LOs	LO3		LO4	
Sub				
Resub	P	Not Achieved	P	Not Achieved

Student Name		Section		Code	
Unit No. & Title	ICT 212- Programming Essentials in C++				
Qualification	Higher Diploma in Information Technology (y2-1st semester)				
Assignment No.	2				
Evidence	Outdoor assignment (project)				
Hand out date	18/12/2025	Hand in date	22/12/2025		
Assessor Name	Mohamed Ramadan			IV Name	Dr: Ayat taha

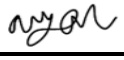
LO No.	Criteria		No.	Grade	Comments
Lo1	Pass	P7	1	☐	
		P8	2	☐	
		P9	3	☐	
	Merit	M3	4	☐	
	Distinction	D3	5	☐	

Grade	NA	Re-sub	P	M	D
	○	○	○	○	○

Lo2	Pass	P10	6	☐	
		P11	7	☐	
	Merit	M4	8	☐	
	Distinction	D4	9	☐	

Grade	NA	Re-sub	P	M	D
	○	○	○	○	○

"I certify that this assignment is my own work, written in my own words. Any other person's work included in my assignment is referenced / acknowledged".

IV Signature:  Date: 19/12/20225

Assessment Criteria Table

Criteria reference	Targeted criteria	To achieve the criteria the evidence must show that the student is able to:	Evidence
LO3	Pass	**P7:** Identify and describe arrays and their types, vectors, and structures in C++. **P8**: Explore functions in C++ and explain their different types. **P9**: Identify pointers in C++ and provide an example of their use	Outdoor assignment (project)
	Merit	**M3:** Differentiate between arrays, vectors, and structures in C++.	
	Distinction	**D3**: Develop a real-world C++ program that uses functions (and their types), arrays, vectors, and structures.	
LO4	Pass	**P10:** Explain the concept of file handling in Python and discuss its importance. **P11:** Identify and explain the concepts of classes and objects in C++.	
	Merit	**M4:** Write a C++ program that Describe file handling.	
	Distinction	**D4:** Develop a real-world C++ program that integrates all learned concepts, including object-oriented programming (classes and objects), file handling, functions, arrays, vectors, structures, and pointers.	

Scenario

You work in the field of ICT at the integrated solution company. You have been asked to develop a C++ program for a University Student Information System (SIS). The program should utilize all the skills you have learned, such as object-oriented programming (classes and objects), file handling, functions, arrays, vectors, structures, and pointers.

The application will be used by the following stakeholders:

1. Students: can view all their data, such as:
   a) Schedules and grades
   b) Number of groups
   c) Number of sections
   d) Tuition fees paid
   e) Exam results
   f) Final grade and GPA

2. Professors can enter, update, append, and delete student grades and attendance data, including:
   a) Student attendance and absence tracking.
   b) Lecture attendance
   c) Assignment 1 grades.
   d) Assignment 2 grades.
   e) Course Work (CW) grades.
   f) Final Exam grades.
   g) Courses assigned to each instructor.
   h) Lecturer/Professor data (personal information).
   i) Academic Schedules.
   j) Academic Calendar.
   k) Academic courses. (ID, Name, Description, Course degree (150,100), Curriculum Structure (Practical courses / Theoretical).

   Note: Practical courses are graded out of 150, while theoretical courses are graded out of 100.

3. Administration: administration can manage the entire educational process, including:

   a) Student data for newly enrolled students.
   b) Academic years.
   c) Academic levels.
   d) Student Fees.
   e) Faculty data and their coding.
   f) Departments within faculties and their coding.
   g) Lecture halls (the number of students the hall can accommodate, and a description of the hall in terms of seating, air conditioning, fans, and lighting - each specified separately) and their coding. (you can choose from list specification).
   h) Laboratory data (the number of students the lab can accommodate, the number of computers, and the number of seats, air conditioning units, fans, and lighting—each specified separately) and laboratory coding. (you can choose from list).
   i) The list specification of lecture halls and laboratories must contain: product ID, product name, and product description.

4. Grade Distribution

Course Type	Ass1	Ass2	CW	Final
Practical courses (out of 150 marks)	20%	30%	20%	30%
Practical courses (out of 100 marks) such as (Big Data – Database – MS Office)	20%	30%	20%	30%
Theoretical courses (out of 100 marks)	20%	20%	60%	—

5. Grade Evaluation

- **≥ 85%** → Excellent
- **≥ 75%** → Very Good
- **≥ 65%** → Good
- **≥ 60%** → Pass

Notes for execution:

1. The main function in the program

a) 1)Data entry, 2) Modify "Update, append", 3) view or print, 4) Delete.

b) A main list to choose the maim operation.

c) A sub list to choose the sub maim operation.

d) The program should determine the correct permissions for all user levels.

e) The output of each operation should be stored in a text file **in case (Console- Command Line Interface).**

f) Basic data such as academic years, academic levels, and departments can be retrieved from implemented text files **in case IDE and Database in case GUI**.

g) Each text file is automatically saved to D:\

h) If you want to record another operation, press the letter "N". If you want to exit the operation or the program, type "exit".

i) The program supports entering multiple operations.

j) An item can be deleted from any operation.

Tasks: Based on the previous scenario, your supervisor asked you to answer the following tasks:

1. Explain the concept of arrays in C++ and describe their different types, along with vectors and structures, explain this through the scenario? (P7)
2. Describe functions in C++ and explain the various types of functions and their uses? (P8)
3. Explain what a pointer is in C++ and illustrate its use with an example from the scenario? (P9)
4. Through the scenario, Compare and contrast arrays, vectors, and structures in C++, explaining the key differences between them? (M3)
5. Design and implement a real-world C++ program that uses functions (and their types), arrays, vectors, and structures, explain this through the scenario? (D3)
6. Describe the concept of file handling in Python and explain why it is important in real-world applications, explain this through the scenario? (P10)
7. Explain the concepts of classes and objects in C++ with suitable examples, mention from scenario the name of class and object? (P11)
8. Demonstrate a real-world problem solution using file handling from the scenario? (M4)
9. Apply the given scenario to design and develop a comprehensive real-world C++ program. Your solution must integrate object-oriented programming (classes and objects), file handling, functions, arrays, vectors, structures, and pointers? (D4)

Best wishes for success

Resubmission Feedback: ***Please note resubmission feedback is focussed only on the resubmitted work**	
Assessor Signature: *mohamed Ramadan*	**Date :19/12/2025**
Internal Verifier's Comments:	
IV Signature:	**Date :19/12/2025**