Optimization Model

Sets

$$
\begin{aligned}
P &: \text{Projects} \\
T &: \text{Teams} \\
S &: \text{Sprints} \\
B &: \text{Sprint Backlogs} \\
E &: \text{Epics} \\
F &: \text{Features} \\
W &: \text{Workers} \\
D &: \text{Development Snapshots} \\
R &: \text{Stakeholder Reviews}
\end{aligned}
$$

Decision Variables

$$
\begin{aligned}
x^p_{\text{dev}} \in \mathbb{Z}, \quad & 3 \leq x^p_{\text{dev}} \leq 15, \quad \forall p \in P \\
x^s_{\text{len}} \in \mathbb{Z}, \quad & 7 \leq x^s_{\text{len}} \leq 28, \quad \forall s \in S \\
x^s_{\text{sp}} \in \mathbb{Z}, \quad & 10 \leq x^s_{\text{sp}} \leq 100, \quad \forall s \in S \\
x^s_{\text{budg}} \geq 0, \quad & x^s_{\text{budg}} \leq 100000, \quad \forall s \in S \\
x^p_{\text{test}} \in \mathbb{Z}, \quad & 1 \leq x^p_{\text{test}} \leq 5, \quad \forall p \in P \\
x^s_{\text{feat}} \in \mathbb{Z}, \quad & 1 \leq x^s_{\text{feat}} \leq 20, \quad \forall s \in S \\
x^w_{\text{tasks}} \geq 1, \quad & x^w_{\text{tasks}} \leq 10, \quad \forall w \in W \\
x^e_{\text{stories}} \in \mathbb{Z}, \quad & 1 \leq x^e_{\text{stories}} \leq 10, \quad \forall e \in E \\
x^f_{\text{budgF}} \geq 0, \quad & x^f_{\text{budgF}} \leq 50000, \quad \forall f \in F \\
x^w_{\text{otlim}} \in \mathbb{Z}, \quad & 0 \leq x^w_{\text{otlim}} \leq 10, \quad \forall w \in W
\end{aligned}
$$

Objective Functions

$$\max\ Z_1 = \sum_{t \in T} \text{velocity\_avg}_t$$

$$\min\ Z_2 = \sum_{f \in F} \text{cycle\_time}_f$$

$$\max\ Z_3 = \sum_{d \in D} \text{quality\_score}_d$$

$$\min\ Z_4 = \sum_{b \in B} \text{bug\_count}_b$$

$$\max\ Z_5 = \sum_{r \in R} \text{stakeholder\_rating}_r$$

$$\min\ Z_6 = \sum_{p \in P} \text{cost\_variance}_p$$

$$\max\ Z_7 = \sum_{f \in F} \text{on\_time\_pct}_f$$

$$\min\ Z_8 = \sum_{s \in S} \text{blocker\_count}_s$$

$$\max\ Z_9 = \sum_{w \in W} \text{utilization\_rate}_w$$

$$\min\ Z_{10} = \sum_{w \in W} \text{overtime\_hours}_w$$

Constraints

$$\text{C1: } \text{skill\_mismatch}_e = 0, \qquad \forall e \in W$$

$$\text{C2: } \sum_{po \in PO_t} 1 = 1, \quad \sum_{sm \in SM_t} 1 = 1, \qquad \forall t \in T$$

$$\text{C3: } \text{team\_size}_t \leq \text{capacity}_t, \qquad \forall t \in T$$

$$\text{C4: } \text{sprint\_duration\_dev}_s = 0, \qquad \forall s \in S$$

$$\text{C5: } \text{budget\_overrun}_p = 0, \qquad \forall p \in P$$

$$\text{C6: } \text{delivery\_delay}_f = 0, \qquad \forall f \in F$$

$$\text{C7: } \text{coverage\_pct}_f \geq 0.8, \qquad \forall f \in F$$

$$\text{C8: } \text{approval\_score}_r \geq 4.0, \qquad \forall r \in R$$

$$\text{C9: } \text{post\_release\_bugs}_b \leq 5, \qquad \forall b \in B$$

$$\text{C10: } \text{compliance\_violations}_p = 0, \qquad \forall p \in P$$