Assessment Task

Qualification national code and title	ICT50718 Diploma of Software Development
Unit/s national code/s and title/s	ICTPRG523 Apply advanced programming skills in another language

Assessment type (☑):

☐ Questioning (Oral/Written)
☐ Practical Demonstration
☐ 3rd Party Report
☒ Other – Project/Portfolio *(programs)*

Assessment Resources:

Personal computer with Python IDE (PyCharm or similar) and internet access.
Access to Blackboard shell "ICTPRG523 Advanced programming skills in another language".

Assessment Instructions:

This assessment requires you to write a program in Python that demonstrates doubly-linked lists and binary trees.

Due date: end of week 9.

1. Complete all the assessment tasks below.
2. Observation by your lecturer of you doing the assessment is considered part of the assessment process.
3. Submit your result and supporting documentation into the Blackboard assessment area.
4. All skills must be demonstrated to achieve a satisfactory result.

All work submitted must be your own individual effort.

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Assessment Instrument:

Assessment 1: Doubly Linked Lists and Binary Trees

You are working for a boutique software development company in Perth. The department head has asked you to write some programs to highlight the types of problems you generally solve to a new cohort of (junior) employees.

For quality assurance purposes, you may also need to debug and test your programs. You must also show the correct use of comments and other documentation (e.g., docstrings). This will help the new employees to learn to organisational requirements that apply to writing software.

Part A
In the first part of this assessment, you must design, code, and test a program that uses a **doubly-linked list** data structure.

Choose ONE of the following scenarios:

- A doubly-linked list that stores data about adjacent neighbours in a street.
- A doubly-linked list that stores playing cards. A card class must hold data to represent each suit of cards (Diamonds, Hearts, Clubs, and Spades) and their ranks (Ace ... 10, J, Q, K).
- A doubly-linked list that stores consecutive dates in a 3-month calendar.

You only need to code ONE of the above scenarios!

1. Write a Python program that provides the ability to:
    a. Add a node to the linked list
    b. Delete a node from the linked list
    c. Display all the data in the linked list by traversing backwards through the list
    d. Find a node in the linked list
2. Debug and test your program. You must write unit tests to test the functionality specified above. Screenshot your test results.

Part B
In the second part of this assessment, you must design, code, and test a Python program that uses a **binary tree** data structure.

Use a binary tree for ONE of the following scenarios:

- Arranging numbers or letters in an ordered structure. Your program must provide the ability to add and delete nodes and display all data in the tree.

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- Decode a Morse code message (i.e., convert sequence of dots and dashes into letters).

You only need to code ONE of the above scenarios.

Comment your programs and upload your evidence in compressed format into the Blackboard assessment area.