**CSCP 1024 Object Oriented Paradigm**

**Lab 14**



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**Task:**

Draw the UML diagram of the following scenario and implement in C++ in such a way that:

* Diamond Problem involved in the solution
* Composition being used
* Base initialization lists being used
* Method over-riding being used
* There are private, protected and public functions and attributes in all the classes that are being created

A modem (modulator-demodulator) is a device that modulates signals to encode digital information and demodulates signals to decode the transmitted information. The goal is to produce a signal that can be transmitted easily and decoded to reproduce the original digital data. Modems can be used with any means of transmitting analog signals, from light emitting diodes to radio. A common type of modem is one that turns the digital data of a computer into modulated electrical signal for transmission over telephone lines and demodulated by another modem at the receiver side to recover the digital data.

A fax modem is a special type of modem which enables a computer to transmit and receive documents as faxes on a telephone line. Fax modems do double duty as data modems; they derive properties from a fax machine and a fax modem. A fax machine has a scanner and a printer. The scanner scans the document and sends the digital copy using a fax modem. When a fax is received, the received message or document is printed using a printer.

It is worth noting here that a printer, a scanner and a fax machine are all machines performing a particular task. A machine is a tool containing one or more parts that uses energy to perform an intended action. Machines are usually powered by mechanical, chemical, thermal, or electrical means, and are often motorized.

**Task2:**

Create a function called swap () that interchanges the value of the two arguments sent to it. Make the function into a template, so it can be used with all numerical data types (int, float, char and so on) .Write main program to exercise the function with several types.

**Task 3:**

Write a template function that returns the average of all the elements of an array. The arguments to the function should be the array name and the size of the array (type int). In main, exercise the function with arrays of type int, long, double and char.

**Task 4:**

**Class Templates:**

Create a class named as arithmetic Operations

Create functions that could ADD, SUBTRACT, MULTIPLY, DIVIDE inputs of different data types given by user.