Gymea Technology High School
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8 Technology A

Task 2: Design Project Stage 2

Due Date: 17 Oct 2024

Distributed: 2 Sept 2024

Weighting: 40%

Task Type: Project & Folio

Syllabus Outcome/s: TE4-1DP, TE4-2DP, TE4-4DP

Unit: Robotic Design

Task Description

In pairs, using the mBot robots, your group will need to develop an algorithm and code your mBot robot so it can navigate an obstacle course successfully.

PART A - Program

Your robot will need to be able to navigate a pre-designed obstacle course using its sensors, avoiding obstacles along the way. The robot should be able to adapt to changing course conditions and operate autonomously (i.e. with no input from humans while running).

Your solution should include the following programming concepts:

- Loops and If Statements
- Inputs and Outputs
- Use of onboard sensors to dynamically change program output
- Comments throughout your code

PART B - Folio

As part of your project, you will be keeping a journal documenting what your group is completing each lesson. This journal needs to show evidence of your mBlock program in development, discussions around testing of your code and subsequent changes needed, video evidence of your robot successfully completing the obstacle course and a final evaluation of your project, looking at the following areas -

- How successfully does your robot navigate the course?
- How well have you managed your time throughout the project?
- Discuss how you worked in class as a team to complete this task?
- Any feedback you've had from other people on your project.
- Any changes/improvements you would make to both the project and your project management for future projects.

NOTE: Your evaluation will be assessed against the Literacy Marking Criteria included in this task.

Glossary of Key Words

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

- **Construct:** Make; build; put together items or arguments
- **Discuss:** Identify issues and provide points for and/or against
- **Demonstrate:** Show by example
- **Evaluate:** Make a judgement based on criteria; determine the value of

Details of Submission

PART A - Program
One member of your group will need to upload your completed mBlock Program file to Google Classroom by the due date.

PART B - Folio
You will need to complete and submit the folio scaffold as provided on Google Classroom by the due date.

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/Y9GaD7kxfnrrdHLg6

How does this link to my learning?

This task will allow students to:

- Demonstrates knowledge and skills in competent use of a variety of software as part of their design projects
- Ability to apply Computational Thinking skills to help design and develop an algorithm to solve an identified problem
- Ability to apply the Design Process to help plan, research, develop and evaluate their design projects
- Ability to communicate and work effectively as part of a team

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 - Program					
CRITERIA	**1 - 2**	**3 - 4**	**5 - 6**	**7 - 8**	**9 - 10**
Algorithm Design	Algorithm is incomplete or lacks a clear sequence of steps or demonstrates an elementary understanding of programming logic and language syntax.	Demonstrates some understanding of programming language and syntax demonstrated to develop a somewhat effective solution.	Demonstrates an understanding of programming language and syntax demonstrated to develop a mostly effective and reliable solution.	Demonstrates a thorough understanding of programming language and syntax demonstrated to develop a mostly effective, efficient and reliable solution.	Sophisticated algorithm design presented with an extensive understanding of programming language and syntax demonstrated to develop a highly effective, efficient and reliable solution. Includes the use of functions.
Code Organisation	Code is hard to follow with no comments provided. No evidence of structure or logical sequencing provided.	Code is poorly organised with minimal comments included. No evidence of structure or logical sequencing provided.	Code is organised with some comments, some suitable variable names and attempts to provide a logical structure evident.	Code is well organised with comments, appropriate variable names and easy to follow logic/structure evident.	Code is well organised with detailed comments, highly suitable variable names with a clear logic/structure evident.
Obstacle Avoidance	Frequent collisions with obstacles on course evident or fails to complete the course.	Attempts to include obstacle avoidance however hits most obstacles and requires extensive human interaction to pass the course.	Robot avoids most obstacles with human interaction required on less than 3 occasions for robot to pass the course	Robot avoids most obstacles, and requires minimal human interaction to pass the course	Robot successfully avoids all obstacles seamlessly the 1st time with no human interaction required.
				SUB-TOTAL	**/ 30**

PART B - Folio					
Criteria	**1**	**2**	**3**	**4**	**5**
Journal	The record is limited and incomplete and is presented inappropriately.	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 time stamped.	The record contains detailed lesson-by-lesson accounts of work completed which includes, discussions, evaluations, images and milestones precisely time stamped.	The record contains detailed and accurate lesson-by-lesson accounts of work completed which includes, discussions, evaluations, images and milestones precisely time stamped.
Testing	Limited evidence of any testing provided and/or lists some areas for testing and/or incomplete test criteria. No video evidence provided.	Test criteria, results of testing and solution implementation have been identified. Incomplete video that demonstrates basic programming and testing of the robot.	Test criteria outlined. Outline of results of testing and some evidence of solutions implemented to solve the identified problem(s). Video illustrates the testing (at least 1), programming of the system.	Descriptive test criteria developed with discussion of results of tests and solutions implemented to solve the problem identified. Video accurately illustrates the testing (at least 3), programming and success of the system.	Detailed evidence of testing criteria and evaluation with clear discussion of results of each test included and solution implemented to solve the problem identified. Video extensively and accurately illustrates a wide range of testing, programming, failures and successes of the system.
Evaluation	Evaluation is incomplete and/or lists some areas of success or improvement or future directions or feedback or how the team worked as a group.	Evaluation identifies areas of success and/or improvements based on predetermined requirements and/or future directions, feedback from others and/or how this was implemented in the project and/or Identifies how the team worked as a group.	Evaluation outlines areas of success and improvements based on predetermined requirements, future directions, feedback from others and how this was implemented in the project. Outlines how the team worked as a group.	Evaluation describes areas of success and improvements based on predetermined requirements, future directions, feedback from others and how this was implemented in the project. Describes how the team worked as a group.	Evaluation is detailed, objective and explains areas of success and improvements based on predetermined requirements, future directions, feedback from others and how this was implemented in the project. Clearly describes how the team worked as a group.
				SUB-TOTAL	**/ 15**

LITERACY MARKING CRITERIA					
Criteria	**0**	**0.25**	**0.50**	**0.75**	**1**
Paragraph 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, provides at least ONE correct break between ideas - Paragraphs may contain some unrelated ideas	- At least ONE paragraph is well structured and develops an idea	- All paragraphs are focused on one idea or a set of like ideas but may not be linked effectively	- Paragraphing creates flow, connectivity and supports argument
Punctuation Use of correct and appropriate punctuation for effect and to aid in reading of the text	- No or minimal evidence of correct sentence punctuation (less than 25%)	- Limited evidence of correct sentence punctuation (at least 25%)	- Some correct sentence level punctuation (at least 50%).	- Mostly correct sentence level punctuation (80%) and *at least two* examples of other punctuation.	- Writing contains accurate use of all applicable punctuation.
Sentences Intentionally constructs a variety of sentences to match purpose and audience	- No evidence of sentences - Drawings, symbols, a list of words OR text fragments	- At least one sentence is used correctly.	- Some correct formation of sentences. (at least 50%)	- Most sentences (80%) are correct but are largely unsophisticated.	- All sentences are correct including sophisticated sentences.
Vocabulary Uses technical vocabulary to explain concepts and/or range of precise and appropriate words for effect	- Symbols or drawings	- Only simple and nontechnical 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
Text Structure Uses features of the appropriate text type	- No evidence of structural components of the appropriate text type	- Minimal evidence of structural components of the appropriate text type	- Some evidence of structural components of the appropriate text type	- Substantial evidence of the structural components of the appropriate text type	- Coherent and controlled use of the appropriate structural components of the text type
				SUB-TOTAL	**/ 5**
				GRAND TOTAL	**/ 50**