

Monthly Evidence Sample question:

- a. Write a Java program that creates an array with 100 randomly chosen integers. It prompts the user for an index and displays the corresponding element value. If the index is out of bounds, it shows "Out of Bounds" with an exception handler.
- b. Design a Java program using abstraction for a vehicle management system. Create an abstract class `Vehicle` with properties: `registrationNumber` (String), `brand` (String), and `year` (int). Include abstract methods `start()` and `stop()`.

Implement concrete subclasses `Car` and `Motorcycle` inheriting from `Vehicle`. In `Car`, display "Car engine started" in `start()` and "Car engine stopped" in `stop()`. In `Motorcycle`, display "Motorcycle engine started" in `start()` and "Motorcycle engine stopped" in `stop()`.

Provide code for these classes and demonstrate creating instances to start and stop engines.

- c. Design a Java program for a simple student management system using Binary I/O operations. Create a `Student` class with properties `name` (String) and `age` (int). Implement methods to write student information to a binary file named "students.dat" and read/display this information from the file. Show the program's functionality by creating instances of the `Student` class, writing their data to the file, and then reading and displaying it.

Provide the Java code showcasing Binary I/O operations.