addition to coding the Robomaster in Python, your group will also need to design, develop and implement code to control a **Lego Mindstorm Robot** to perform the following:

- Follow the Carrier Robot at a constant distance of 30 cm

Part A - Group Folio:

The folio should contain the following:

1. **Design:**
   a. **Introduction:** Briefly state the problem definition and each group member and their role(s).

   b. **Content:** Describe the functional and nonfunctional requirements of the mechatronic system.

2. **Journal:** A journal of the development of the project solution that accurately illustrates the process of completing the task. It should clearly show modifications made to the code, problems and solutions encountered.

3. **Test Data (Desk Check)**: Your group will need to thoroughly test the algorithms developed using a range of test data.It should clearly demonstrate errors or bugs found in the algorithm.

4. **Evaluation**: An evaluation of the project which involves discussing the areas of success and improvement based on all **FOUR** robots in the project.

Part B - Practical Submission:

1. **Code:** Your group will need to include code for both the Robomaster in Python, and the Lego Mindstorm robot in block coding. This should include Python code for each of the THREE robots and Block code for the LegoMindstorm.

2. **Film:** Your group will need to film the Robomaster EPs and Lego Mindstorm complete the course to retrieve and deliver the box as described above.

NESA Glossary of Key Words

Understand the verb associated with the task. The verb will provide an understanding of the detail needed to successfully answer the question.

- **Describe:** Provide characteristics and features.
- **Evaluate**: Make a judgement based on criteria. Determine the value of.

Check the NESA Glossary of Key Words for further guidance https://educationstandards.nsw.edu.au/wps/portal/nesa/11-12/hsc/hsc-student-guide/glossary-keywords

Details of Submission

Group Folio submitted as a Google Doc and robots footage as an .mp4 video or link inside the folio to Google Classroom.

Teacher Feedback and Student Self-Reflection

- The task will typically be returned to students within 14 Days of the due date.
- At this time feedback including information on how to improve will be provided through Google Classroom for details of feedback.
- Students can clarify or seek further feedback by the speaker with their teacher or the assessment marker.
- You will also receive feedback on your literacy performance based on the criteria in the school's literacy marking rubric. The marks achieved for literacy will account for between 10% – 20% of the maximum task value.

Upon return of the task, students will also be expected to complete a self-reflection.

INSERT Indicate how you would like students to reflect on the completed task. This may include completion of a self-reflection worksheet or form, paper-based or digitally, resubmission of a section of the task, a goal statement on how they will use their task to improve their learning etc.

How does this link to my learning?

- Enhanced Understanding: Deepen their comprehension of the subject matter by applying it practically.
- Skill Development: Improve critical thinking, analytical, and problem-solving skills.
- Practical Application: Gain experience in applying classroom theories to real-world contexts.
- Collaboration: Develop teamwork and communication skills if the task involves group work.
- Self-Assessment: Reflect on their learning process and identify areas for improvement.

Assessment Procedures

All students should be fully aware of the School Assessment Procedures for their year group. These were provided at the beginning of the school year and are available off the school website under the Learning Tab for each year group.

Part A - Group Folio:					
Criteria	**1**	**2**	**3**	**4**	**5**
Design	Identifies ONE design requirement to complete the scenario.	Provides an outline of the design requirements for the mechatronic system to complete.	Satisfactorily describes the design requirements of the scenario for the mechatronic system to complete.	Thoroughly clarifies the design requirements of the scenario for the mechatronic system to complete.	Extensively clarifies the design requirements of the scenario for the mechatronic system to complete.
Journal	Students incorrectly record the journey of completing and modelling a system. The record is limited and incomplete and is presented inappropriately.	Students provide a basic record of project development that inaccurately illustrates the journey of completing the system. The record contains incomplete lesson by lesson accounts of work completed.	The record contains lesson by lesson accounts of work completed which includes, discussions, evaluations, images and milestones precisely timestamped and is presented appropriately.	The record contains detailed lesson by lesson accounts of work completed which includes, discussions, evaluations, images and milestones precisely timestamped and is presented in a professional manner.	The record contains detailed and accurate lesson by lesson accounts of work completed which includes, discussions, evaluations, images and milestones precisely timestamped and is presented in a professional manner.
Test Data	Test data is incomplete and/or lists some test cases (four robots).	Test criteria for components of the mechatronic system have been identified (four robots).	Test criteria for components of the mechatronic system are outlined (four robots).	Descriptive test criteria for components of the mechatronic system is used (four robots).	There are extensive test criteria for components of the mechatronic system (four robots).
Evaluation	Evaluation is incomplete and/or lists some areas of success or for improvement in the robots	Evaluation identifies some areas of success and/or areas for improvement for some robots.	Evaluation outlines areas of success and areas for improvement based on predetermined functional and non-functional requirements of all FOUR robots	Evaluation describes areas of success and areas for improvement based on predetermined functional and non-functional requirements of all FOUR robots	Evaluation is detailed, objective and explains areas of success and improvement based on predetermined functional and non-functional requirements of all FOUR robots
				TOTAL	**/20**

Part B - Practical Submission:					
Criteria	**1**	**2**	**3**	**4**	**5**
Python Code - Sorter 1 RoboMaster "HOMER"	Students coded solution shows little logical structure with few examples of correct syntax and readable code, and does not fully solve components identified in the mechatronic system.	Students apply problem-solving skills to code a solution, using Python, that shows some basic logical structure, using some correct syntax, includes some comments and solves some components identified in the mechatronic and/or automated system.	Students apply problem-solving skills to code a solution that follows a sound logical structure, using mostly correct syntax, has a sound level of readability and comments, and solves most components identified in the mechatronic system using Python.	Students apply thorough problem-solving skills to code a solution that follows a mostly logical structure, using mostly correct syntax, contains comments and an accurate and reliable algorithm which is mostly free of syntax and logic errors, is mostly readable, and solves the majority of the components identified in the mechatronic system using Python.	Students apply extensive problem-solving skills to code a solution that follows a logical structure, using the correct syntax, contains an accurate and reliable algorithm which is free of syntax and logic errors, is highly readable and efficient, and solves all components identified in the mechatronic system using Python. Includes extensive comments explaining all components of the code.
Python Code - Carrier RoboMaster "DERVIS"	Students coded solutions show little logical structure with few examples of correct syntax and readable code, and do not fully solve components identified in the mechatronic system.	Students apply problem-solving skills to code a solution, using Python, that shows some basic logical structure, using some correct syntax, includes some comments and solves some components identified in the mechatronic system.	Students apply problem-solving skills to code a solution that follows a sound logical structure, using mostly correct syntax, has a sound level of readability and comments, and solves most components identified in the mechatronic system using Python.	Students apply thorough problem-solving skills to code a solution that follows a mostly logical structure, using mostly correct syntax, contains comments and an accurate and reliable algorithm which is mostly free of syntax and logic errors, is mostly readable, and solves the majority of the components identified in the mechatronic system using Python.	Students apply extensive problem-solving skills to code a solution that follows a logical structure, using the correct syntax, contains an accurate and reliable algorithm which is free of syntax and logic errors, is highly readable and efficient, and solves all components identified in the mechatronic system using Python. Includes extensive comments explaining all components of the code.
Python Code - Sorter 2 RoboMaster "ROBDOG"	Students coded solution shows little logical structure with few examples of correct syntax and readable code, and does not fully solve components identified in the mechatronic system.	Students apply problem-solving skills to code a solution, using Python, that shows some basic logical structure, using some correct syntax, includes some comments and solves some components identified in the mechatronic system.	Students apply problem-solving skills to code a solution that follows a sound logical structure, using mostly correct syntax, has a sound level of readability and comments, and solves most components identified in the mechatronic system using Python.	Students apply thorough problem-solving skills to code a solution that follows a mostly logical structure, using mostly correct syntax, contains comments and an accurate and reliable algorithm which is mostly free of syntax and logic errors, is mostly readable, and solves the majority of the components identified in the mechatronic system using Python.	Students apply extensive problem-solving skills to code a solution that follows a logical structure, using the correct syntax, contains an accurate and reliable algorithm which is free of syntax and logic errors, is highly readable and efficient, and solves all components identified in the mechatronic system using Python. Includes extensive comments explaining all components of the code.

Part B - Practical Submission:					
Criteria	**1**	**2**	**3**	**4**	**5**
Python Code - Sorter 1 RoboMaster "HOMER"	Students coded solution shows little logical structure with few examples of correct syntax and readable code, and does not fully solve components identified in the mechatronic system.	Students apply problem-solving skills to code a solution, using Python, that shows some basic logical structure, using some correct syntax, includes some comments and solves some components identified in the mechatronic and/or automated system.	Students apply problem-solving skills to code a solution that follows a sound logical structure, using mostly correct syntax, has a sound level of readability and comments, and solves most components identified in the mechatronic system using Python.	Students apply thorough problem-solving skills to code a solution that follows a mostly logical structure, using mostly correct syntax, contains comments and an accurate and reliable algorithm which is mostly free of syntax and logic errors, is mostly readable, and solves the majority of the components identified in the mechatronic system using Python.	Students apply extensive problem-solving skills to code a solution that follows a logical structure, using the correct syntax, contains an accurate and reliable algorithm which is free of syntax and logic errors, is highly readable and efficient, and solves all components identified in the mechatronic system using Python. Includes extensive comments explaining all components of the code.
LEGO Mindstorm	Students coded solutions show little logical structure with few examples of correct syntax and readable code, and do not fully solve the problem definition.	Students apply basic problem-solving skills to code a solution that shows some basic logical structure, using some correct syntax, includes some comments and solves part of the problem definition.	Students apply problem-solving skills to code a solution that follows a sound logical structure, using mostly correct syntax, has a sound level of readability and comments, and solves most of the problem definition.	Students apply thorough problem-solving skills to code a solution that follows a mostly logical structure, using mostly correct syntax, contains comments, has a high level of readability and solves the majority of the problem definition.	Students apply extensive problem-solving skills to code a solution that follows a logical structure, using correct syntax, contains comments, is highly readable and efficient and solves the problem definition.
Film	Students provide an incomplete video that incorrectly illustrates the robot(s) completing the course and/or objectives.	Students provides an incomplete video that illustrates the robot(s) completing the course and objectives.	Students compile and presents a well organised and sequenced video. The video illustrates the robots completing some of the objectives. The video is well made and presented. Video has been exported.	Students compile and presents a well organised and sequenced video that accurately demonstrates their robots completing the objectives. The video is professionally made and presented. Video exported in the correct format (.mp4).	Students compile and present a well organised and sequenced video video that accurately demonstrates their robots completing the objectives. The video extensively and accurately illustrates the three robots navigating the course and completing their objective. The video is professionally made, exported as .mp4 and presented including use of titles.
					Total /30

Literacy Criteria

Literacy Outcomes	Elementary achievement You have:	Limited achievement You have:	Satisfactory achievement You have:	High achievement You have:	Outstanding achievement You have:
Vocabulary *Uses technical vocabulary to explain concepts and/or range of precise and appropriate words for effect*	Very limited response. Few content words used.	Only simple words are used.	Some precise and technical words are used.	Sustained use of precise and technical words.	Sustained, consistent and fluent use of precise and technical words.
	0	0.25	0.50	0.75	1
Punctuation *Use of correct and appropriate sentence and other punctuation for effect, and to aid in reading of the text*	No evidence of correct sentence punctuation.	Sentence punctuation is correctly used in at least one place - *one sentence is punctuated correctly.*	Some correct sentence level punctuation (at least 50%). May attempt other punctuation where it is required.	Mostly correct sentence level punctuation (80%) and at least two correct examples of other punctuation.	Writing contains accurate use of all applicable punctuation.
	0	0.25	0.50	0.75	1
Sentences & Cohesion *The intentional construction of a variety of sentences to match purpose and audience, and the control of multiple sentence threads across the whole text.*	No clear evidence of sentences: a list of words OR text fragments.	At least one sentence is used correctly. Some meaning can be construed from the text.	Some correct formation of sentences. Mainly uses simple and compound sentences, but may attempt more complex structures.	Most sentences are correct. Range of sentence types and connectives are evident, but with varied effectiveness.	All sentences are correct, effective and controlled, and include a range of sentence types and connectives (complex sentences and other sophisticated structures)
	0	0.25	0.50	0.75	1
Paragraphs *Paragraphs are used to effectively structure information and partition events and ideas*	No correct use of paragraphing; may be a block of text or random breaks.	Ideas are separated; paragraphs may contain some unrelated ideas.	At least ONE paragraph is well structured and develops an idea	Writing is organised into paragraphs that assist the reader to digest chunks of the text, but may not be linked or executed effectively.	All components of the paragraphs are evident and paragraphing is consistent and well-developed across the whole text.
	0	0.25	0.50	0.75	1
Text Structure *Uses features of the appropriate text type*	No evidence of the structural features of the appropriate text type. *No attempt to write in the appropriate text type and/or response is off task.*	Minimal evidence of the structural features - *1 component evident* - of the appropriate text type.	Some evidence of the structural features - *2 components evident* - of the appropriate text type.	Substantial evidence of the structural features - *all components evident but there may be some lapses* - of the appropriate text type.	Coherent and controlled use of **all** the appropriate structural features of the text type.
	0	0.25	0.50	0.75	1
	Level of response is well below syllabus expectation	Level of response is below syllabus expectation	Level of response is equivalent to syllabus expectation	Level of response is above syllabus expectation	Level of response is well above syllabus expectation
			Literacy Criteria Total		**/5**
			GRAND TOTAL		**/55**