

Task 2: LEGO Spike Prime

Due Date: 3 Jun 2025 Week 6B Term 2

Distributed: 5 May 2025	Weighting: 30%
Task Type: Group Project	Unit: Building Mechatronic Automated Systems
Syllabus Outcome/s: <ul style="list-style-type: none"> ● CT5-DPM-01: applies iterative processes to define problems and plan, design, develop and evaluate computing solutions ● CT5-COL-01: manages, documents and explains individual and collaborative work practices ● CT5-OPL-01: designs, produces and evaluates algorithms and implements them in a general-purpose and/or object-oriented programming language ● CT5-THI-01: applies computational, design and systems thinking to the development of computing solutions 	

Task Description

In your project, you will need to design and implement an algorithm for the **LEGO SPIKE PRIME** to collect a box, and then to navigate an obstacle course by following a line.

Part A - LEGO Spike Folio

The folio should contain the following:

1. **Identifying and defining:**
 - a. **Problem definition:** Describe the problem definition.
 - b. **Functional and non-functional requirements:** Describe the functional and nonfunctional requirements of the mechatronic system.
2. **Record of project development:** Create an extensive record of project development that accurately illustrates detailed and accurate lesson--by-lesson accounts of work completed which includes discussions, evaluations, images and milestones precisely timestamped and presented in a professional manner.
3. **Testing (Desk Check):** Your group will need to thoroughly test the algorithm developed for the robot, using a range of test data. It should clearly test all paths (conditions) of the algorithm.
4. **Evaluation:** An evaluation of the project which involves discussing the areas of success and areas of improvement for the robot used in the project.

NOTE: Your folio will be assessed against the Literacy Marking Criteria.

Part B - Practical

The practical components includes:

1. **Code** - Your group will need to include the code for your LEGO SPIKE.
2. **Video** - Your group will need to film, using the school's iPads, the LEGO SPIKE completing the required task as outlined above. This film is to be exported as a .mp4 file with appropriate titles and effects.

Glossary of Key Words

These verbs will provide an understanding of the detail needed to successfully complete this task:

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

Details of Submission

PART A - Group Folio

Submit the folio and record of production as a PDF on Moodle.

PART B - Practical

Upload the video of your group's LEGO Spike completing the course as an MP4. file and Python code (.py file).

Teacher Feedback and Student Self-Reflection

The task will be returned to students within **14 days** of the due date. Information on how to improve will be provided through written teacher feedback and the marking criteria. Students can clarify or seek further feedback by speaking with their teacher.

Upon return of the task and teacher feedback, students will also be expected to complete the following self-reflection form, to provide them with the opportunity to reflect on the strength of their performance, as well as areas that have been identified to strengthen in future tasks - <https://forms.gle/Ck4y1jid49x7sKfq7>

How does this link to my learning?

This task will allow students to:

- **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

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 menu for each year group.

Marking Criteria

PART A - Group Folio					
Criteria	1	2	3	4	5
Identifying and defining	Identifies ONE aspect in the problem definition or shows no understanding of the problem definition.	Provides an outline of the problem definition for the mechatronic system	Describes the problem definition for the mechatronic system to be solved	Thoroughly clarifies the problem definition for the mechatronic system.	Extensively clarifies the problem definition for the mechatronic system
Functional and non-functional requirements	Identifies ONE design requirement to complete the scenario or shows no understanding of the design requirements.	Provides an outline of the design requirements (functional or nonfunctional) for the mechatronic system to complete.	Describes the design requirements (functional and/or nonfunctional) of the scenario for the mechatronic system to complete.	Thoroughly clarifies the design requirements (both functional and nonfunctional) of the scenario for the mechatronic system to complete.	Extensively clarifies the design requirements (both functional and nonfunctional) of the scenario for the mechatronic system to complete.
Record of project development	Provides an elementary or incomplete record of project development.	Identifies parts of the record of project development. Includes some screenshots.	Outlines the record of project development and includes some evidence of the iterative design process. Provides an outline and dated entries including some screenshots.	Describes record of project development clearly showing the iterative design process and ongoing evaluation. Provides a description and dated entries including screenshots.	Clearly describes the record of project development clearly showing the iterative design process and ongoing evaluation. Provides a clear and detailed description and dated entries including screenshots.
Testing	Test data is incomplete or shows no understanding of estimated data	Test criteria for the algorithm in the mechatronic system have been identified.	Test criteria for the algorithm in the mechatronic system are outlined.	Descriptive test criteria for the algorithm used for the mechatronic system is used.	There are extensive test criteria for the algorithm used for the mechatronic system.
Evaluation	Evaluation is incomplete and/or lists some areas of success or for improvement	Evaluation defines some areas of success and/or areas for improvement	Evaluation outlines areas of success and/or areas for improvement based on predetermined functional and non-functional requirements	Evaluation describes areas of success and areas for improvement based on predetermined functional and non-functional requirements	Evaluation is detailed, objective and explains areas of success and improvement based on predetermined functional and non-functional requirements
					Part A TOTAL / 25

PART B - Practical					
Criteria	1- 4	5 - 7	8-12	13-16	17-20
Code	Students coded solutions show little logical structure with few examples of correct syntax and readable code, and/or doesn't comply and run.	Students Python code shows some basic logical structure, Solves some components identified in the mechatronic system. Contains logical errors within the coded solution.	Students Python code follows a sound logical structure, has a sound level of readability and includes some comments, and solves most components identified in the problem definition. Contains some logical errors within the coded solution.	Students Python solution follows a logical structure. Includes comments and an accurate algorithm that is largely free from logical errors. The solution addresses most components identified in the problem definition.	Students Python code shows excellent problem solving skills and is efficient, highly logical, and includes a reliable algorithm free from logical errors. The solution addresses all components identified in the problem definition.
Criteria	1	2	3	4	5
Film	Students provide an incomplete video that incorrectly illustrates the robot(s) completing the course and/or objectives.	Students provide an incomplete video that illustrates the robot(s) completing the course and objectives.	Students video illustrates the robots completing some of the objectives. The video is well made and presented. Video has been exported.	Students video that accurately demonstrates their robots completing the objectives. The video is professionally made and presented. Video exported in the correct format (.mp4).	Students video 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 exported as .mp4 and presented including the use of titles.
					Part B TOTAL / 25
					OVERALL TOTAL / 50

Literacy Outcomes	Elementary achievement You have:	Limited achievement You have:	Satisfactory achievement You have:	High achievement You have:	Outstanding achievement You have:
	1	2	3	4	5
Vocabulary <i>Uses technical vocabulary to explain concepts and/or range of precise and appropriate words for effect</i>	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.
Punctuation <i>Use of correct and appropriate sentence and other punctuation for effect, and to aid in reading of the text</i>	No evidence of correct sentence punctuation.	Sentence punctuation is correctly used in at least one place - <i>one sentence is punctuated correctly.</i>	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.
Sentences & Cohesion <i>The intentional construction of a variety of sentences to match purpose and audience, and the control of multiple sentence threads across the whole text.</i>	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)
Paragraphs <i>Paragraphs are used to effectively structure information and partition events and ideas</i>	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.
Text Structure <i>Uses features of the appropriate text type</i>	No evidence of the structural features of the appropriate text type. <i>No attempt to write in the appropriate text type and/or response is off task.</i>	Minimal evidence of the structural features - <i>1 component evident</i> - of the appropriate text type.	Some evidence of the structural features - <i>2 components evident</i> - of the appropriate text type.	Substantial evidence of the structural features - <i>all components evident but there may be some lapses</i> - of the appropriate text type.	Coherent and controlled use of all the appropriate structural features of the text type.
	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 Total / 5

GRAND TOTAL /55