Assessment Task: Portfolio

Qualification national code and title	ICT40520	Certificate IV in Programming
Unit/s national code/s and title/s	ICTPRG430	Apply introductory object-oriented language skills
	ICTICT449	Use version control systems in development environments

Task:	3
Task Title:	Portfolio
Task Code:	AT2 POR-Task-3

ASSESSMENT TYPE (🌐):

☐ Questioning (Oral/Written)   ☒ Portfolio

☐ Practical Demonstration   ☐ Project

☐ 3rd Party Report   ☐ Other – Please Specify

RTO Code 52786   CRICOS Code: 00020G

Folder location: *ally_context444846041369368002.docx*

Date Created: *2021-08-23 12:18*

Document ID: F122A12

Current Template Version: February 2020

Assessment task last updated: *2023-04-28 20:45*

Page 1 of 27

Uncontrolled Copy When Printed

Qualification national code and title	ICT40520	Certificate IV in Programming
Unit/s national code/s and title/s	ICTPRG430	Apply introductory object-oriented language skills
	ICTICT449	Use version control systems in development environments

The base requirements this assessment task include:

- Web server, Python interpreter and database server
- IDE or editor for developing Python programs *(only PyCharm supported by the college)*
- *Raspberry Pi with SenseHat*
- Access to Office 365 & Microsoft Word
- Report Template (*Portfolio: Part 3 Document Template*) as supplied

Use of some of these items may not occur in this part of the assessment task.

RTO Code 52786   **CRICOS Code: 00020G**

Folder location: *ally_context444846041369368002.docx*

Date Created: *2021-08-23 12:18*

Document ID: F122A12

Current Template Version: February 2020

Assessment task last updated: *2023-04-28 20:45*

Page 2 of 27

Uncontrolled Copy When Printed

Government of Western Australia
North Metropolitan TAFE

Qualification national code and title	ICT40520	Certificate IV in Programming
Unit/s national code/s and title/s	ICTPRG430	Apply introductory object-oriented language skills
	ICTICT449	Use version control systems in development environments

Assessment Due

This assessment is due on the following date:

- Week 14   17:00 (5:00PM) on the day of the scheduled lecture.

Refer to Blackboard for the most accurate dates, which may alter due to unforeseen circumstances.

We also will endeavour to update these document(s) at the same time.

Instructions

Follow the steps listed in this assessment item. *Please note that **additional** information may be given.*

Submission of the documentation, code, and associated items is at the end of each part of the portfolio.

Each part of the portfolio has a deadline for submission.

It is advantageous to you to attempt to meet the deadline provided.

Important

If you are using a different configuration of tools and equipment for this assessment item, then assistance in this and subsequent parts of the portfolio to ensure the systems work correctly will be limited.

Scenario / background

In this Portfolio Task, we're going to have a closer look at the four pillars of OO:

1. Abstraction
2. Polymorphism
3. Inheritance
4. Encapsulation

RTO Code 52786   **CRICOS Code: 00020G**

Folder location: *ally_context444846041369368002.docx*

Date Created: *2021-08-23 12:18*

Document ID: F122A12

Current Template Version: February 2020

Assessment task last updated: *2023-04-28 20:45*

Page 3 of 27

Uncontrolled Copy When Printed

Assessment Task: Portfolio

Qualification national code and title	ICT40520	Certificate IV in Programming
Unit/s national code/s and title/s	ICTPRG430	Apply introductory object-oriented language skills
	ICTICT449	Use version control systems in development environments

General Instructions

We provide a document template for your answers.

Save the file as:

- XXX-IoT-Port-Part-3.docx

Replacing the XXX with your initials.

For example, Adrian Gould would use AG-IoT-Port-Part-3.docx for his submitted filename.

Upload any code as a PyCharm project in a zip-file. Remove the virtual environment (`venv` or `.venv`) from the zip-file before uploading it to Blackboard. Include your .git file with your submission. Your .git file must point to an origin on GitHub.

Answering Questions

When a step includes a question, you must attempt to answer it.

There is a minimum and maximum number of words to use for each answer.

If a step has more than one question, these maxima and minima are a total for all the questions in that specific step.

All answers must be in complete sentences unless indicated.

RTO Code 52786   **CRICOS Code: 00020G**

Folder location: *ally_context444846041369368002.docx*

Date Created: *2021-08-23 12:18*

Document ID: F122A12

Current Template Version: February 2020

Assessment task last updated: *2023-04-28 20:45*

Page 4 of 27

Uncontrolled Copy When Printed

Qualification national code and title	ICT40520	Certificate IV in Programming
Unit/s national code/s and title/s	ICTPRG430	Apply introductory object-oriented language skills
	ICTICT449	Use version control systems in development environments

Sources of Information

In industry, it is good practice to keep track of where information was obtained. This is especially true if it is a written document, or even code.

If you answer any questions using information from web sites, please include the site name and URL (Web site address) after the answer. Likewise, include the title and author for books and magazine articles. For example:

- RS Electronics Ltd: https://au.rs-online.com/
- Slack API Documentation, Users List Method: https://api.slack.com/methods/users.list

If you use ChatGPT (or any other AI) to help you answer the questions, you must reference the chat as a conversation (e.g. 2023, Conversation with ChatGPT) . Copying/pasting from ChatGPT or any other LLM without attribution is plagiarism. Your answer must be in **your** own words to be accepted. If you use ChatGPT to proof your answer, include "Proofed by ChatGPT" with your answer. Your lecturer may ask follow up questions to validate your understanding.

Code Storage

The initial source code for this project is available on GitHub. You must fork the repository and provide evidence of using Git. See for details:

https://github.com/NM-TAFE/civ-ipriot-smiley/blob/main/README.md

RTO Code 52786   **CRICOS Code: 00020G**

Folder location: *ally_context444846041369368002.docx*

Date Created: *2021-08-23 12:18*

Document ID: F122A12

Current Template Version: February 2020

Assessment task last updated: *2023-04-28 20:45*

Page 5 of 27

Uncontrolled Copy When Printed

Qualification national code and title	ICT40520	Certificate IV in Programming
Unit/s national code/s and title/s	ICTPRG430	Apply introductory object-oriented language skills
	ICTICT449	Use version control systems in development environments

This space left intentionally blank.

RTO Code 52786   **CRICOS Code: 00020G**

Folder location: *ally_context444846041369368002.docx*

Date Created: *2021-08-23 12:18*

Document ID: F122A12

Current Template Version: February 2020

Assessment task last updated: *2023-04-28 20:45*

Page 6 of 27

Uncontrolled Copy When Printed

Qualification national code and title	ICT40520	Certificate IV in Programming
Unit/s national code/s and title/s	ICTPRG430	Apply introductory object-oriented language skills
	ICTICT449	Use version control systems in development environments

STEP	TASK TO PERFORM	Words Min/Max
00	**Create Evidence Document** Make sure you have followed the instructions on creating the answer document, as given in the General Instructions. Familiarise yourself with the content and document your progress in this assessment. Make sure that you complete the title page of the document. At any stage during this assignment, you may consult the stakeholder(s) or their representative(s).	

This space left intentionally blank.

RTO Code 52786   **CRICOS Code: 00020G**

Folder location: *ally_context444846041369368002.docx*

Date Created: *2021-08-23 12:18*

Document ID: F122A12

Current Template Version: February 2020

Assessment task last updated: *2023-04-28 20:45*

Page 7 of 27

Uncontrolled Copy When Printed

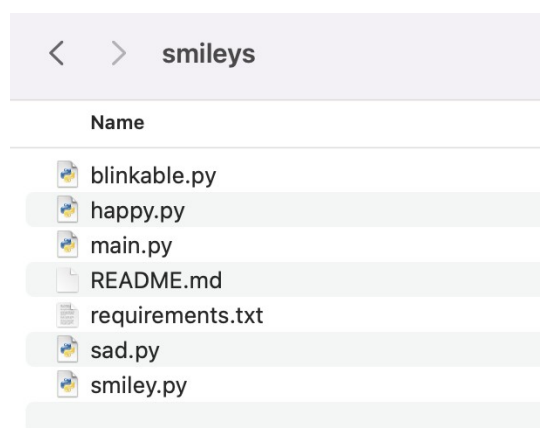| Qualification national code and title	ICT40520	Certificate IV in Programming
Unit/s national code/s and title/s	ICTPRG430	Apply introductory object-oriented language skills
	ICTICT449	Use version control systems in development environments

STEP	TASK TO PERFORM	Words Min/Max
01	**Download the "Smileys" project**	**n/a**

You can download the Smileys project from GitHub using the provided link. .

After cloning, the directory structure should look something like this:

The `main.py` script is the entry point for the project. You should be able to run the script on your Raspberry Pi by typing `python3 main.py` in a terminal. Make sure to `cd` into your project directory (this means Change Directory).

You may ignore the `requirements.txt` for now. The file `README.md` contains a brief description of what the project is about. It is good practice to add a README to any project you create.

Take a screenshot of the result of the following two commands and put it in the answer document ($ is the prompt; don't type that):

`$ ls`
`$ python3 main.py`

Qualification national code and title	ICT40520	Certificate IV in Programming
Unit/s national code/s and title/s	ICTPRG430	Apply introductory object-oriented language skills
	ICTICT449	Use version control systems in development environments

STEP	TASK TO PERFORM	Words Min/Max

This space left intentionally blank.

RTO Code 52786   **CRICOS Code: 00020G**

Folder location: *ally_context444846041369368002.docx*

Date Created: *2021-08-23 12:18*

Document ID: F122A12

Current Template Version: February 2020

Assessment task last updated: *2023-04-28 20:45*

Page 9 of 27

Uncontrolled Copy When Printed

Qualification national code and title	ICT40520	Certificate IV in Programming
Unit/s national code/s and title/s	ICTPRG430	Apply introductory object-oriented language skills
	ICTICT449	Use version control systems in development environments

STEP	TASK TO PERFORM	Words Min/Max
02	**Find the classes**	n/a

The project contains a few classes. Some are "base classes" (sometimes called super classes) and some are "subclasses", which are derived from the base classes.

Answer the following questions:

a. *How many classes can you identify in the project?*
b. *In your own words, describe how 'abstraction' is visible in this project.*
c. *Describe which of these classes are subclasses and which are base (or super) classes.*
d. *What is the name of the process of deriving from base classes?*

Qualification national code and title	ICT40520	Certificate IV in Programming
Unit/s national code/s and title/s	ICTPRG430	Apply introductory object-oriented language skills
	ICTICT449	Use version control systems in development environments

STEP	TASK TO PERFORM	Words Min/Max
	This space left intentionally blank.	

RTO Code 52786   **CRICOS Code: 00020G**

Folder location: *ally_context444846041369368002.docx*

Date Created: *2021-08-23 12:18*

Document ID: F122A12

Current Template Version: February 2020

Assessment task last updated: *2023-04-28 20:45*

Page 11 of 27

Uncontrolled Copy When Printed

Qualification national code and title	ICT40520	Certificate IV in Programming
Unit/s national code/s and title/s	ICTPRG430	Apply introductory object-oriented language skills
	ICTICT449	Use version control systems in development environments

STEP	TASK TO PERFORM	Words Min/Max
03	**Not all classes are the same**	n/a

Investigate the classes `Happy` and `Sad`.

Notice the similarities and the difference. Be careful, what may look like a similarity may actually contain a subtle but important difference.

In your own words, describe:

- *The commonalities between `Happy` and `Sad`*
- *The differences between `Happy` and `Sad`*
- *Is there anything that stands out as a difference?*

This space left intentionally blank.

RTO Code 52786   **CRICOS Code: 00020G**

Folder location: *ally_context444846041369368002.docx*

Date Created: *2021-08-23 12:18*

Document ID: F122A12

Current Template Version: February 2020

Assessment task last updated: *2023-04-28 20:45*

Page 12 of 27

Uncontrolled Copy When Printed

Government of **Western Australia**
North Metropolitan **TAFE**

Qualification national code and title	ICT40520	Certificate IV in Programming
Unit/s national code/s and title/s	ICTPRG430	Apply introductory object-oriented language skills
	ICTICT449	Use version control systems in development environments

STEP	TASK TO PERFORM	Words Min/Max
04	**Where's the Sense(Hat) in that?**	n/a

You will have noticed by now that the project uses the *SenseHat* to display the smileys on the display.

Yet, in `main.py` there is no mention of any SenseHat at all.

Answer the following questions:

a. *Where is **SenseHat** used (in which **class**)?*
b. *Which functionalities of **SenseHat** are used?*
c. *What is the process of storing and potentially hiding objects in classes called?*

This space left intentionally blank.

RTO Code 52786 **CRICOS Code: 00020G**
Folder location: *ally_context444846041369368002.docx*
Date Created: *2021-08-23 12:18*
Document ID: F122A12

Current Template Version: February 2020
Assessment task last updated: *2023-04-28 20:45*
Page 13 of 27
Uncontrolled Copy When Printed

Qualification national code and title	ICT40520	Certificate IV in Programming
Unit/s national code/s and title/s	ICTPRG430	Apply introductory object-oriented language skills
	ICTICT449	Use version control systems in development environments

STEP	TASK TO PERFORM	Words Min/Max

05 Sad smileys can't blink (or can they?)

Unlike the **Happy** smiley, the current implementation of the **Sad** smiley does not have the ability to blink.

Investigate the **Happy** smiley to see how blinking has been implemented by looking at the method **blink()**, which takes in one argument. The argument determines how long the blink lasts.

You will now add the ability to blink to the **Sad** smiley.

Follow the instructions (and answer any questions):

a. *In your own words, how does the **blink()** method make the smiley blink?*

b. *Create a new method called blink in the **Sad** class and ensure you use the same prototype (prototype = name + arguments):*

```python
def blink(self, delay=0.25):
    pass  # your implementation goes here
```

c. *Implement the code that makes the smiley blink. You may use the implementation from **Happy** as guidance.*

d. *Test the code on your Raspberry Pi (or with the provided classes) and watch the sad smiley blink its eyes. (You may have to adjust the **main.py** script for this.)*

RTO Code 52786   **CRICOS Code: 00020G**

Folder location: *ally_context444846041369368002.docx*

Date Created: *2021-08-23 12:18*

Document ID: F122A12

Current Template Version: February 2020

Assessment task last updated: *2023-04-28 20:45*

Page 14 of 27

Uncontrolled Copy When Printed

Qualification national code and title	ICT40520	Certificate IV in Programming
Unit/s national code/s and title/s	ICTPRG430	Apply introductory object-oriented language skills
	ICTICT449	Use version control systems in development environments

STEP	TASK TO PERFORM	Words Min/Max

This space left intentionally blank.

RTO Code 52786   **CRICOS Code: 00020G**

Folder location: *ally_context444846041369368002.docx*

Date Created: *2021-08-23 12:18*

Document ID: F122A12

Current Template Version: February 2020

Assessment task last updated: *2023-04-28 20:45*

Page 15 of 27

Uncontrolled Copy When Printed

Qualification national code and title	ICT40520	Certificate IV in Programming
Unit/s national code/s and title/s	ICTPRG430	Apply introductory object-oriented language skills
	ICTICT449	Use version control systems in development environments

STEP	TASK TO PERFORM	Words Min/Max
06	### If it walks like a duck…	

If you followed the instructions in the previous question closely, you didn't use the class **Blinkable** to make **Sad** blink. (If you did, that's fine. In that case, however, you should assume you did not when answering the following questions.)

You did not have to use **Blinkable** to allow the **Sad** smiley to blink.

Answer the following questions:

a. *What kind of class is* **Blinkable**? *Look at its super class for a hint.*
b. *Any class that uses* **Blinkable** *is said to "implement" it. What is another (generic) name for a class like* **Blinkable**, *which may be implemented by other classes?*
c. *What is the answer from the previous question an example of? Choose from: Abstraction, Polymorphism, Inheritance, and Encapsulation.*
d. *Why were you able to use it like the one defined in* **Happy**, *yet without using* **Blinkable**?
e. *Regarding the answer to d., what is this called and why does it work in Python but not in some other languages, like C#? (A hint is in the title of this question.)*

Qualification national code and title	ICT40520	Certificate IV in Programming
Unit/s national code/s and title/s	ICTPRG430	Apply introductory object-oriented language skills
	ICTICT449	Use version control systems in development environments

STEP	TASK TO PERFORM	Words Min/Max
	This space left intentionally blank.	

RTO Code 52786   **CRICOS Code: 00020G**

Folder location: *ally_context444846041369368002.docx*

Date Created: *2021-08-23 12:18*

Document ID: F122A12

Current Template Version: February 2020

Assessment task last updated: *2023-04-28 20:45*

Page 17 of 27

Uncontrolled Copy When Printed

Assessment Task: Portfolio

Qualification national code and title	ICT40520	Certificate IV in Programming
Unit/s national code/s and title/s	ICTPRG430	Apply introductory object-oriented language skills
	ICTICT449	Use version control systems in development environments

STEP	TASK TO PERFORM	Words Min/Max
07	**Does a smiley have to be yellow?** You don't have to answer the above question, because obviously it doesn't. But keep reading. Smileys that do not feel too well are often green, while angry smileys are usually red or orange. The current implementation only allows for yellow smileys, though. That means we're a bit limited as to what emotions we can express with our SenseHat Smileys. *Answer the following questions:* *a. Which colours are **defined** and where?* *b. What is the name of the **type of variables** that hold the colours?* *c. Where are the colour variables actually **used**?* *d. What would be an easy, albeit rather naive, way to change the colour of the smileys, for example, to green?*	

RTO Code 52786   **CRICOS Code: 00020G**

Folder location: *ally_context444846041369368002.docx*

Date Created: *2021-08-23 12:18*

Document ID: F122A12

Current Template Version: February 2020

Assessment task last updated: *2023-04-28 20:45*

Page 18 of 27

Uncontrolled Copy When Printed

Qualification national code and title	ICT40520	Certificate IV in Programming
Unit/s national code/s and title/s	ICTPRG430	Apply introductory object-oriented language skills
	ICTICT449	Use version control systems in development environments

STEP	TASK TO PERFORM	Words Min/Max

This space left intentionally blank.

Qualification national code and title	ICT40520	Certificate IV in Programming
Unit/s national code/s and title/s	ICTPRG430	Apply introductory object-oriented language skills
	ICTICT449	Use version control systems in development environments

STEP	TASK TO PERFORM	Words Min/Max

08 Flexible colours – Step 1

Changing the colour of the smileys once is easy. But it's not very flexible, is it?

To allow for smileys to have different colours, we best not hardcode any values in any class, which you discovered in *question 7c*.

Some classes have a built-in assumption about the colour that is used. Let's remove that assumption one step at a time.

Follow these instructions:

a. *Added an instance method called* `complexion` *to the class* `Smiley`. *You can make it return* `self.YELLOW`.
   (Technically speaking, smileys don't have a complexion as they have no skin, but it sounds a bit nicer than just "colour".)

b. *Update the subclasses that use the colour variable directly to, instead, use the new method* `complexion`.

c. *Which of the four pillars of OO have we used here: Abstraction, Polymorphism, Inheritance, or Encapsulation? (If you feel more than one applies, pick the one that applies* **best**.)

d. *Check that the new code works correctly. It should still just show a yellow smiley…*

RTO Code 52786   **CRICOS Code: 00020G**

Folder location: *ally_context444846041369368002.docx*

Date Created: *2021-08-23 12:18*

Document ID: F122A12

Current Template Version: February 2020

Assessment task last updated: *2023-04-28 20:45*

Page 20 of 27

Uncontrolled Copy When Printed

Qualification national code and title	ICT40520	Certificate IV in Programming
Unit/s national code/s and title/s	ICTPRG430	Apply introductory object-oriented language skills
	ICTICT449	Use version control systems in development environments

STEP	TASK TO PERFORM	Words Min/Max
	This space left intentionally blank.	

RTO Code 52786   **CRICOS Code: 00020G**

Folder location: *ally_context444846041369368002.docx*

Date Created: *2021-08-23 12:18*

Document ID: F122A12

Current Template Version: February 2020

Assessment task last updated: *2023-04-28 20:45*

Page 21 of 27

Uncontrolled Copy When Printed

Qualification national code and title	ICT40520	Certificate IV in Programming
Unit/s national code/s and title/s	ICTPRG430	Apply introductory object-oriented language skills
	ICTICT449	Use version control systems in development environments

STEP	TASK TO PERFORM	Words Min/Max

09	**Flexible colours – Step 2**
	
	The subclasses no longer make any assumptions about the colour (complexion) of the smiley. Instead, it simply "asks" the superclass by calling the new method we defined.
	
	While that still does not provide the flexibility we crave, it will make it easier to provide this flexibility.
	
	We will now update the base class to allow flexible colours.
	
	Follow these instructions:
	
	   a. *Add a default argument to the magic method* `__init__()` *of the* `Smiley` *class and call it* `complexion`*. Assign* `YELLOW` *to it. (Yes, this is allowed.)*
	   b. *Create a new **instance variable** called* `my_complexion` *and assign* `complexion` *to it.*
	   c. *Why do we need to call this instance variable* `my_complexion` *and can't just use* `complexion`*? (You may refer to Question 8.)*
	   d. *Also assign* `complexion` *to* `Y`*. (Okay, not the best name, but because the scope is so small, we'll allow it for now.)*
	   e. *Finally, update the **method** `complexion` and have it return* `self.my_complexion`*.*
	   f. *Run the program and see that it still just creates a yellow smiley…*	

RTO Code 52786   **CRICOS Code: 00020G**

Folder location: *ally_context444846041369368002.docx*

Date Created: *2021-08-23 12:18*

Document ID: F122A12

Current Template Version: February 2020

Assessment task last updated: *2023-04-28 20:45*

Page 22 of 27

Uncontrolled Copy When Printed

Qualification national code and title	ICT40520	Certificate IV in Programming
Unit/s national code/s and title/s	ICTPRG430	Apply introductory object-oriented language skills
	ICTICT449	Use version control systems in development environments

STEP	TASK TO PERFORM	Words Min/Max
	This space left intentionally blank.	

RTO Code 52786   CRICOS Code: 00020G

Folder location: *ally_context444846041369368002.docx*

Date Created: *2021-08-23 12:18*

Document ID: F122A12

Current Template Version: **February 2020**

Assessment task last updated: *2023-04-28 20:45*

Page 23 of 27

Uncontrolled Copy When Printed

Qualification national code and title	ICT40520	Certificate IV in Programming
Unit/s national code/s and title/s	ICTPRG430	Apply introductory object-oriented language skills
	ICTICT449	Use version control systems in development environments

STEP	TASK TO PERFORM	Words Min/Max
10	**Flexible colours – Step 3** We have updated our code to allow for smileys to have different colours. The colours that are provided for us are *Yellow, Green, Red, and Blue*. Let's update the sad smiley to be *Blue*. (See what we did there?) *Follow these instructions:* a. *Locate the initialiser method of the class* `Sad` *and within it the call to its super class's initialiser method.* b. *Change the call as follows:* `super().__init__(complexion=self.BLUE)` c. *Run code to show that the sad smiley is now blue.* d. *Run code to show that the happy smiley is still yellow.* e. *In your own words, **describe** how you would create a new angry smiley that has a Red complexion and angry looking eyes. (You don't have to write this code, but you may do this as an exercise.)*	

RTO Code 52786   **CRICOS Code: 00020G**

Folder location: *ally_context444846041369368002.docx*

Date Created: *2021-08-23 12:18*

Document ID: F122A12

Current Template Version: February 2020

Assessment task last updated: *2023-04-28 20:45*

Page 24 of 27

Uncontrolled Copy When Printed

Qualification national code and title	ICT40520	Certificate IV in Programming
Unit/s national code/s and title/s	ICTPRG430	Apply introductory object-oriented language skills
	ICTICT449	Use version control systems in development environments

STEP	TASK TO PERFORM	Words Min/Max
	This space left intentionally blank.	

Government of Western Australia
North Metropolitan TAFE

Qualification national code and title	ICT40520	Certificate IV in Programming
Unit/s national code/s and title/s	ICTPRG430	Apply introductory object-oriented language skills
	ICTICT449	Use version control systems in development environments

STEP	TASK TO PERFORM	Words Min/Max
	### Submission of Portfolio Work To submit the portfolio, do the following: • Save the document with your answers as a MS Word file (.docx). • Save the code that you have produced or changes in a zip-file. Make sure to remove any virtual environment (.*venv*) and project directories (.*idea*) from the zip-file before uploading. • Open Blackboard, and locate the AT2 Portfolio Task 3 assessment • Open the assessment and upload the original word-processed document and the zip-file. • Click submit. *Whilst there is no need to use any other word processing software as you have access to Office 365 for free as a student, if you use Apple Pages, or Open Office, we will then require you to upload the original file **AND** a PDF version.*	

RTO Code 52786   **CRICOS Code: 00020G**

Folder location: *ally_context444846041369368002.docx*

Date Created: *2021-08-23 12:18*

Document ID: F122A12

Current Template Version: February 2020

Assessment task last updated: *2023-04-28 20:45*

Page 26 of 27

Uncontrolled Copy When Printed

Qualification national code and title	ICT40520	Certificate IV in Programming
Unit/s national code/s and title/s	ICTPRG430	Apply introductory object-oriented language skills
	ICTICT449	Use version control systems in development environments

APPENDIX A: CODE STYLE GUIDELINES

Your code will follow the PEP 8 standard.

Readability Counts
- Zen of Python

Explicit is better than implicit.
- Zen of Python

Other code standards available in the Presentation, "Python Coding Standards for North Metropolitan TAFE".