# CS 2123
# Fall 2025

Section: 004

Group: 10

Group Members: Zachary Blaha(ATZ292), Gabriel Reyes(HOO528), Lisan Temprana(RLZ023), Mathew Kuttner(JUR989), David Dominguez(SBU283)

# Work Distribution

PowerPoint slides, meeting documents – Zach

Documentation Form – Gabriel

ResourceManagement Constructor – Lisan

PrintSummary – David

Department Constructor - Mathew

# Meeting Info

**Meeting #1**

Date: 10/15/25

Info: Initial discussion of project details and work distribution, as well as setting up github for collaboration on project.

**Meeting #2**

Date: 11/11/25

Info: Discussed progress on tasks and cleared some confusion about project details related to the mention of nonexistent part 2.

# Solution Implementation Key Components

**Department Constructor**

- **Goal:** Capture requests while preserving the required order.
- **Approach:** The constructor was set up to handle file parsing directly. It reads the input line-by-line and makes a queue. This makes it so that when the program runs, items are processed in the order they were requested in the text file.

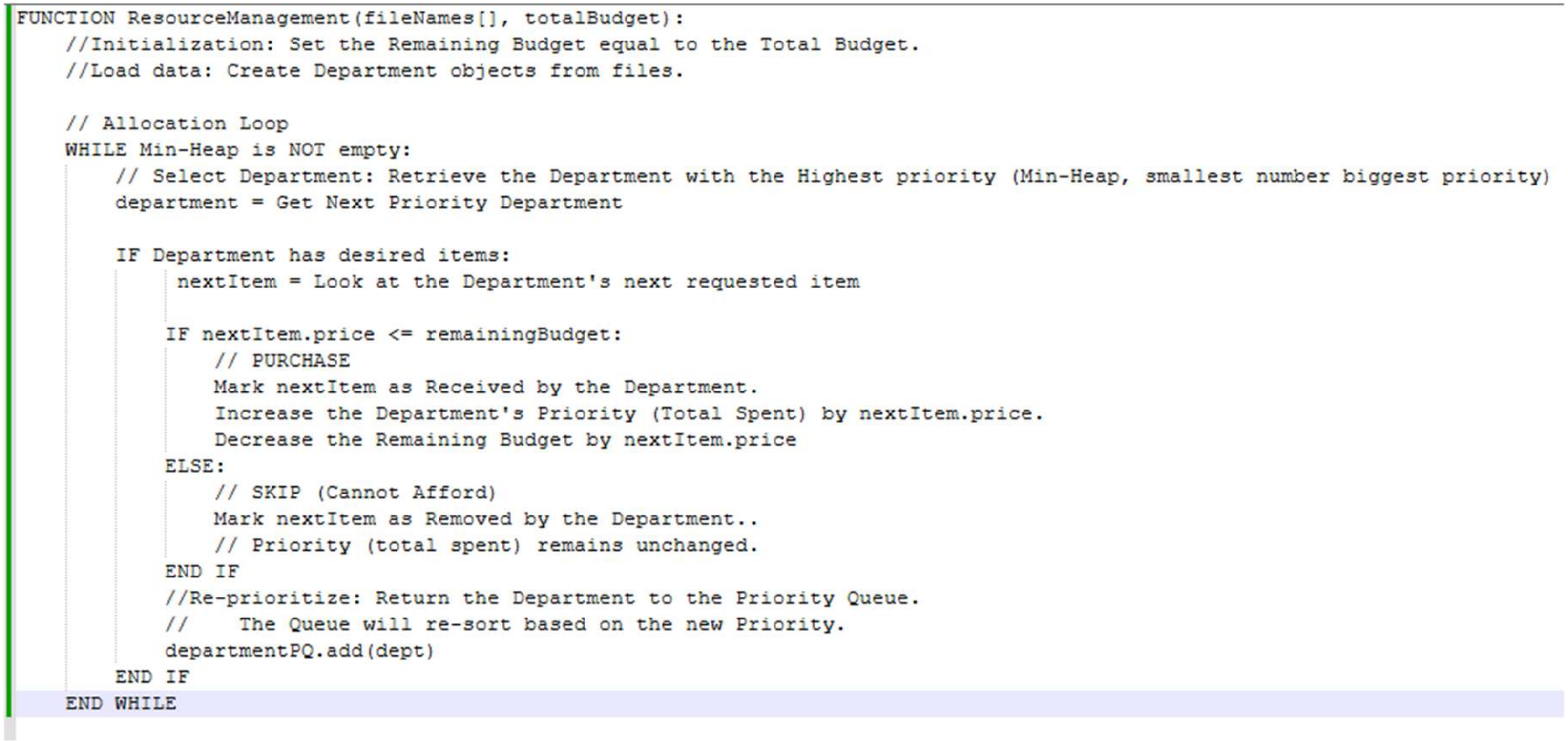
**ResourceManagement Constructor**

- **Goal:** Execute the fair allocation algorithm and manage the entire budget distribution process.
- **Approach:** We initialized the budget and the main priority queue. The main while loop extracts the department with the lowest spending priority, attempts to purchase their next item, updates their total spent, and re-inserts them into the queue to maintain priority until the budget is depleted.

**printSummary Method (Reporting)**

- **Goal:** Generate the specific output format required by the driver.
- **Approach:** We separated the display logic from the calculation logic. printSummary iterates through the departments *after* the simulation completes. It handles the specific formatting requirement calculating budget percentages and distinguishing between "Items Received" and "Items Not Received“, without interfering with the main algorithm.

# ResourceManagement pseudo code



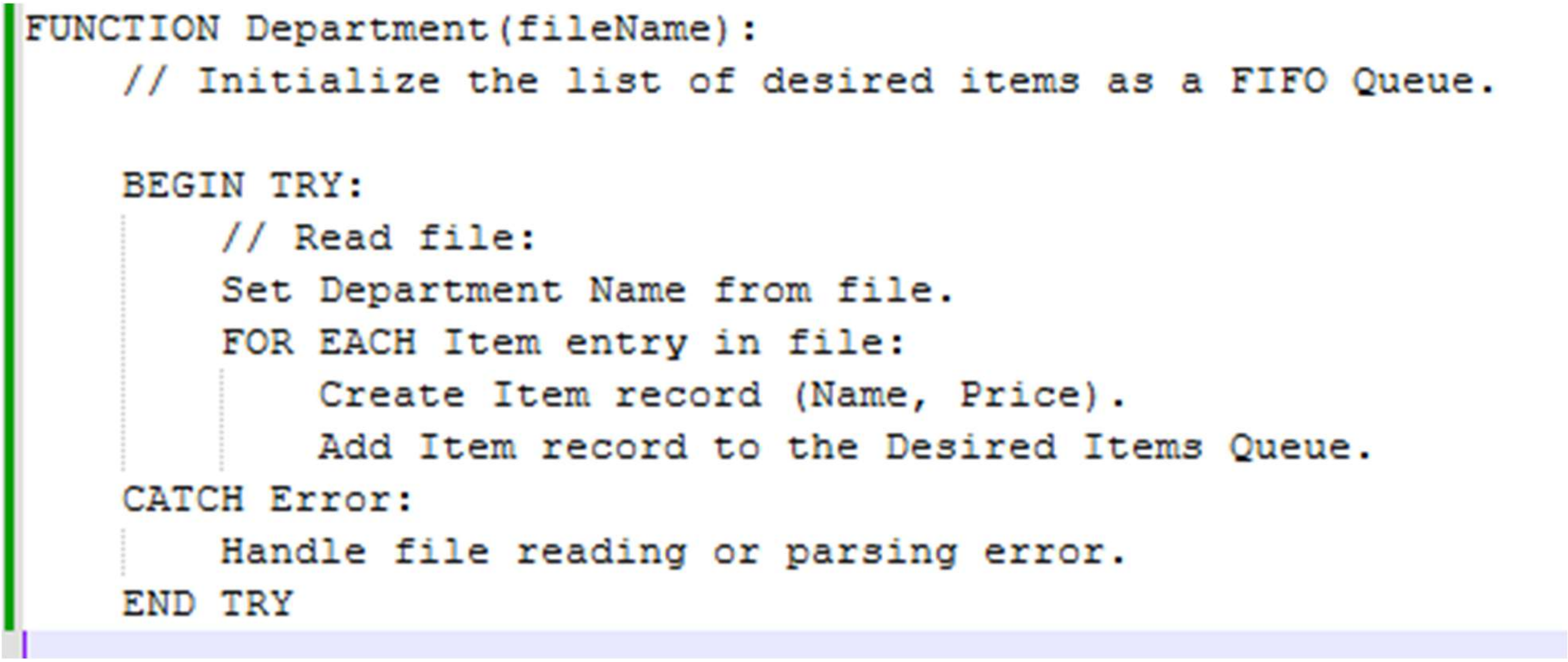
```
FUNCTION ResourceManagement(fileNames[], totalBudget):
    //Initialization: Set the Remaining Budget equal to the Total Budget.
    //Load data: Create Department objects from files.

    // Allocation Loop
    WHILE Min-Heap is NOT empty:
        // Select Department: Retrieve the Department with the Highest priority (Min-Heap, smallest number biggest priority)
        department = Get Next Priority Department

        IF Department has desired items:
             nextItem = Look at the Department's next requested item

            IF nextItem.price <= remainingBudget:
                // PURCHASE
                Mark nextItem as Received by the Department.
                Increase the Department's Priority (Total Spent) by nextItem.price.
                Decrease the Remaining Budget by nextItem.price
            ELSE:
                // SKIP (Cannot Afford)
                Mark nextItem as Removed by the Department..
                // Priority (total spent) remains unchanged.
            END IF
            //Re-prioritize: Return the Department to the Priority Queue.
            //    The Queue will re-sort based on the new Priority.
            departmentPQ.add(dept)
        END IF
    END WHILE
```

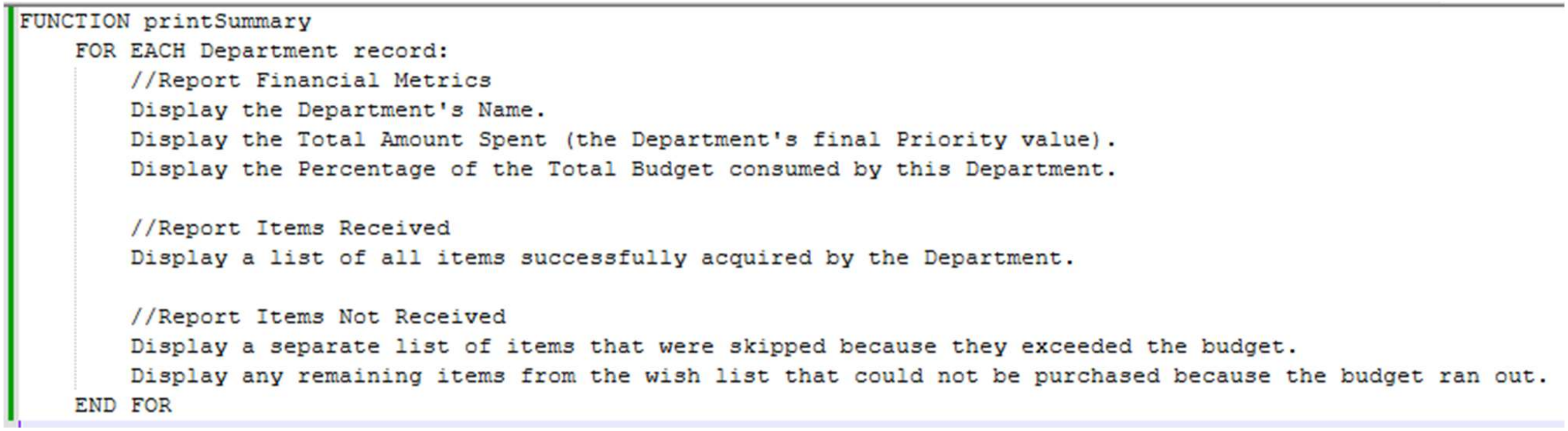
# Department pseudo code



```
FUNCTION Department(fileName):
    // Initialize the list of desired items as a FIFO Queue.

    BEGIN TRY:
        // Read file:
        Set Department Name from file.
        FOR EACH Item entry in file:
            Create Item record (Name, Price).
            Add Item record to the Desired Items Queue.
    CATCH Error:
        Handle file reading or parsing error.
    END TRY
```

# PrintSummary pseudo code



```
FUNCTION printSummary
    FOR EACH Department record:
        //Report Financial Metrics
        Display the Department's Name.
        Display the Total Amount Spent (the Department's final Priority value).
        Display the Percentage of the Total Budget consumed by this Department.

        //Report Items Received
        Display a list of all items successfully acquired by the Department.

        //Report Items Not Received
        Display a separate list of items that were skipped because they exceeded the budget.
        Display any remaining items from the wish list that could not be purchased because the budget ran out.
    END FOR
```

# Questions?