# Year 10 IT - Machine Learning

## Self-Driving Car Simulation & Code Analysis


**Weight**: 30%

**Date**:

Tuesday 12 September 2023 8:45 AM

## Changelog

- This task was created on **Friday 24 August 2023.**

  - Version 1.0.0 - Initial Publication - 29/8/23

## Task Context

- This task is an assignment in which students will complete an analysis and evaluation of pre-written Python code. They will then choose a machine learning parameter directly related to the simulation and conduct a scientific investigation into the effects of modifying that parameter.
- Students will use their understanding of the Python programming language as well as what they have learned about machine learning topics covered in the course.
- The task will be presented as a document following a scaffold presented in the marking criteria.

# Task Description

- The task will require students to explain major aspects of a Python program designed to simulate a self-driving car. They will provide a detailed description of major parts of the code in terms of what it does with specific reference to machine learning methodology. They will add insightful comments into the code at specified locations.
- Students will conduct a scientific investigation into the effects of a change to a specific parameter directly related to machine learning concepts such as hyperparameters and activation functions.
- In preparation for submission of this task, students should be familiar with basic scientific methodology and simple algebraic mathematics. Aspects of the report will include identification of independent, dependent and controlled variables, method of investigation, tabulated results data, supporting graphs and evaluation and discussion of results with an eye to further study.
- The task will draw upon all content which has been covered in the course up to Friday 8 September 2023. Note, we will still be completing activities after this date which cover assessable material, and you should review these activities as part of your revision. However, any new content will not be assessed — for clarity, you will be informed whether the material being covered is new and thus non-examinable, or review of existing material which is assessable.

## Reporting Criteria

- Demonstrating a good understanding of the Python language.
- Demonstrating a good knowledge of general concepts in Artificial Intelligence and Machine Learning.
- Presentation of results of an investigation into the effects of modifying parameters related to machine learning.
- Make a copy of these **marking guidelines** and share with your teacher.

## Submission Instructions

This assignment is worth 30% of your Semester Two assessment for this subject.

Your complete project should be submitted via a link to your forked copy of the GitHub Repository below.

Please click on the Submit button by 8:45am on Tuesday 12 September 2023 (Week 9).

Late submissions will incur penalties as per the school assessment policy.

# Hints and Pro Tips

**Here you can find various hints and tips to help with your preparation for the common test.**

- Take your time reading through the code. Review aspects of Python that you may not be confident with. The best strategy is to try to understand what each part does to affect the simulation.

- All starting code and instructions can be found on this repo: ML-Task2. Fork this repository and complete the tasks as required. Be sure to go through the linked resources as these will help you gain a better understanding of the investigation you will conduct.

- Get started right away on the task. If you have difficulties with any aspect of getting started, seek assistance via the EdStem forum or email your teacher.