MIN-MAX (MAX-MIN) CRITERION

THIS IS A CONSERVATIVE CRITERION AND CHOOSES THE BEST FROM THE WORST-CASE SCENARIOS.

ACCORDING TO THIS CRITERION DO a_{i^*} such that

$$O_{i^*j} = \min_{a_i} \left\{ \max_{\theta_j} O_{ij} \right\} \leftarrow \text{IF } O_{ij} \text{ IS A COST}$$

$$= \max_{a_i} \left\{ \min_{\theta_j} O_{ij} \right\} \leftarrow \text{IF } O_{ij} \text{ IS PROFIT}$$

LET US TAKE THE PREVIOUS EXAMPLE WHERE O_{ij} REPRESENTS COST.

SINCE COST; WORST CASE = MAX { }.

	θ_1	θ_2	θ_3	θ_4	$\max_{\theta_j}\{O_{ij}\}$
a_1	2	10	18	25	25
a_2	8	7	8	23	23
a_3	21	18	12	21	21 ← BEST AMONG THE WORST. (MINIMUM OF 25, 23, 21, 30).
a_4	30	22	19	15	30

Do a_3.

HOWEVER THIS "BLEAK" VIEWPOINT IN DECISION MAKING MAY NOT ALWAYS BE PRAGMATIC. FOR EXAMPLE TAKE THE FOLLOWING COST MATRIX

	θ_1	θ_2	$\max_{\theta_j}\{O_{ij}\}$
a_1	11,000	90	11,000
a_2	10,000	10,000	10,000 ← DESIRED ACTION.

INTUITIVELY, a_1 SEEMS BETTER AS THERE IS A CHANCE THAT THE COST MAY BE LIMITED TO 90. HOWEVER BY CHOOSING a_2 I AM ENSURING THAT COST IS 10,000 — WHICH IS NOT GOOD.