National Certificate of Educational Achievement
TAUMATA MĀTAURANGA Ā-MOTU KUA TAEA

'Teach me Thy way, O Lord'

Hamilton Christian School

Year 12 Digital Technologies

Digital Technologies | Hangarau Matihiko Level 2

2.7 Use advanced programming techniques to develop a computer program

AS91896 (6 credits)   **Version 1**

Achievement	Achievement with Merit	Achievement with Excellence
● Use advanced programming techniques to develop a computer program.	● Use advanced programming techniques to develop an informed computer program.	● Use advanced programming techniques to develop a refined computer program.

2.8 Use advanced processes to develop a digital technologies outcome

AS91897 (6 credits)   **Version 1**

Achievement	Achievement with Merit	Achievement with Excellence
● Use advanced processes to develop a digital technologies outcome.	● Use advanced processes to develop an informed digital technologies outcome	● Use advanced processes to develop a refined digital technologies outcome

Resource title: GLOBAL CITIZEN GAME

Achievement Criteria for AS91896 (2.7)

1   *Use advanced programming techniques to develop a computer program* involves:
- writing code for a program that performs a specified task
- using advanced techniques in a suitable programming language
- setting out the program code clearly and documenting the program with comments
- testing and debugging the program to ensure that it works on a sample of expected cases.

Use advanced programming techniques to develop an informed computer program involves:
- documenting the program with appropriate names and comments that describe code function and behaviour
- following common conventions for the chosen programming language
- testing and debugging the program effectively to ensure that it works on a sample of both expected cases and relevant boundary cases.

Use advanced programming techniques to develop a refined computer program involves:
- ensuring that the program is a well-structured, logical response to the specified task
- making the program flexible and robust
- comprehensively testing and debugging the program.

2   The programming language chosen must support the required data types, control structures, advanced programming techniques and have good commenting facilities.

3   An *advanced computer program*:
- uses variables storing at least two types of data (e.g. numeric, text, Boolean)
- uses sequence, selection and iteration control structures
- takes input from a user, sensors, or other external source
- produces output
- uses two or more advanced programming techniques.

4   Examples of *advanced programming techniques* include:
- modifying data stored in collections (e.g. lists, arrays, dictionaries)
- storing multidimensional data in collections
- creating methods, functions, or procedures that use parameters and/or return values
- responding to events generated by a graphical user interface (GUI)
- using non-trivial string manipulation
- using additional non-core libraries.

5   Examples of ways of making a *program flexible and robust* include:
- using actions, conditions, control structures and methods, functions, or procedures effectively
- checking input data for validity
- correctly handling expected, boundary and invalid cases
- using constants, variables and derived values in place of literals.

Achievement Criteria for AS91897 (2.8)

1   *Use advanced processes to develop a digital technologies outcome* involves:
- using appropriate project management tools and techniques to plan the development of a digital technologies outcome
- decomposing the outcome into smaller components
- trialling the components of the digital technologies outcome
- testing that the digital technologies outcome functions as intended
- explaining relevant implications.

Use advanced processes to develop an informed digital technologies outcome involves:
- effectively using project management and version control tools and techniques to manage the development of a digital technologies outcome
- trialling multiple components and/or techniques and selecting those which are most suitable
- using information appropriately from testing and trialling to improve the functionality of the digital technologies outcome
- addressing relevant implications.

Use advanced processes to develop a refined digital technologies outcome involves:
- discussing how the information from planning, testing and trialling of components assisted in the development of a high-quality outcome.

2   Examples of *project management and version control tools and techniques* include:
- saving backup copies with a logical file naming system
- using collaboration tools
- using simple version control software applications
- using tools or systems to plan tasks and milestones
- adjusting key actions and tasks where appropriate

3   Examples of *relevant implications* include:
- social
- cultural
- legal
- ethical
- intellectual property
- privacy
- accessibility
- usability
- functionality
- aesthetics
- sustainability and future proofing
- end-user considerations
- health and safety.

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12 DT Assessment Schedule

2.7 (91896) Advanced computer program

PROGRAMMING (6 CREDITS)		
Achieved	**Merit**	**Excellence**
Use advanced programming techniques to develop a computer program.	Use advanced programming techniques to develop an informed computer program.	Use advanced programming techniques to develop a refined computer program.

If any information is missing look for it in once of there places as it will have been logged there somewhere (try using a keyword search with in my Repo)
https://github.com/OLLYDOTDEV/Project-Birdseye-DTX-2020/
https://github.com/OLLYDOTDEV/Project-Birdseye-DTX-2020/issues?page=1&q=
Or check for issue with labels of 2.7 or 3.7

Or if you dont know how to use github i have added all to a google doc (the maybe the odd formatting issue)

https://docs.google.com/document/d/18i7r6FDUm2NnaW7tX2osDDcfcMaJmfYflJPwUAAQ3Jc/edit#

Project overview
https://youtu.be/X6soR0ZIsdU

Implications
https://youtu.be/VuXKZyuU8Dc

Achieved		Comments

Student has:
 	
 ● **written code for a program that performs a specified task**
    - The student's program allows text variable entered by players to be stored under the player's name, uses Boolean variables to store game play choices.
    - They have used sequence, selection and iteration control structures within their code. They have utilised input from the player to control the flow of the game.
		https://github.com/OLLYDOTDEV/Project-Birdseye-DTX-2020/tree/master/CODE
		
		 https://github.com/OLLYDOTDEV/Project-Birdseye-DTX-2020/blob/master/README.md

● **used advanced techniques in a suitable programming language**
    - Student has used a GUI with event handling and programmed appropriate responses to the events (e.g. button clicks, mouse overs). Functions/modules are used to check if user input is valid and/or do calculations which would otherwise be repeated in the code. The program uses an array/list to store and update game information (e.g. characters, environmental facts to display).
		advanced techniques that i have used are
		    - modifying data stored in collections
		     Eg
		     Char array
		     Int Array
		
		    - creating methods, functions, or procedures
		     Eg
		     parameters and/or return values
		
		    - responding to events generated by a graphical user interface (GUI)
		     Eg
		     https://github.com/OLLYDOTDEV/Project-Birdseye-DTX-2020/issues/21
		
		     https://github.com/OLLYDOTDEV/Project-Birdseye-DTX-2020/issues/23

		- using additional non-core libraries. Eg used https://github.com/OLLYDOTDEV/Project-Birdseye-DTX-2020/tree/master/CODE/libraries - non-trivial string manipulation https://github.com/OLLYDOTDEV/Project-Birdseye-DTX-2020/issues/29#issuecomment-690181516 https://github.com/OLLYDOTDEV/Project-Birdseye-DTX-2020/issues/17#issuecomment-686221963 https://github.com/OLLYDOTDEV/Project-Birdseye-DTX-2020/issues/17#issuecomment-686260754

● **set out the program code clearly and documents the program with comments**
  - Most of the variable names are clear, sensible and the code includes some comments, but these comments don't describe the code's function.
  Eg # Menu Display
		https://github.com/OLLYDOTDEV/Project-Birdseye-DTX-2020/tree/master/CODE/Release

● **tested and debugged the program to ensure that it works on a sample of expected cases** - Student has provided evidence of testing their program. The program works on expected input, but may crash on boundary or invalid input.		Have a look here https://github.com/OLLYDOTDEV/Project-Birdseye-DTX-2020/issues?q=is%3Aissue+label%3A2.7+
Merit		

● **documented the program with appropriate variable/module names and comments that describe code function and behaviour** - The student uses descriptive variable and function name, e.g. the menu choice function might have been called 'menu check', the variable holding the value of the player name might be called 'player name'. The code has comments at key points, e.g. 'function checks that user input is a number that is between a given lower and upper bound'		This is where the code that is best documented https://github.com/OLLYDOTDEV/Project-Birdseye-DTX-2020/tree/master/CODE/Release The rest of the code is documented just maybe not to the same extent https://github.com/OLLYDOTDEV/Project-Birdseye-DTX-2020/tree/master/CODE/TESTING
● **followed common conventions for the chosen programming language** - The student uses all lower case variable names for code written in Python. Function definitions are placed before or after the main function, as per the programming language. Layout conventions are followed, e.g. whitespace between definitions. Indentation and/or bracketing conventions are followed as per the programming language. The student has used an automated tool to check that their code follows common conventions.		http://www.cplusplus.com/forum/beginner/142576/ - To start I used industry standard widely accepted build tool(Compiler). In this case I used Autotool (g++) - As for error checking this is done by g++ also - Due to C++ static nature it is best to define arrays at the the code. - Followed Multiple-word identifier formats (PascalCase,Camel_Snake_Case) - Functions all start with Uppercase letter - variable declaration split into relevant groups - Used // for writing comments - function are made to do one task and just do that one task well
● **tested and debugged the program effectively to ensure that it works on a sample of both expected and relevant boundary cases** - The student has provided evidence of testing relevant components (or the complete program) to confirm that it works correctly on a range of boundary cases,		https://github.com/OLLYDOTDEV/Project-Birdseye-DTX-2020/issues/29#issuecomment-690181516 https://github.com/OLLYDOTDEV/Project-Birdseye-DTX-2020/issues/12#issuecomment-663498882

e.g. for lives at 0, 1, -1 or menu selection at the upper and lower bounds of the choices. - Student testing methodology is effective within the context of the problem.		https://github.com/OLLYDOTDEV/Project-Birdseye-DTX-2020/issues/17#issuecomment-683281917 https://github.com/OLLYDOTDEV/Project-Birdseye-DTX-2020/issues/17#issuecomment-683704989 https://github.com/OLLYDOTDEV/Project-Birdseye-DTX-2020/issues/12#issuecomment-662942547 https://github.com/OLLYDOTDEV/Project-Birdseye-DTX-2020/issues/17#issuecomment-681179813 https://github.com/OLLYDOTDEV/Project-Birdseye-DTX-2020/issues/22#issuecomment-696541203 https://github.com/OLLYDOTDEV/Project-Birdseye-DTX-2020/issues/12#issuecomment-649840709 https://github.com/OLLYDOTDEV/Project-Birdseye-DTX-2020/issues/17#issuecomment-674493328 https://github.com/OLLYDOTDEV/Project-Birdseye-DTX-2020/issues/14#issuecomment-649520131
Excellence		
● **ensured that the program is a well-structured, logical response to the task** - The student has used abstractions where appropriate. Functions have been used to avoid repeated code. The code works for expected, unexpected and boundary values. It is easy to extend its functionality of the code (e.g. a function has been used to check the menu choices, so it would be		https://github.com/OLLYDOTDEV/Project-Birdseye-DTX-2020/blob/master/CODE/Release/RPI/RPI.cpp https://github.com/OLLYDOTDEV/Project-Birdseye-DTX-2020/blob/master/CODE/Release/ROMS/ROMS.ino

easy to update menu to add another level or path).	
● **made the program flexible and robust** - They have used derived values to iterate through a collection instead of hard coded values. The code works for expected, unexpected and boundary values. They have used the GUI to limit invalid input or used other appropriate techniques such as try/except to check for validity.	https://github.com/OLLYDOTDEV/Project-Birdseye-DTX-2020/blob/master/CODE/Release/WebServer/upload.php https://github.com/OLLYDOTDEV/Project-Birdseye-DTX-2020/blob/dcd891941f50d60008e7fb5fa4e514a2ba644cf8/CODE/Release/RPI/RPI.cpp#L210 https://github.com/OLLYDOTDEV/Project-Birdseye-DTX-2020/blob/dcd891941f50d60008e7fb5fa4e514a2ba644cf8/CODE/Release/ROMS/ROMS.ino#L298 https://github.com/OLLYDOTDEV/Project-Birdseye-DTX-2020/blob/dcd891941f50d60008e7fb5fa4e514a2ba644cf8/CODE/Release/ROMS/ROMS.ino#L159 https://github.com/OLLYDOTDEV/Project-Birdseye-DTX-2020/issues/29#issuecomment-690181516 https://github.com/OLLYDOTDEV/Project-Birdseye-DTX-2020/issues/17#issuecomment-683247612
● **comprehensively tested and debugged the program** - Student has supplied test plans and/or annotated screenshots/a screencast showing that the program components (and final program) have been tested to ensure that it works correctly, e.g. they have used others to comprehensively test their program to ensure it responds gracefully to a variety of input.	https://github.com/OLLYDOTDEV/Project-Birdseye-DTX-2020/issues?q=label%3A3.7+label%3A2.7

Overall Grade:		Achieved		Merit		Excellence	

2.8 (91897) Use advanced processes to develop a digital outcome

PLANNING / DEVELOPMENT (6 CREDITS)		
Achieved	**Merit**	**Excellence**
Use advanced processes to develop a digital technologies outcome.	Use advanced processes to develop an informed digital technologies outcome.	Use advanced processes to develop a refined digital technologies outcome.

Achieved		Comments
● **used an appropriate planning methodology to plan the development of a digital technologies outcome** - The student has decided to follow an Agile-based planning methodology.		https://docs.google.com/document/d/18i7r6FDUm2NnaW7tX2osDDcfcMaJmfYflJPwUAAQ3Jc/edit#bookmark=id.43g9tbdb4gd2
● **decomposed the outcome into smaller components** - They have broken their outcome down into a series of components. For each component they have created a piece of code and tested that code.		Every part has been decomposed into smaller components Then each of these was given a user story to outline the aims of each component. To view the components check this link. https://github.com/OLLYDOTDEV/Project-Birdseye-DTX-2020/issues?q=

● **trialled components of the digital technologies outcome** - They have trialled different methods for providing a user interface for the app and added to/changed the interface as they progressed through the programming stages. - Towards the end of the process the components have been combined into a fully working version of the outcome. - The student has used Trello (or an off-line visual planning board) to manage their development process. Student code is clearly named and shows version numbers/indicates which part of the decomposition has been coded. They have created a team drive and added each version of the code to the drive so that the teacher has access and the program is backed up in the cloud.		Again see https://github.com/OLLYDOTDEV/Project-Birdseye-DTX-2020/issues?q= Also a project board was used within github to help add the planning / development of the project https://github.com/OLLYDOTDEV/Project-Birdseye-DTX-2020/projects/1?fullscreen=true Everything is backed up on my open-source repository
● **tested that the digital outcome functions as intended** - The student has provided evidence of testing with expected cases. They have also provided screenshot/screencast evidence showing that the actual program works as expected. They may not have had others test the program or looked at boundary/unexpected cases		Project overview https://youtu.be/X6soR0ZIsdU
● **explained relevant implications** - Student has explained the importance of creating code which is functional and easy to use. - They explained why their legal obligations need to be honoured. - They have explained why their program needs to meet the requirements of the Enviroschools club and why the game needs to have relevance to important environmental issues.		Implications https://youtu.be/VuXKZyuU8Dc
Merit		
● **trialled multiple components and/or techniques and selected those which are most suitable.** - The student trialled various techniques for programming the menu system and decided to create a function that could be called from any point within the program. They considered alternate ways of getting user input and laying		There are just select some https://github.com/OLLYDOTDEV/Project-Birdseye-DTX-2020/issues/23

out the GUI (or text-based menu system) of the game		https://github.com/OLLYDOTDEV/Project-Birdseye-DTX-2020/issues/17 https://github.com/OLLYDOTDEV/Project-Birdseye-DTX-2020/issues/14 https://github.com/OLLYDOTDEV/Project-Birdseye-DTX-2020/issues/13 https://github.com/OLLYDOTDEV/Project-Birdseye-DTX-2020/issues/8
● **used information appropriately from testing and trialling to improve the functionality of the digital technologies outcome** - They trialled the different ways with the members of the Enviroschools club and selected the one that was rated easiest to use and understand by the testers.		https://github.com/OLLYDOTDEV/Project-Birdseye-DTX-2020/issues/14 https://github.com/OLLYDOTDEV/Project-Birdseye-DTX-2020/issues/16 https://github.com/OLLYDOTDEV/Project-Birdseye-DTX-2020/issues/17
● **used project management and version control tools and techniques to effectively manage the development of a digital technologies outcome** - The student has updated their development plan, when they realised a new component was needed to improve the game play and make the game less predictable. - They have saved versions of the outcome (e.g. developing new versions of the working file) at each stage of the development. They have named each file with a version number and date. - Evidence shows that at each stage of the development, a new version of the working file was created, and these were named appropriately.		https://github.com/OLLYDOTDEV/Project-Birdseye-DTX-2020/issues/21 https://github.com/OLLYDOTDEV/Project-Birdseye-DTX-2020/issues/24 https://github.com/OLLYDOTDEV/Project-Birdseye-DTX-2020/issues/25

- They have used evidence from their trialling to inform their decisions to update their project plan		https://github.com/OLLYDOTDEV/Project-Birdseye-DTX-2020/commits/master https://github.com/OLLYDOTDEV/Project-Birdseye-DTX-2020/issues/6 https://github.com/OLLYDOTDEV/Project-Birdseye-DTX-2020/issues/5 https://github.com/OLLYDOTDEV/Project-Birdseye-DTX-2020/issues/17 They should cover what is being looked for if not check other issues
● **addressed relevant implications** - The student has created a program which functions as intended and easy to use (rather than just explaining that these are important attributes). They have provided annotated screenshots of their program to illustrate what they have done to address functionality, usability, accessibility (etc.) implications. Note that students only need to address relevant implications – where the output is essentially text, aesthetics are less relevant than other implications. Students who have created a game with a GUI interface will have shown adherence to aesthetic design principles		Implications https://youtu.be/VuXKZyuU8Dc
Excellence		
● **discussed how the information from planning, testing and trialling of components assisted in the development of a high-quality outcome** - The student presents a brief reflective summary of how the information from planning, testing and trialling of the components of their game program assisted them to develop a high-quality outcome. They provided annotated screen shots of the changes they have made throughout the process and how feedback from the users and the testing process helped them to refine their program. They also included screen shots of their Trello board with a reflection on how it guided their development process and helped them to complete all the		https://github.com/OLLYDOTDEV/Project-Birdseye-DTX-2020/projects/1?fullscreen=true Then open the menu to see history otherwise do all that information that's needed to tick this box it already been covered in the other box's

components and keep on track with their time management.		

Overall Grade:	Achieved		Merit		Excellence	