



Digital Design and Verification

C++ Assignment # 01

Basic Concepts in C++

Std vector & This pointer

Release: 1.1

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Revision History

Revision Number	Revision Date	Nature of Revision	Approved By
1.0	19/02/2025	Complete manual	Hira Sohail



TASK # 01:

C++ Task: Student Record Management Using `std::vector`

Implement a Student Record Management System using the `std::vector` container in C++. The system should allow users to:

1. Add a new student record.
2. Display all student records.
3. Search for a student by roll number.
4. Update a student's marks.
5. Sort the records based on marks in descending order.

Requirements:

- Use a class `Student` to store student details:
 - `string name`
 - `int rollNumber`
 - `vector<int> marks` (to store multiple subject marks)
 - `double averageMarks` (calculated dynamically)
- Implement a vector of `Student` objects to manage multiple students.
- Use iterators for traversal where applicable.
- Implement functions for each operation.
- Display a menu-based system for user interaction.
- Handle input validation properly.

Expected Output Example:

Student Record Management System

1. Add Student
2. Display All Students
3. Search Student by Roll Number
4. Update Marks
6. Sort students by Average Marks
7. Exit

Enter your choice:



TASK # 02:

Using this Pointer in C++

Write a C++ program to demonstrate the use of the 'this' pointer in a class representing a bank account. The program should include the following operations:

1. Deposit Amount – Add a specified amount to the account balance.
2. Withdraw Amount – Deduct a specified amount if sufficient balance is available.
3. Display Account Details – Show account holder's name and current balance.
4. Use this Pointer – Implement a member function that returns this pointer to allow method chaining.

Requirements:

- Define a BankAccount class with attributes:
 - accountHolder (string)
 - balance (double)
- Implement the following member functions using the 'this' pointer:
 - deposit(double amount) – Returns this to allow method chaining.
 - withdraw(double amount) – Returns this to allow method chaining.
 - display() – Prints account details.
- Demonstrate method chaining using this pointer.

Example:

Enter account holder name: John Doe

Enter initial balance: 1000

Depositing \$500...

Withdrawing \$300...

Account Holder: John Doe

Current Balance: \$1200

Submission:

Attach .c files of all the tasks along with the screenshots of outputs on LMS in a proper report.