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

Internal Assessment Resource

Digital Technologies & Hangarau Matihiko Level 3

This resource supports assessment against Achievement Standard 91906[1]

Standard title:	Use complex programming techniques to develop a computer program
Credits:	6
Resource title:	Waka Ama Sprint Nationals Analysis
Resource reference:	Digital Technologies & Hangarau Matihiko 3.7B

This resource:

● Clarifies the requirements of the achievement standard

● Supports good assessment practice

● Should be subjected to the school's usual assessment quality assurance process

● Should be modified to make the context relevant to students in their school/kura environment and ensure that submitted evidence is authentic

[1]Achievement standard 91906 is derived from both The New Zealand Curriculum and Te Marautanga o Aotearoa.

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Teacher/Kaiako guidelines

The following guidelines are supplied to enable teachers/kaiako to carry out valid and consistent assessment using this internal assessment resource.

Teachers/kaiako need to be very familiar with the outcome being assessed by the achievement standard. The achievement criteria and the explanatory notes contain information, definitions, and requirements that are crucial when interpreting the standard and assessing students/ākonga against it.

Context/Te Horopaki

Being able to parse files and analyse the contents is a valuable part of understanding programming, be it log files, reading text files for specific content, analysing data from sensors.

This assessment is developed with support of Nga Kaihoe o Aotearoa, Waka Ama New Zealand.

At the beginning of each year Nga Kaihoe o Aotearoa, Waka Ama New Zealand hold their annual Sprint Nationals. There is a mixture of events at the competition in which regional associations compete for medals, as well as for the overall association of the competition.

Students are required to develop a refined computer program, using complex programming techniques, to read in the raw data from the race results and award scoring for the competition. Please see the student task for more details.

Teachers are encouraged to edit this default task to make it suitable for their community.

Note: Allow students to either complete the default task (see student task) or 'pitch' an alternate idea. Provided their idea allows them to use advanced techniques to plan and develop an advanced computer program, they should be encouraged to develop their custom solution.

Conditions/Ngā Tikanga

It is recommended that students should have at least two identified checkpoints with their teacher as they work through this assessment activity to ensure they have an opportunity to ask questions and gather feedback.

It would be recommended that the first checkpoint would be at the stage of testing that the correct files are being found and analysed.

The second checkpoint would be around testing to ensure that the correct points are being assigned and recorded to the correct associations.

The final outcome is a program that will read the folder of results, find the required files for analysis and display the regional points on screen as well as write them to an output file.

Resource requirements/Ngā Rauemi

Students will need access to a programming environment that is able to read and write files.

The files from two years (2017 and 2018) of Waka Ama Sprint Nationals are provided.

Students will also need access to a text editor to be able to read the files to see what they contain.

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Student/Ākonga instructions

Introduction/Kupu Arataki

This assessment activity requires you to create a computer program, using complex techniques, to read in the raw data from the Waka Ama Sprint Nationals race results and award scoring for the competition. In addition to reading from and writing to files, your program must also demonstrate one or more of the following complex programming techniques:

● creating a graphical user interface (GUI)
● defining class(es) and creating objects
● defining and using custom type(s)
● uses third party or non-core API, library or framework
● using complex data structures (e.g. stacks, queues, trees).

This assessment is developed with support of Nga Kaihoe o Aotearoa, Waka Ama New Zealand, www.wakaama.co.nz. Approval has been given to use the data associated with this assessment task.

You will be assessed on how effectively you develop, test and refine your program, so that it is a well-structured, logical response to the task. While developing, testing and refining your program:

● write code that meets all the task specifications
● set out the program code clearly, following conventions of your chosen programming language
● document the program with appropriate variable/module names and organised comments that describe code function and behaviour
● comprehensively test and debug your program in an organised way, to ensure that it works on a sample of both expected cases, relevant boundary cases, and invalid cases
● ensure that the program is a well-structured, logical response to the task
● make the program flexible and robust

> Teacher note: Insert due dates and timeframes

Task/Hei Mahi

Scenario

At the beginning of each year Nga Kaihoe o Aotearoa, Waka Ama New Zealand hold their annual Sprint Nationals. There is a mixture of events at the competition in which regional associations compete for medals as well as for the overall association of the competition.

The Club Points Trophy recognises a club's paddling excellence and achievement throughout the week. Points are accumulated throughout the week from all finals, and the club with the most points at the end of the week is awarded this Club Points Trophy. The requirements for the competition points mean that a computer program is required to analyse all the races in order to:

- find the results of the finals out of the batch of data
- assign points based on placing against the correct regional association.

You are required to develop a computer program, using complex programming techniques, to read in the raw data from the race results, award scoring for the competition and determine the overall winning regional association.

All times are recorded through the FinishLynx system. This is a camera and software that allow times to be recorded based on an image capture. The files are saved to the system as .lif files, very similar to .csv files. The Waka Ama database records the progressions, results, disqualifications, places and times.

Flexibility in your programming

The program must be able to be flexible enough to handle different input parameters each year. For example,

- different regional associations may compete each year
- the number of lanes may differ each year based on where the Sprint Nationals are held
- if the competition is held overseas for Waka Ama worlds, different places and points may be awarded.

Reading from files

You will have access to a folder of all the .lif files. Your program must be able to connect to the finals files and read the raw data. You must ensure that no files are deleted from the folder.

You may have to modify some files to enable testing and debugging.

Testing can be done by making a brief screencast showing the outcome being comprehensively tested. If desired, you can take screenshots of your screencast and annotate them. This is often easier than trying to screenshot whilst testing where it is easy to 'forget' to screenshot a key part of the test. If you prefer, you are welcome to talk us through your testing and simply submit a brief screencast (screencasts should be 3 minutes or less in length).

Waka Ama Sprint Nationals Scoring Program Specifications:

- The program must be able to determine the regional association that wins the Waka Ama New Zealand Club Points Trophy and displays the number of points for each association sorted in descending order and produce a .csv file with this information as output.
- On startup, the program should display what folder (2017 or 2018) it is analysing and the number of files in that folder.
- The program should find the finals files and analyse just those files. It should leave the other files alone.
- The program should show the file it is analysing. If there is an error while processing, it should display the error.
- The program should record the regional association and determine the points for all finals. These include bowl, plate, cup champ, straight finals.

Rules for Assigning Points

1st place - 8 points

2nd place - 7 points

3rd place - 6 points

4th place - 5 points

5th place - 4 points

6th place - 3 points

7th place - 2 points

8th place - 1 point

any placing onward, 1 point.

Other considerations for awarding of points

- If a result is DQ/Disqualified or DNS (Did Not Start), no points are awarded.
- There may be some cases within the data that the same place is awarded to 2 or 3 teams, as they received the same finish time. This is not an error and they should each receive the same number of points.
- In the W12 category, where two regional associations are paddling in the same waka, the same points are to be given to both regional associations.

Example (input of .lif file)

```
045,Champ Final,1,Mid Women - W6 250,,,,,,250,9:04:36.5444,,,,,,,

1,56470,1,Puketirini Puhi,,Rahui Pokeka Waka
Sports,1:30.11,,1:30.11,,,9:04:36.55,,,,1:30.11,1:30.11

2,53948,3,Rangiatea,,Otaki Waka Hoe Charitable
Trust,1:32.39,,2.28,,,9:04:36.55,,,,2.28,2.28

3,55109,4,Tamaki Nga Taonga Iti,,Tamaki Outrigger Canoe
Club,1:33.33,,0.94,,,9:04:36.55,,,,0.94,0.94

4,56908,7,Hine Ataahua,,Horouta Waka Hoe Club
Inc.,1:36.71,,3.38,,,9:04:36.55,,,,3.38,3.38

5,55852,2,Mauri Midgets,,Nga Hoe Horo Outrigger Canoe
Cl,1:37.04,,0.33,,,9:04:36.55,,,,0.33,0.33

6,56121,6,Hilo,,Ruamata Waka Ama
Club,1:37.76,,0.72,,,9:04:36.55,,,,0.72,0.72

7,56434,5,Midge Angels,,Waitakere Outrigger Canoe Club
,1:38.10,,0.34,,,9:04:36.55,,,,0.34,0.34

8,54498,8,Waipuna(R),,Te Toki Voyaging
Trust,1:42.42,,4.32,,,9:04:36.55,,,,4.32,4.32
```

The program will need to be able to establish whether a file is relevant (is it a final or not) and, for each file that is relevant, allocate the appropriate number of points to the regional association.

Description of what is in each row

The topmost row gives data about the race:

race number,race type,heat,title,unused,unused,unused,unused,unused,length,start time,unused,unused,unused,unused,unused,unused

eg. *045,Champ Final,1,Mid Women - W6 250,,,,,,250,9:04:36.5444,,,,,,,*

The rows that follow provide data about the placings of the teams, in finishing order. Notice that the same data may appear in several places in each row, and each row may repeat data found in a previous row. The final columns in first placing provides elapsed time, and subsequent rows the time difference between first and the subsequent places.

on subsequent rows:

place,team id,lane,team name,unused,regional association,elapsed time,unused,elapsed time,unused,unused,start time,unused,unused,unused,elapsed time,elapsed time

*1,56470,1,Puketirini Puhi,,Rahui Pokeka Waka
Sports,1:30.11,,1:30.11,,,9:04:36.55,,,,1:30.11,1:30.11*

subsequent rows - place,team id,lane,team name,unused,regional association,elapsed time,unused,difference,unused,unused,starttime,unused,unused,unused,difference,difference

```
2,53948,3,Rangiatea,,Otaki Waka Hoe Charitable
Trust,1:32.39,,2.28,,,9:04:36.55,,,,2.28,2.28
```

Example of a possible output:

A table of values listing the associations and the points won in rank order, from highest to lowest, including an appropriate title. The table is formatted so that the column widths are appropriate for the text.

FULL CLUB POINTS

Association	Points
Horouta Waka Hoe Club Inc.	418
Manukau Outrigger Canoe Club	154
Ruamata Waka Ama Club	145
Mareikura Waka Ama Club Incorporated	133
Taniwha Outrigger Canoe Club Inc	115
Te Au Rere Waka Ama Club	107
Kaihoe o Ngati Rehia Trust	101.5
Haeata Ocean Sports Inc	101
Otaki Waka Hoe Charitable Trust	89
Hei Matau Paddlers	88
Rahui Pokeka Waka Sports	88
Mitamitaga o le Pasefika Va'a-alo Canoe Club	77
Waitakere Outrigger Canoe Club Inc	75.5
Turangawaewae Waka Sports	75
Te Paerangi Waka Ama Inc	68.5
Akarana	62
Parihaka Waka Ama Inc	56
Aratika Tamaki Waka Ama Club Incorporated	52
Cook Islands Outriggers Association	47
Nga Hoe Horo Outrigger Canoe Club	43.5
Te Toki Voyaging Trust	31.5
Whakatu Marae Waka-Ama Club	31
Te Rau Oranga O Ngati Kahungunu Waka Ama Club	31
Wairarapa Waka Ama Canoe Club	30
Te Waka Pounamu	29
TOA Waka Ama Club	28
Heretaunga Ararau O Ngati Kahungunu Waka Ama Roopu	27
Waka Ama O Whakatane	27
Tauranga Moana Outrigger Canoe Club Inc.	22.5
Te Awa Haku	20
Hawaiki Nui Tuarua Waka Ama	19
Hoe Aroha Whanau o Mauao	18.5
Porirua Canoe Kayak Club Inc.	17
YMP Waka Ama	17

Waikato Dragon Boat & Waka Ama Association	12
Maraenui Rugby & Sports Association	10
Whaingaroa Whanau Hoe Waka	10
Te Pou Herenga Waka Ama Club Inc.	9
Tarawera Outrigger Canoe Club	8
Hoe Tonga Pacifica Waka Ama Association	7
Tu Tangi Ora - South Kaipara Collective Inc	6
Taranaki Outrigger Canoe Club	6
Wakatipu Waka Ama Club	6
Ocean Blue Sports Club	5
Hikoikoi Waka Club	4
Pakuranga Outrigger Canoe Club	4
Te Ringa Miti Tai Heke Whanganui Waka Ama Club Incorporated	4
Maketu Hoe Waka	3.5
Orakei Water Sports	3
Rangaunu Sports Club	3
Whanganui River Outrigger Canoe Club Inc.	2
Nga Tai Whakarongo	1
Te Puu Ao	1

Assessment schedule/Mahere Aromatawai: Digital Technologies & Hangarau Matihiko 91906 – Waka Ama Analysis

Evidence/Judgements for Achievement/Paetae	Evidence/Judgements for Achievement with Merit/Kaiaka	Evidence/Judgements for Achievement with Excellence/Kairangi
Use complex programming techniques to develop a computer program. The student has: ● written code for a program that performs a specified task **For example (partial evidence):** The student's program allows users to direct the program to analyse a folder of files to process the final result files only. The program determines the number of points associated per place and assigns them to the regional association. The program deals with valid input data. The program then outputs the results in descending order. ● used complex techniques in a suitable programming language **For example (partial evidence):** The student has written the code to read the finals data from the correct folder and output the results to a .csv file. They have created a GUI to serve as the interface for accessing the files and displaying the results. ● set out the program code clearly and documented the program with comments **For example (partial evidence):** Layout is clear, and whitespace has been	Use complex programming techniques to develop an informed computer program. The student has: ● documented the program with appropriate variable/module names and organised comments that describe code function and behaviour **For example (partial evidence):** The student uses sensible variable and function names. For example, the points function might have been called 'points check', the list holding the value of the regional associations and points associated with each place might be called 'regional list'. The code has comments at key points (e.g. purpose, parameters and return values of functions, purpose of classes and their fields etc) For example: 'function checks that the associated points are applied for each place within the file'. ● followed conventions for the chosen programming language **For example (partial evidence):** For code written in Python, the student uses all lower-case variable names, functions are placed before the main routine and classes (if used) are named using CapWords. The student has used an automated tool to check that their code follows conventions.	Use complex programming techniques to develop a refined computer program. The student has: ● ensured that the program is a well-structured, logical solution to the task ● made the program flexible and robust **For example (partial evidence):** The student has used abstractions where appropriate. Functions and classes have been used to keep distinct tasks separate. Functions/modules with input parameters have been used to avoid repeated code and increase flexibility (such as for scoring/lane/regional association set up information). The code works for expected, unexpected and boundary values. Where the program uses a GUI, the GUI and the underlying code are kept separate, and communicate via a well-defined interface. It is easy to edit the code to extend its functionality. ● comprehensively tested and debugged the program **For example (partial evidence):** Student has supplied test plans and/or annotated screenshots/a screenshot showing that the program components (and final program) have been tested to ensure that it works correctly for expected cases, boundary and unexpected or invalid cases. They have used others to test their program throughout the development process and have refined their final program based upon

effectively used. Student has included comments stating what the code does. ● tested and debugged the program to ensure that it works on a sample of expected cases. **For example (partial evidence):** Student has provided evidence of testing their program. The testing might be missing some of the expected detail and only includes expected cases. *The examples above are indicative samples only*	● tested and debugged the program in an organised way to ensure that it works on a sample of both expected and relevant boundary cases **For example (partial evidence):** The student has tested their code to confirm that it works correctly on a sample of expected and boundary cases, e.g. that the program assigns the correct points for shared places as well as W12 waka that the points are shared between regional associations. Student test plans make sense within the context of the problem. *The examples above are indicative samples only*	testing. *The examples above are indicative samples only*

Final grades will be decided using professional judgement based on a holistic examination of the evidence provided against the criteria in the Achievement Standard.