Test case design Example

Explanation of the Municipal Property Tax (MPT) Calculation with Test Cases

The municipal property tax (MPT) is calculated based on three factors:

1. **S** = Size of the apartment (in square yards).
2. **N** = Number of people living in the apartment.
3. **A, B, or C** = Suburb classification, which determines the tax rate.

Formula for MPT Calculation

- **Class A**: MPT = **(100 × S) / (N + 8)**
- **Class B**: MPT = **(80 × S) / (N + 8)**
- **Class C**: MPT = **(50 × S) / (N + 8)**

Applying the Formula to the Given Test Cases

Test Case	Size of Apartment (S)	Suburb Class	No. of People (N)	Calculation	MPT (Expected Result)
Test Case 1	250	A	2	(100 × 250) / (2 + 8) = **25000 / 10**	**$2500**
Test Case 2	180	B	4	(80 × 180) / (4 + 8) = **14400 / 12**	**$1200**
Test Case 3	98	C	6	(50 × 98) / (6 + 8) = **4900 / 14**	**$350**

Key Observations

✅ **Higher S value = Higher MPT** (Larger apartments pay more tax).
✅ **Higher N value = Lower MPT** (More people in a house reduce tax per person).
✅ **Suburb Class Impact**:

- **Class A** (highest rate) → $2500 tax for 250 sq. yards.
- **Class B** (moderate rate) → $1200 tax for 180 sq. yards.
- **Class C** (lowest rate) → $350 tax for 98 sq. yards.

Note:

The term **"/ (N + 8)"** in the municipal property tax (MPT) formula represents **division** by the sum of the number of persons living in the apartment (**N**) plus 8. This denominator is used to normalize the tax amount based on household size.