

TEAM 3

CPE22S3 - CPE311

CASE STUDY 1

SOLVING REAL-WORLD PROBLEMS USING
COMPUTATIONAL THINKING

BUDGET MANAGEMENT IN A HOUSEHOLD



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MAIN PROBLEM:

THE MONTHLY INCOME ON CERTAIN HOUSEHOLDS IS ENOUGH FOR THE NEEDS LIKE RENT, GROCERIES, ELECTRICITY AND WATER BILLS, ETC. BUT SOMETIMES THERE ARE MISCELLANEOUS BILLS TO PAY FOR LIKE SPECIFIC WANTS, DEBTS, EMERGENCY BILLS, MAINTENANCE, TRAVEL COSTS, ETC.

Problem Identification

HOW CAN WE BUDGET THE BILLS / EXPENSES TO PAY FOR THE NEEDS AND THE MISCELLANEOUS BILLS IF THE MONTHLY INCOME IS FIXED

DECOMPOSITION

ASSESS TOTAL HOUSEHOLD INCOME AND DETERMINE ITS SUFFICIENCY FOR COVERING BOTH ESSENTIAL NEEDS AND MISCELLANEOUS BILLS/EXPENSES.

PATTERN RECOGNITION

**IDENTIFICATION OF INCOME AND BILLS/EXPENSES
PRIORITIZATION OF NEEDS**

ABSTRACTION

**CATEGORIZE EXPENSES/BILLS INTO ESSENTIAL AND NON-ESSENTIAL
EXPENSE PRIORITIZATION**

1ST ITERATION

Problem Identification

**ASSESS TOTAL HOUSEHOLD
INCOME AND DETERMINE ITS
SUFFICIENCY FOR COVERING
BOTH ESSENTIAL NEEDS AND
MISCELLANEOUS BILLS.**

DECOMPOSITION

**HOW TO MAKE THE BEST
CHOICE ON WHAT TO PAY
FOR WITH THE
LIMITED/FIXED INCOME OF
THE HOUSEHOLD**

PATTERN
RECOGNITION

**IDENTIFY COMMON AREAS
WHERE OVERSPENDING
OCCURS**

ABSTRACTION

**PRIORITIZING EXPENSES:
RANKING YOUR NEEDS BASED ON
IMPORTANCE**

**EVALUATION OF EXPENSES (IS
THIS EXPENSE WORTH IT)**

HOW WILL WE SOLVE THE PROBLEM?

BY BASING OUR SOLUTION TO THE KNAPSACK PROBLEM. THE CODE SPECIFICALLY ADDRESSES THE KNAPSACK PROBLEM BY USING THE GREEDY ALGORITHM, WHERE THE GOAL IS TO DETERMINE THE MOST VALUABLE COMBINATION OF ITEMS (EXPENSES, IN THIS CASE) TO INCLUDE IN A KNAPSACK (WITHIN A GIVEN BUDGET) IN ORDER TO MAXIMIZE A CERTAIN VALUE (TOTAL PRIORITY).

THE ALGORITHM AIMS TO FIND THE COMBINATION OF EXPENSES THAT MAXIMIZES THE TOTAL PRIORITY WHILE STAYING WITHIN THE BUDGET CONSTRAINT.

WITH THIS SOLUTION, IT HELPS THE USER TO MAKE DECISIONS BASED ON THE OPTIMAL SELECTIONS OF EXPENSES THAT ARE CHOSEN WITH MAXIMIZED VALUE (THE PRIORITY/COST RATIO IN OUR CASE).
