9. Practice problems on classes and OOPs

1. Model a simple bank account. It must have:
   1. Class BankAccount with private data: owner (std::string) and balance (double).
   2. Two constructors with default values of (owner="", balance=0) and (owner, initialBalance).
   3. Public methods are
      1. deposit(double), withdraw(double) (refuse overdraft)
      2. double getBalance() const;
      3. const std::string& getOwner() const;
2. Write a program with a class that logs data to the screen
   1. Class Logger with function void log(const std::string&) const; This function just prints a message on the screen
   2. Class TimestampedLogger : public Logger that overrides log to print a fake timestamp, then calls Logger::log(msg) to print the message.
   3. Show both logs in main function.
3. Write a program to implement a base class Shape and two derived classes Rectangle and Circle with the following conditions:
   1. Abstract class Shape with pure virtual double area() const = 0; and virtual destructor.
   2. Rectangle (double w, double h) and Circle(double r) that override area() in Shape class.
   3. Write a function printArea(const Shape&) that prints the area.
   4. In main, create a Rectangle and Circle, call printArea on each.
4. Write a program that will generate a compile time error. The following aspects should be covered:
   1. Class Point with private variables x, y with getters
   2. Methods of Point class are:
      1. void move(double dx, double dy); that moves x and y by dx and dy
      2. void print() const; that prints (x,y)
   3. Write a function outside the class called showPoint(const Point&) that calls print().
   4. Try calling move() from showPoint(). The program should not compile.
5. Write a program with the following features:
   1. Class Course with
      1. variable called name of type std::string and credits of type int,
      2. A print() const; function that prints the variable values in the class
   2. Class Student with
      1. variable name and a single Course member.
      2. Student() constructor which takes as input, the student name and a Course object, and stores the data in the class member variables with the constructor.
      3. void print() const; function that prints both the student name and the course info (by calling print() belonging to Course class)
   3. the main() function that creates a Student object with user defined values and calls the void print() const; function.