Target/Timer Assessment Task

Resource for AS91894: Use advanced techniques to develop an electronics outcome

Resource Reference: Digital Technologies and Hangarau Matihiko 2.5
Resource Title: Target/Timer
Credits: 6

Achievement standard AS 91894

Achievement Standard	Title	Level	Credits	Version
AS91894 (2.5) Digital Technologies	Use advanced techniques to develop an electronics outcome	2	6	1

Assessment criteria

Achievement	Achievement with Merit	Achievement with Excellence
Use advanced techniques to develop an electronics outcome.	Use advanced techniques to develop an *informed* electronics outcome.	Use advanced techniques to develop a *refined* electronics outcome.

Student instructions

Kupu Arataki | Introduction

Your project will fall into one of the below categories:
- A target based project
    - EXAMPLE - A student creates a hunting simulation game that involves a target.
- A timer based project
    - EXAMPLE - A student creates an electronic device to assist in training and measuring improvements in physical fitness and performance.

When the target is hit or the time is taken, data is gathered about the students performance (such as accuracy or time taken) and stored for the student to

review.
An output will be generated by the system such as resetting the target with servo or pushing the data to a webpage.

Use of Tutorials

Supplemental Learning: Tutorials can be used as supplementary learning tools to complement your studies and aid in the comprehension of complex concepts. Direct Replication: Submission of work that closely mirrors tutorials is strictly prohibited. Assignments should reflect your unique thought process, analysis, and understanding of the material. The work you submit should be significantly different from the work that was done as part of any tutorial.

Hei Mahi/Task

The Process

1. Find a project/problem

2. Understand the project and the context
   a. Choose your relevant implications

3. Design an M.V.P
   a. Choose your components

4. Build an M.V.P

5. Test your M.V.P

6. Improve your design

7. Build your design

8. Repeat steps 4 - 6

9. Explain and Justify:
   a. How the product works and what it does (function and behaviour).
   b. Your implications and how your product addresses the implications.
   c. What components/systems you used and why.
   d. The interfaces between user and the electronics outcome. How does the user interact with the outcome? Why did you choose those interfaces/methods?
      i. E.g. the dart hitting the target, the user resetting the target with a button/remote/etc, and the user retrieving their data from the display, website, device, phone, etc.

Specifications for the project:

- The user must be able to interact with the project and control its main functions in a repeatable manner. E.g. The timer can be reset and reused - not just used once.
- The project needs to use two of the below:
  - using embedded software
    - writing software on the ESP32
  - subsystem level design
    - creating different sub-systems for input/output
  - remote control
    - Using the bluetooth/WiFi capabilities of the ESP32
  - data storage (EEPROM or on SD Card)
    - Storing data permanently
  - analogue to digital conversion (ADC).
    - Reading signals from analogue sensors

Evidence

Please put your evidence into your documentation sheet which can be found on the assessment on Google Classroom. The sections have been created for you but you may:

- Add rows/columns for additional evidence
- Add additional sections if you believe it gives good evidence

Relevant Implications

When developing any digital outcome there are a range of external considerations to take into account - we call these relevant implications. Identify some from the given list below, describe their meaning, and outline how you addressed them in the development of your target/timer.

- social
- cultural
- legal
- ethical
- intellectual property
- privacy
- accessibility

- usability
- functionality
- aesthetics
- sustainability and future proofing
- end-user considerations
- health and safety.

example:

Definition: Cultural implications relate to the differences across cultures and considering customs, ways of doing things, things that are important to other

cultures. There may be different cultures using the outcome or the outcome may draw from other cultures. It is important to consider their needs and priorities when developing the outcome.

Explaining its relevance to my project: we are creating a dictionary for Te Reo Māori to English. I will have to make sure the database will store UTF text to ensure it will be able to store the macrons used in Māori words. This is important because the macrons indicate and change the pronunciation of the word. It would be culturally insensitive to not include them.

There is an area in your documentation sheet to document this.

Development and Testing

Use your documentation sheet for this. You should document:

- Your development log - 1 per lesson

Date	What you did today	Screenshot	Next steps

- Your Blackbox testing - 1 per week with 2 testers giving feedback

Date	User 1 feedback	User 2 feedback	What did I change due to information from feedback?

- You should note any iterative improvements to your design that occur in either of the above testing.

Knowledge and Design Choices

Use your documentation sheet for this. You should document:

- Evaluating and justifying the choice of components and systems used
- Describing/identifying the behaviour and function of the electronics outcome
- Explaining and justifying the interfaces between the user and the outcome e.g. the user resetting the target or accessing the data

Evidence to be submitted

Video Submission

Include in your video (no longer than 3 minutes);

- A recording of your outcome working
- You describing the parts of your outcome
- You explaining the major functions of your outcome
- You can use your documentation as a guide for the above.

Written Submission
Include the following:

- Your documentation handed in via Google Classroom
- Your code handed in via Google Classroom

Physical Submission

- Your outcome should be in the storage area of the classroom and available for inspection.

Assessment schedule: Digital Technologies 91894

NQF Number	Achievement Standard	Level	Credits	I or E	
91894 (2.5) v1	Use advanced techniques to develop an electronics outcome	2	6	I	

Assessment evidence *(What I need to show)*	Assessment strategies *(How I need to show it)*	✓
Achieved: Use advanced techniques to develop an electronics outcome		
• using appropriate resources and techniques to develop a functional electronics outcome	• Develop a working robot integrating the required (minimum) numbers of components • Write code (embedded software) to make the robot function	
• testing and debugging to ensure that the electronics outcome performs to specifications	• Teacher observations and interactions • Evidence in testing document	
• explaining the interfaces and functions of components and systems.	• Written explanations in documentation template	
• explaining relevant implications.		
Merit: Use advanced techniques to develop an *informed* electronics outcome		
• identifying the behaviour and function of the electronics outcome	• Correctly identified in documentation template	
• testing and modifying to ensure reliability of the electronics outcome	• Testing document outlines modifications to outcome as a result of testing	
• evaluating the choice of components and systems used	• Written evaluations in documentation template	
• addressing relevant implications	• This may be evident in your robot • Explanation of how you addressed relevant implications - in documentation template	
Excellence: Use advanced techniques to develop a *refined* electronics outcome		
• undertaking iterative improvement throughout the design, development and testing process to produce a high-quality electronics outcome	• Documentation template shows how robot and code were improved iteratively	
• justifying the choice of components and systems used	• Written justifications in documentation template	