Objetivo:

Este proyecto tiene como finalidad desarrollar un simulador completo y funcional de una máquina de café automatizada utilizando Python, aplicando principios de programación procedural y estructurada. El sistema simula de manera realista el funcionamiento de una máquina expendedora de café comercial.
El simulador gestiona de forma integral todos los recursos necesarios para la operación (agua, leche, granos de café y vasos), implementa un sistema de transacciones monetarias con cálculo automático de cambio, y proporciona funcionalidades administrativas protegidas por autenticación.

Requerimientos:

Técnicos

- Python 3.x
- Módulos: random, sys, io, unittest.mock
- No requiere dependencias externas

Funcionales

- Gestión de recursos: agua, leche, granos, vasos
- Menú de café: espresso ($4), latte ($7), cappuccino ($6)
- Sistema de pagos con cambio automático
- Operaciones administrativas con contraseña
- Validación de entrada y manejo de errores
- Límites máximos de recursos

6 casos de uso:

========== EXECUTING RANDOM TEST 1/6 ==========
=== RANDOM TEST CASE 3: Random Successful Coffee Purchase ===
Random selection: latte ($7)
Random payment: $7
Coffee purchase output:

--- Coffee Menu ---
Espresso: $4 - Water: 250ml, Milk: 0ml, Beans: 16g
Latte: $7 - Water: 350ml, Milk: 75ml, Beans: 20g
Cappuccino: $6 - Water: 200ml, Milk: 100ml, Beans: 12g

Latte costs $7
Available money in machine: $0
Here is your latte! Enjoy!

Machine status after purchase:
The coffee machine has:
    * 180 g of beans
    * 9 units of cups
    * 2150 ml of water
    * 925 ml of milk
    * $7 of money

========== TEST 1 COMPLETED ==========

========== EXECUTING RANDOM TEST 2/6 ==========
=== RANDOM TEST CASE 1: View Machine Status ===
Random initial state generated:
The coffee machine has:
    * 95 g of beans
    * 7 units of cups
    * 1890 ml of water
    * 672 ml of milk
    * $89 of money

========== TEST 2 COMPLETED ==========

========== EXECUTING RANDOM TEST 3/6 ==========
=== RANDOM TEST CASE 2: Fill Machine with Random Amounts ===
Machine status before filling:
The coffee machine has:
    * 6 g of beans
    * 0 units of cups
    * 43 ml of water
    * 203 ml of milk
    * $0 of money

Random inputs: 131g beans, 757ml water, 311ml milk, 7 cups
Fill operation output:
The coffee machine has:
    * 6 g of beans
    * 0 units of cups
    * 43 ml of water
    * 203 ml of milk
    * $0 of money

Machine status after filling:
The coffee machine has:
    * 137 g of beans
    * 7 units of cups

* 800 ml of water
* 514 ml of milk
* $0 of money

========== TEST 3 COMPLETED ==========

========== EXECUTING RANDOM TEST 4/6 ==========
=== RANDOM TEST CASE 6: Random Resource Limits Test ===
Machine with random low resources:
The coffee machine has:
* 16 g of beans
* 2 units of cups
* 257 ml of water
* 142 ml of milk
* $0 of money

Attempting to make: cappuccino
Required resources: {'water': 200, 'milk': 100, 'beans': 12, 'price': 6}
Payment: $6
Coffee attempt output:

--- Coffee Menu ---
Espresso: $4 - Water: 250ml, Milk: 0ml, Beans: 16g
Latte: $7 - Water: 350ml, Milk: 75ml, Beans: 20g
Cappuccino: $6 - Water: 200ml, Milk: 100ml, Beans: 12g

Cappuccino costs $6
Available money in machine: $0
Here is your cappuccino! Enjoy!

Final machine status:
The coffee machine has:
* 4 g of beans
* 1 units of cups
* 57 ml of water
* 42 ml of milk
* $6 of money

========== TEST 4 COMPLETED ==========

========== EXECUTING RANDOM TEST 5/6 ==========
=== RANDOM TEST CASE 5: Random Admin Operations ===
Initial machine money: $72
Random deposit amount: $19
Deposit operation output:
Deposited $19. Total money in machine: $91

Random withdraw amount: $22

Random charity choice: no
Withdraw operation output:
Withdrawing $22.

Final machine status:
The coffee machine has:
    * 200 g of beans
    * 10 units of cups
    * 2500 ml of water
    * 1000 ml of milk
    * $69 of money

========== TEST 5 COMPLETED ==========

========== EXECUTING RANDOM TEST 6/6 ==========
=== RANDOM TEST CASE 4: Random Insufficient Payment ===
Random selection: cappuccino ($6)
Random insufficient payment: $3
Coffee purchase output:

--- Coffee Menu ---
Espresso: $4 - Water: 250ml, Milk: 0ml, Beans: 16g
Latte: $7 - Water: 350ml, Milk: 75ml, Beans: 20g
Cappuccino: $6 - Water: 200ml, Milk: 100ml, Beans: 12g

Cappuccino costs $6
Available money in machine: $0
Insufficient payment. Cappuccino costs $6. Money returned.

Machine status after failed purchase:
The coffee machine has:
    * 200 g of beans
    * 10 units of cups
    * 2500 ml of water
    * 1000 ml of milk
    * $0 of money

========== TEST 6 COMPLETED ==========