

# Problem Title: Supply Chain Inventory Tracker

## Problem Statement

You are building a **Supply Chain Inventory Tracker** for a retail chain. Each product in the supply chain has:

- **Key → Product ID** (`String`, unique)
- **Value → Units in stock** (`Integer`)

The system manages the inflow and outflow of goods and offers utilities to manage restocking and listing items in stock.

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## Class Declaration

```
class SupplyChainInventory:
```

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### The `__init__` Method

```
def __init__(self):
    self.stock = {}
```

Initializes an empty dictionary to maintain the product stock.

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## Operations (Methods)

### 1. Add Product Stock

```
def add_product(self, product_id: str, quantity: int) -> dict:
```

If the product already exists, increase its stock.  
Otherwise, create a new entry.  
Return the updated stock dictionary.

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## 2. Fulfill Order

```
def fulfill_order(self, product_id: str, quantity: int) -> dict:
```

If sufficient quantity exists, deduct from stock.

If not, raise a `ValueError`.

Return the updated stock dictionary.

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## 3. Restock Return

```
def restock_return(self, product_id: str, quantity: int) -> dict:
```

Add returned quantity back into stock.

If product doesn't exist, add it.

Return the updated stock dictionary.

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## 4. List Available Stock

```
def list_available_products(self) -> list:
```

Return list of `product_ids` with stock > 0.

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## Example Behavior

```
sc = SupplyChainInventory()
sc.add_product("PRD101", 50)           # {'PRD101': 50}
sc.fulfill_order("PRD101", 10)         # {'PRD101': 40}
sc.restock_return("PRD101", 5)          # {'PRD101': 45}
sc.list_available_products()           # ['PRD101']
```

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## Visible Test Cases

TC#	Description	Function
TC1	Adding a new product	<code>add_product()</code>
TC2	Fulfilling an order	<code>fulfill_order()</code>
TC3	Restocking returned goods	<code>restock_return()</code>

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## Hidden Test Cases

HTC#	Description	Function
HTC1	Listing only products with stock >0	<code>list_available_products()</code>
HTC2	Order with insufficient stock	<code>fulfill_order()</code> — should raise <code>ValueError</code>

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- `run.py`: Script to run visible test cases locally.
- `requirements.txt`: Lists dependencies (if any).