

# Assignment Report

## ATM Withdrawal - Introduction

In today's world, ATMs (Automated Teller Machines) play a vital role in banking. They allow customers to withdraw money anytime without visiting a bank branch. Behind this convenience lies a systematic process of verification, input, and secure output. This makes it an ideal real-world scenario to apply computational thinking.

## ATM Withdrawal - Analysis

**Abstraction:** Input: Card insertion, PIN entry, withdrawal amount. Processing: Authentication, balance check. Output: Cash + receipt.

**Decomposition:** Insert card → Enter PIN → Verify PIN → Select withdrawal → Enter amount → Check balance → Dispense cash → Print receipt → End.

**Pattern Recognition:** Similar to login systems (PIN verification), wallets (balance check), and stock deduction (dispensing cash).

## ATM Withdrawal - Pseudocode

```
BEGIN ATM_WITHDRAWAL
DISPLAY 'Insert Card'
INPUT cardInserted
IF cardInserted = TRUE THEN
  DISPLAY 'Enter PIN'
  INPUT userPIN
  IF userPIN = storedPIN THEN
    DISPLAY 'Enter Withdrawal Amount'
    INPUT amount
    IF amount <= accountBalance THEN
      accountBalance = accountBalance - amount
      DISPENSE cash
      PRINT 'Transaction Successful'
    ELSE PRINT 'Insufficient Balance'
  ENDIF
ELSE PRINT 'Invalid PIN'
ENDIF
ELSE PRINT 'No Card Detected'
ENDIF
```

END ATM\_WITHDRAWAL

## **ATM Withdrawal - Reflection**

Main challenge: ensuring security while keeping abstraction simple.

Insights: Computational thinking simplifies real-world tasks.

Future improvements: Retry limits, multiple options, database linkage.

## Online Shopping Checkout - Introduction

Online shopping is now a core part of daily life. The checkout process is critical, as it ensures correct item purchase, payment, and confirmation. It involves customer input, processing payment and stock, and generating order confirmation.

## Online Shopping Checkout - Analysis

**Abstraction:** Input: Cart items, address, payment details. Processing: Verify stock, calculate bill, process payment. Output: Order confirmation.

**Decomposition:** Add items → View cart → Enter details → Verify stock → Payment processing → Generate receipt → Confirm order.

**Pattern Recognition:** Similar to ATM (payment validation), ticket booking (seat availability check), and warehouse systems (inventory deduction).

## Online Shopping Checkout - Pseudocode

```
BEGIN ONLINE_CHECKOUT
DISPLAY 'View Cart'
INPUT customerDetails
FOR each item IN cart
CHECK stock
IF stock < requested THEN PRINT 'Item Out of Stock'
ELSE reserve item
END FOR
CALCULATE totalAmount
INPUT paymentDetails
IF paymentSuccessful THEN
CONFIRM order
GENERATE receipt
UPDATE inventory
ELSE PRINT 'Payment Failed'
ENDIF
END ONLINE_CHECKOUT
```

## Online Shopping Checkout - Reflection

Challenge: Handling stock checks in real time and payment failures.

Insights: The same checkout logic applies to e-commerce, ticketing, and event booking.

Future improvements: Multiple payment gateways, discounts/coupons, real-time inventory sync.

