**Vending Buddy – A Console-Based Vending Machine Simulation in Java**

**Abstract**

This project presents *Vending Buddy*, a console-based vending machine simulation system developed in Java. The primary goal is to simulate a real-life vending machine experience where users can view products, insert money, and receive selected items along with the appropriate change. The program is designed to be interactive and user-friendly, demonstrating key object-oriented programming principles such as encapsulation and class interaction.

**Methodology**

The application is built using Java with an object-oriented approach. The system defines a Product class representing individual items with attributes like ID, name, and price. The VendingMachine class manages the product list, user interaction, and payment processing. A menu-driven interface allows users to select items and insert money (in rupees), and the system handles validation, transaction completion, and change return. Java utilities like Scanner, ArrayList, loops, and conditional statements drive the user flow and system logic.

**Methods**

* **main(String[] args)**: Entry point of the application where the vending machine system is initialized and started.
* **display() (in Product class)**: Displays product details such as name and price in a formatted output.
* **loadProducts()**: Initializes and loads a predefined list of products into the vending machine.
* **displayMenu()**: Lists all available products with their respective IDs and prices.
* **getProductById(int id)**: Retrieves a product from the list based on the user-selected ID.
* **start()**: Handles the entire vending interaction — showing products, accepting user input, processing transactions, and returning change.

**Results**

The simulation allowed users to select products, insert rupee amounts, and receive accurate transaction outcomes including the correct product and any necessary change. The system handled invalid selections and insufficient funds gracefully. The program successfully mimics a basic vending machine operation, delivering an intuitive user experience within a console interface.

**Conclusion**

The *Vending Buddy* project serves as a practical application of Java programming for beginners. It effectively showcases the use of object-oriented design, class abstraction, and real-time user interaction through a console.