$1 \le i \le m, \quad 1 \le j \le n.$

A_i : Atk of Friendly i^{th}

B_i : HP of Friendly i^{th}

P_j : Atk of Enemy j^{th}

Q_j : HP of Enemy j^{th}

m : num of friendly minions

n : num of enemy minions

x_{ij} : whether i^{th} friendly minion attacked j^{th} enemy minion.

y_i : whether i^{th} friendly minion survived.

z_j : whether j^{th} enemy minion survived.

S_i : score of i^{th} friendly minion

$C_j = \sum_{k=1}^{m} (x_{kj} \cdot A_k)$: Total atk that j^{th} enemy took

$D_i = \sum_{k=1}^{n} (x_{ik} \cdot P_k)$: Atk that i^{th} friendly minion took

$C, Q, z, M = \infty$

if $Q - C \leq 0$ then $z = 0$

if $Q - C > 0$ then $z = 1$

$Q - C \leq 0 \Rightarrow !(Q - C > 0) \Rightarrow Q - C + (1-z)\cdot M > 0$ must imply $z = 0$

$Q - C > 0 \Rightarrow !(Q - C \leq 0) \Rightarrow Q - C - z\cdot M \leq 0$ must imply that $z = 1$

$$\begin{cases} Q - C + (1-z)\cdot M > 0 \\ Q - C - z\cdot M \leq 0 \end{cases} \Rightarrow \begin{cases} Q - C + M - z\cdot M > 0 \\ Q - C - zM \leq 0 \end{cases}$$

Q, M is constant

$$\begin{cases} Q + M > C + zM \\ Q \leq C + zM \end{cases} \Rightarrow Q \leq C + M\cdot z < Q + M$$

1. $Q_j \leq C_j + M\cdot z_j < Q_j + M \quad \forall\ 1 \leq j \leq n$

$D, B, Y, M = \infty$

2. $B_i \le D_i + M \cdot Y_i < B_i + M \quad \forall\, 1 \le i \le m$

3. $\sum_{k=1}^{n} (x_{ik}) \le 1 \quad \forall\, 1 \le i \le m$

Total $2m+n$ constrains.

1. $\sum_{k=1}^{n} (x_{ik}) \leq 1 \quad \forall\ 1 \leq i \leq m$

2. $B_i \leq D_i + M \cdot y_i < B_i + M \quad \forall\ 1 \leq i \leq m$

3. $Q_j \leq C_j + M \cdot z_j < Q_j + M \quad \forall\ 1 \leq j \leq n$

#1 Min: $\sum_{k=1}^{n}(P_k \cdot Z_k) \Rightarrow$ optimal value O^*

#2 Max: $\sum_{k=1}^{m}(S_k)$ and $6 \cdot \sum_{k=1}^{n}(P_k \cdot Z_k) \leq O^*$

m more columns

1 more row

$S(i) = A_i \cdot (B_i - D_i) \cdot Y_i$

$Y, S, A, B, D, M = \infty$

if $y=0$ then $S=0$

if $y=1$ then $S=A\cdot(B-D)$

$$0 \le S \le y\cdot M$$

$$A(B-D)-(1-y)M \le S \le A(B-D)+(1-y)M$$

$$S \ge 0$$

$$S - y\cdot M \le 0$$

$$S + AD - yM \ge AB - M$$

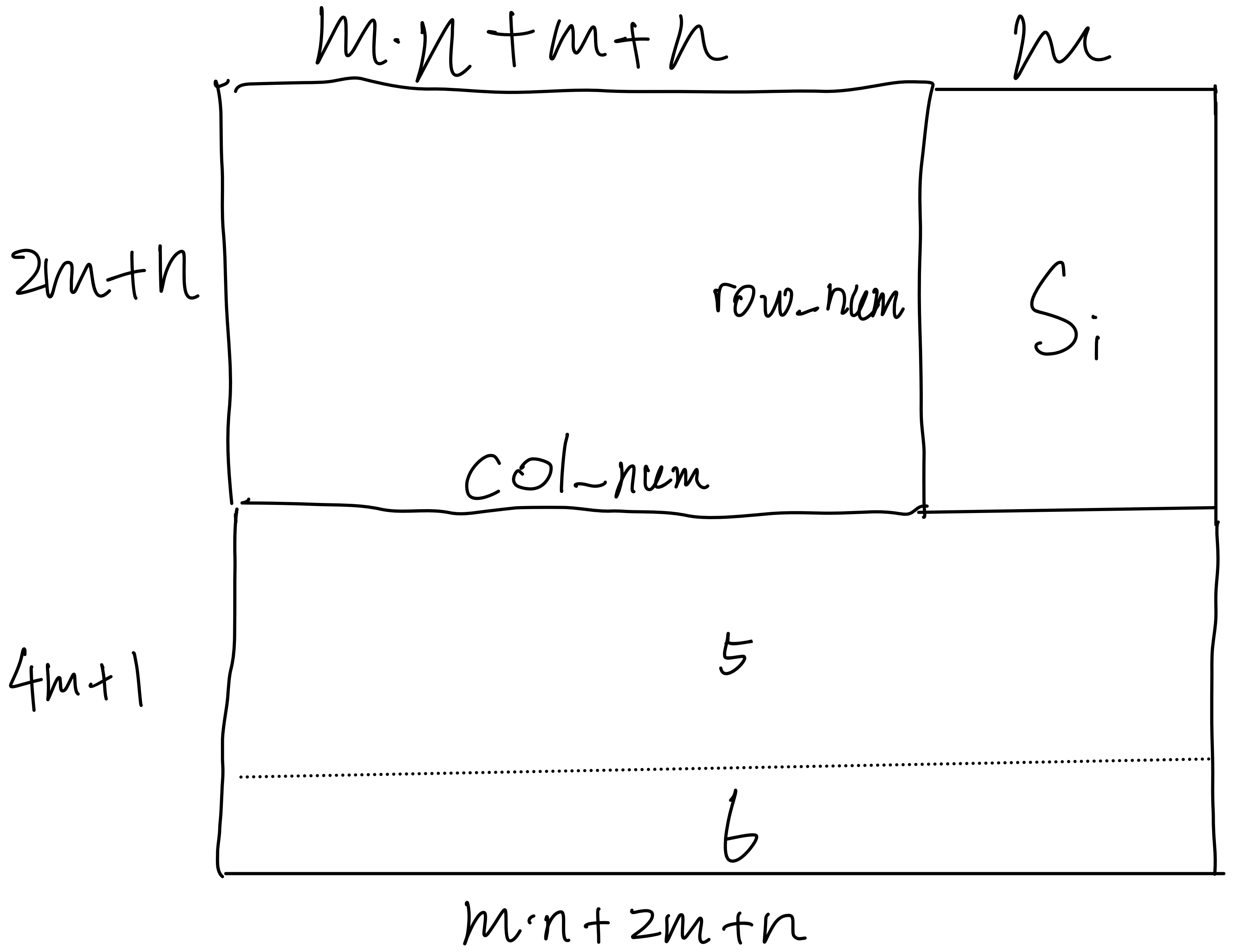
$$S + AD + yM \le AB + M$$

5.

$$\left.\begin{aligned} S_i &\ge 0 \\ S_i - Y_i M &\le 0 \\ S_i + A_i D - Y_i M &\ge A_i B_i - M \\ S_i + A_i D + Y_i M &\le A_i B_i + M \end{aligned}\right\} \forall 1 \le i \le m \text{, } 4m \text{ more rows}$$

Thus $(m \cdot n + m + n) + m = m \cdot n + 2m + n$ cols

$(2m+n) + 1 + 4m = 6m + n + 1$ rows



GRBtest sample