Name: Justin Jake B Macatangay
Section: CPE11S2
Date : November 7, 2025

1. What is a file system in C++ programming?

A file system in C++ refers to the method and structure that allows a program to store, organize, access, and manage data in files on a storage device. It enables programs to read from and write to files using standard input/output operations. In C++, the <fstream> library is used to handle files, providing classes such as ifstream (input file stream), ofstream (output file stream), and fstream (for both input and output).

2. How does a file system work in C++?

A file system in C++ works by creating a stream connection between the program and the file.
When a file is opened, C++ establishes a data stream that allows information to flow between the program and the file.

The program can use ofstream to write data to a file (output stream).

It can use ifstream to read data from a file (input stream).

Or it can use fstream to perform both reading and writing.

After operations are complete, the file is closed using the .close() function to free resources and save changes properly.

3. Advantages of using file systems in programming

Using file systems in C++ provides several benefits:

Data Storage: Allows programs to save data permanently even after the program ends.

Data Retrieval: Enables reading and processing of stored data when needed.

Organization: Helps manage large amounts of information efficiently.

Automation: Allows automatic data logging, configuration saving, or report generation.

Flexibility: Data can be shared, updated, and reused across multiple programs or sessions.

4. Description of files and streams in C++ with example

In C++, files are containers used to store data permanently, while streams act as channels that move data between the program and the file.
The <fstream> library provides three main stream classes:

ofstream – used to create and write to files.

ifstream – used to read from files.

fstream – used for both reading and writing.

```
#include <iostream>
#include <fstream>
using namespace std;

int main() {
   // Writing to a file
   ofstream outFile("sample.txt");
   outFile << "Hello, this is a sample file." << endl;
   outFile << "C++ file handling using streams.";
   outFile.close();  // Close file after writing

   // Reading from a file
   ifstream inFile("sample.txt");
   string line;
   cout << "Reading from file:" << endl;
   while (getline(inFile, line)) {
      cout << line << endl;
   }
   inFile.close();  // Close file after reading

   return 0;
}
```