

# 1 Problem statement

## 1.1 Version 1

Input:

- Set  $\mathcal{R} = (R_1, R_2, \dots, R_m)$  representing available resources, where each resource  $R_k \in \mathcal{R}$  has capacity  $c_k$ .
- Value  $g$ , representing GPU capacity.
- Set  $\mathcal{T} = (T_1, T_2, \dots, T_n)$  representing tasks to be scheduled. Each task  $T_i \in \mathcal{T}$  is characterized by processing time  $p_i$ , resource assignment function  $a_r : \mathcal{T} \rightarrow \mathcal{R}$  and GPU offloading function  $a_g : \mathcal{T} \rightarrow \{0, 1\}$ .
- Value  $h$ , representing main frame length.

Objective: Let  $\mathcal{W} = (W_1, W_2, \dots, W_\ell)$  be a set of isolation windows, where each window  $W_j \in \mathcal{W}$  has length  $l_j$ . The goal is to assign each task  $T_i \in \mathcal{T}$  to a window  $W_j \in \mathcal{W}$  such that:

$$l_j \geq \frac{\max_{T_i \in W_j} (p_i)}{0.6}, \forall W_j \in \mathcal{W} \quad (1)$$

$$\sum_{W_j \in \mathcal{W}} l_j \leq h \quad (2)$$

$$\sum_{T_i \in W_j} [a_r(T_i) == R_k] \leq c_k, \forall R_k \in \mathcal{R}, \forall W_j \in \mathcal{W} \quad (3)$$

$$\sum_{T_i \in W_j} a_g(T_i) \leq g, \forall W_j \in \mathcal{W} \quad (4)$$