

The ABC of Petri Net

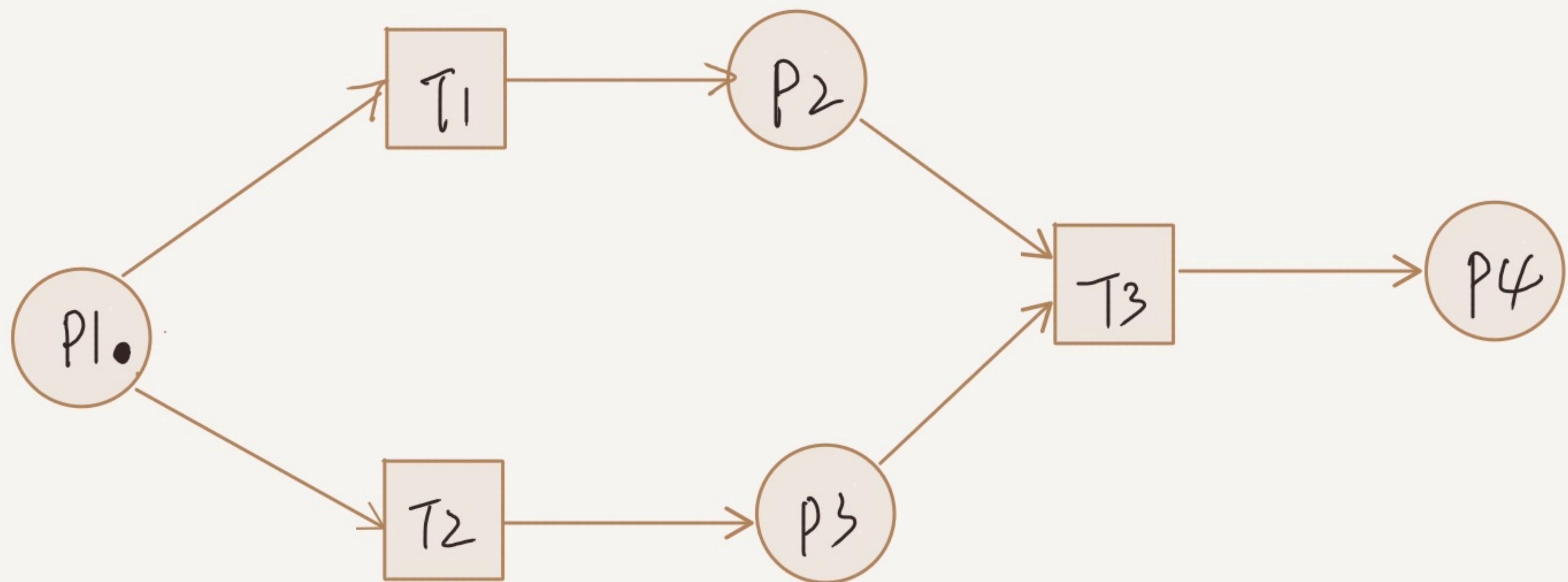
陈飞

2020.03.13

定义

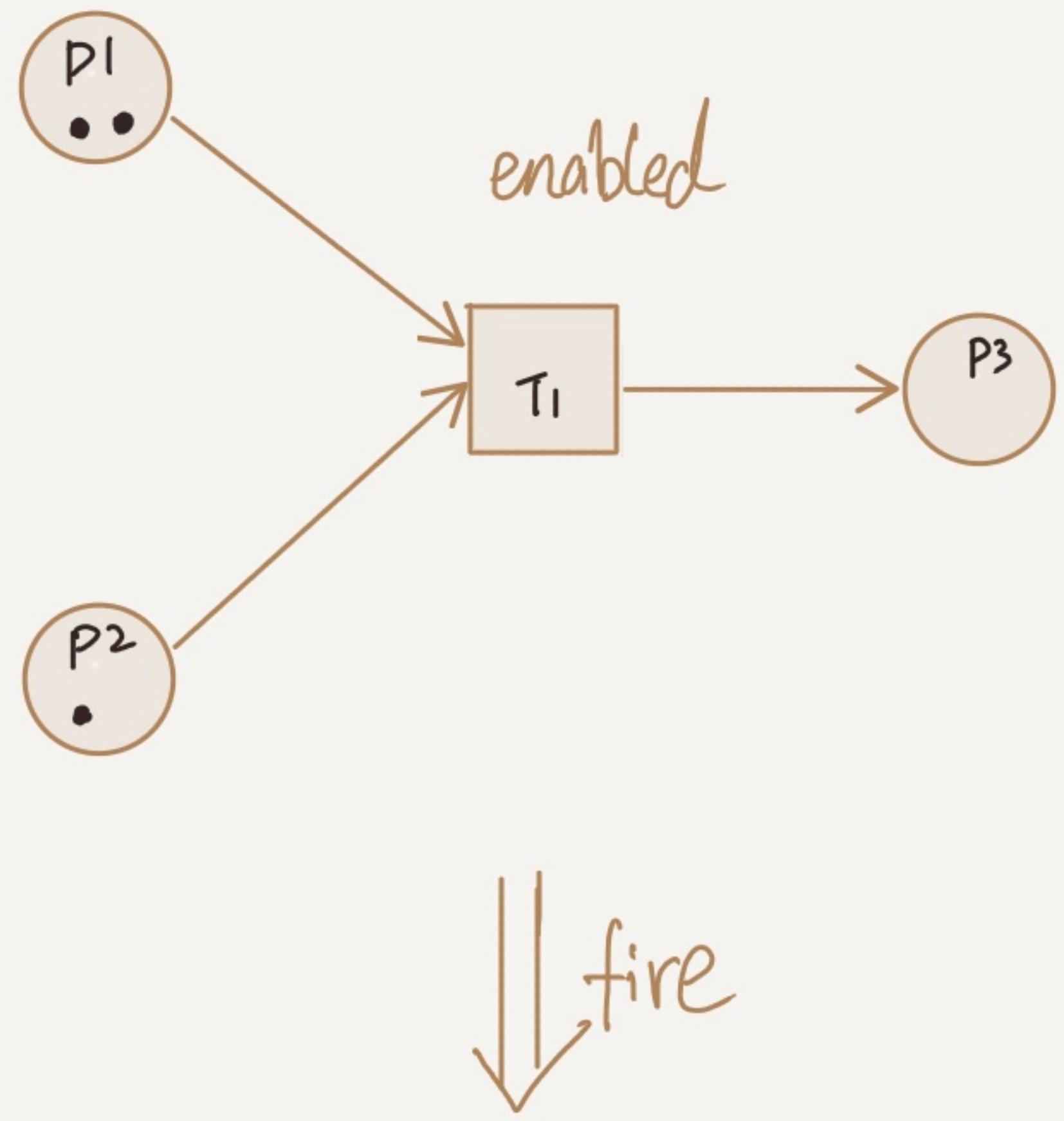
60年代由 Carl Adam Petri 发明
是对离散并行系统的数学表示
适合于描述异步、并发的计算机模型
是所有流程定义语言之母

- Place
- Transition
- Arc
- Token



- * ARC是有方向的
- * 两个place或两个Transition不能同时有ARC
- * place可以有任意数量的Token

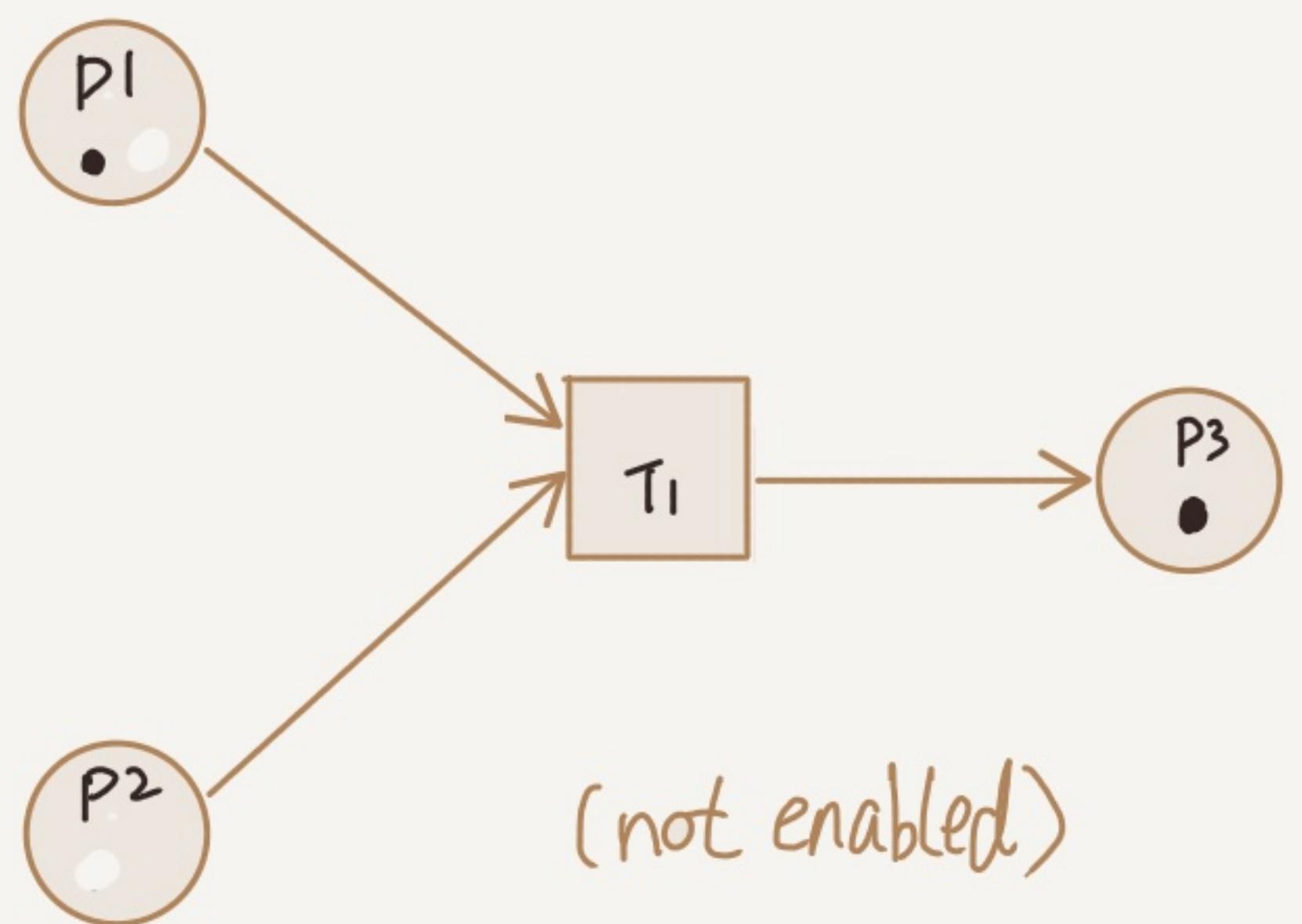
行为



Marking(State)

$$\{2, 1, 0\}$$

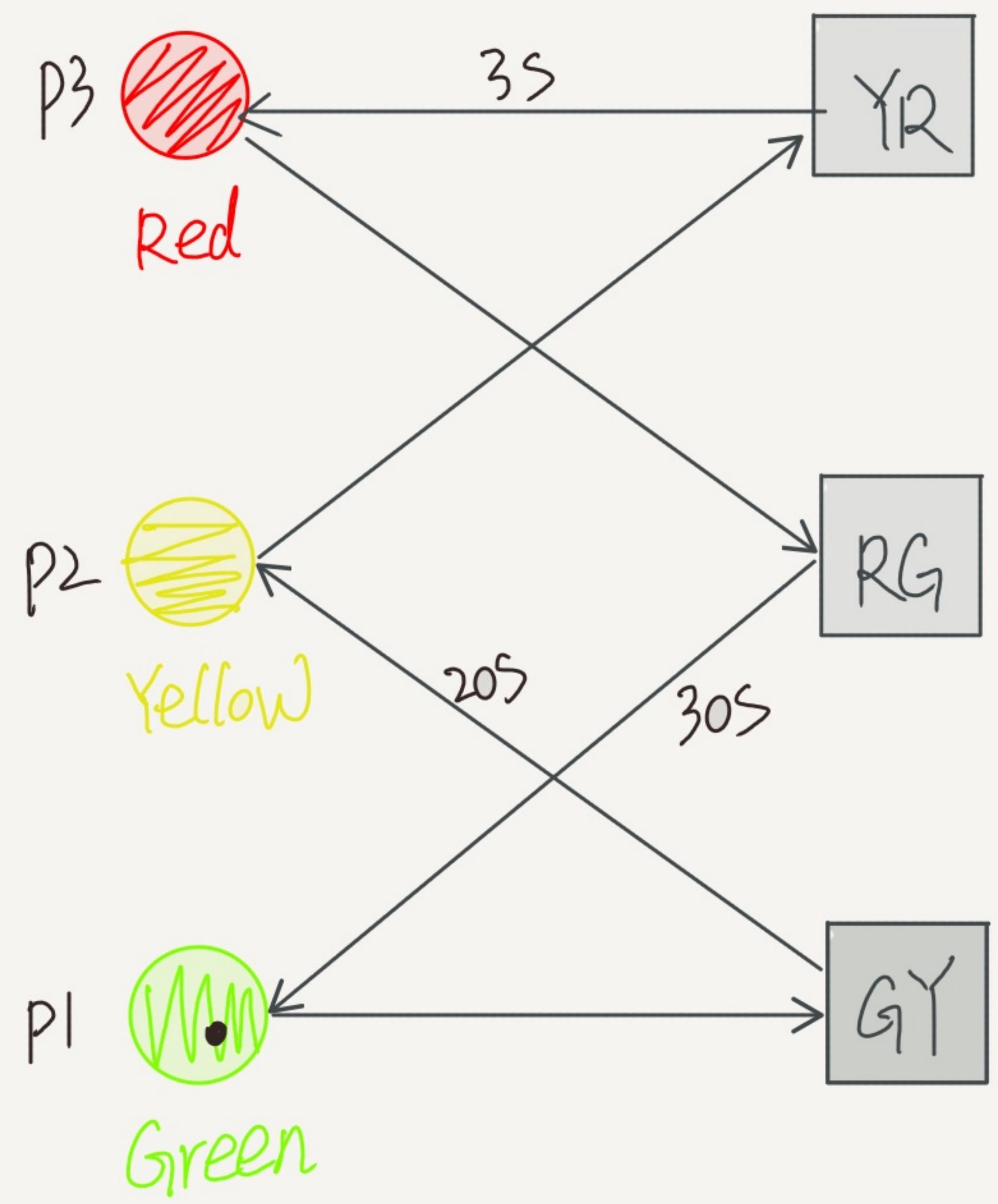
- * Transition 的 fire 是原子的
- * Token 数量 不是 守恒的
- * Petri Net 是 静态的 不存在一个 transition 在 net 中多于一个 place 和 transition



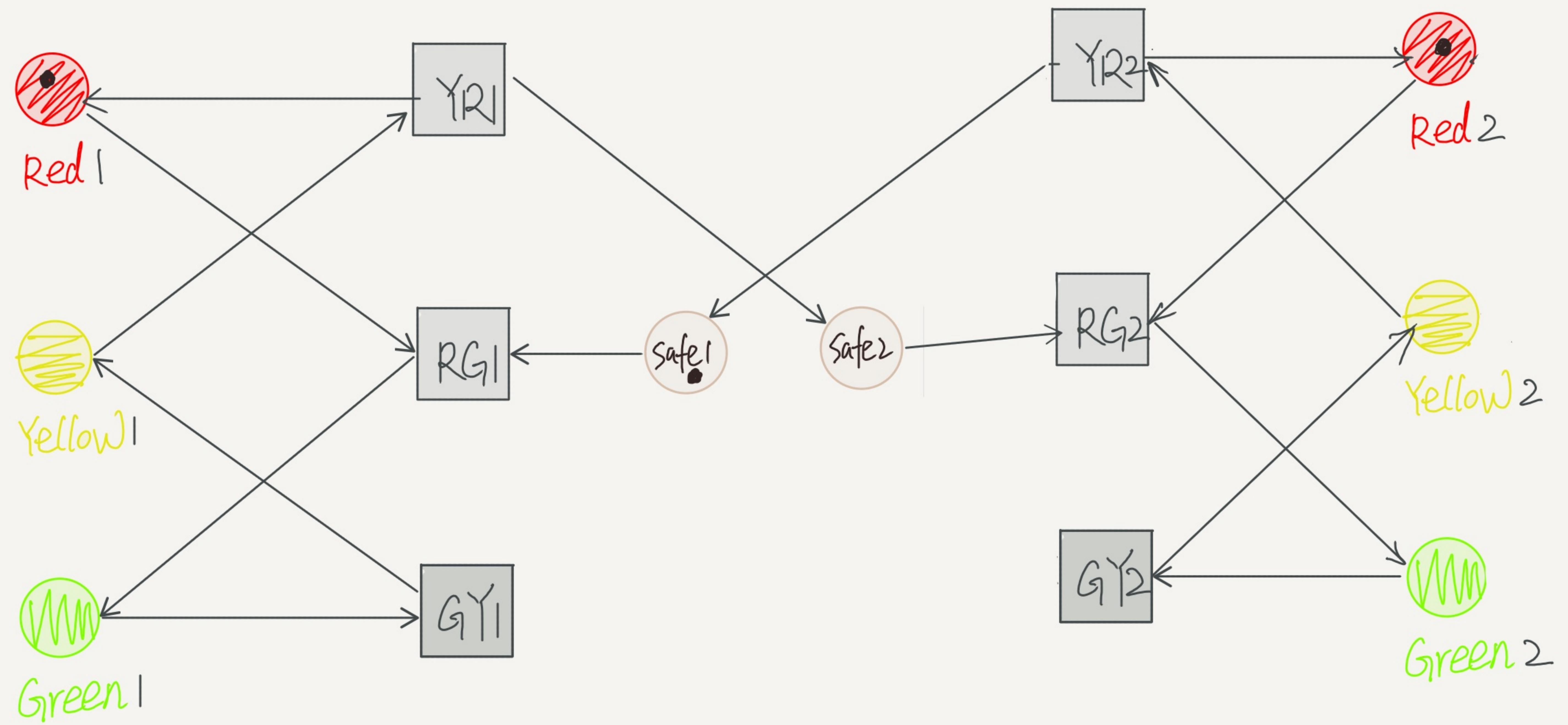
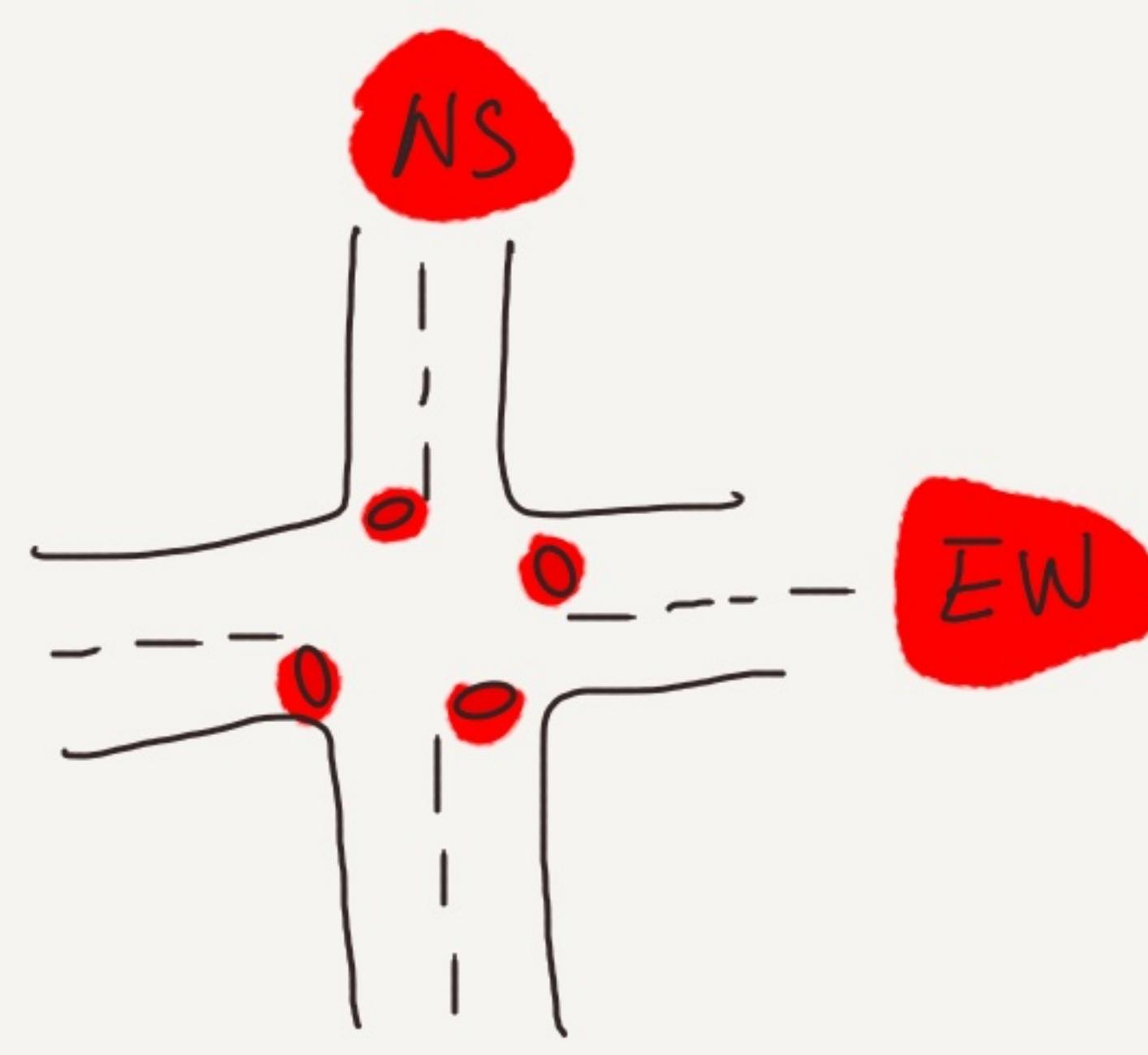
$$\{1, 0, 1\}$$

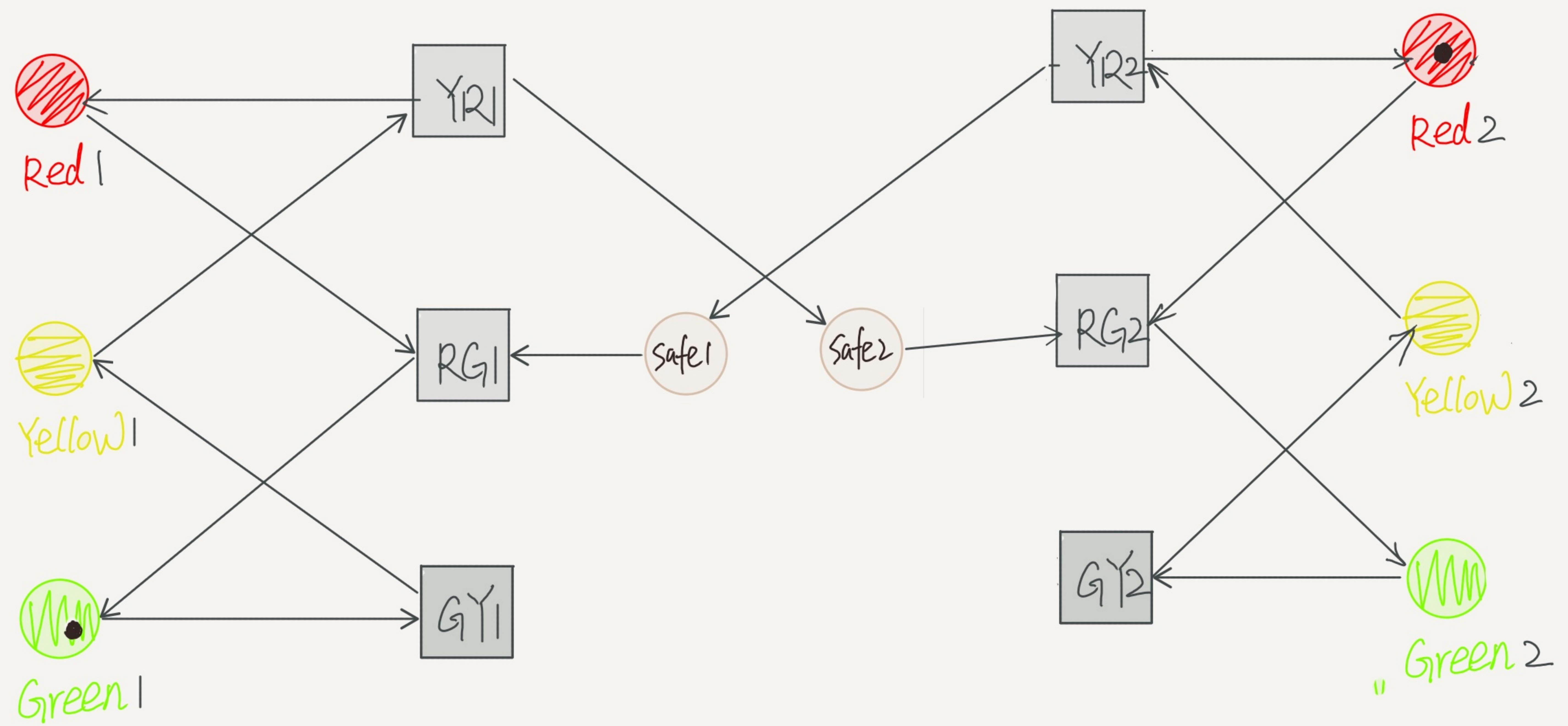
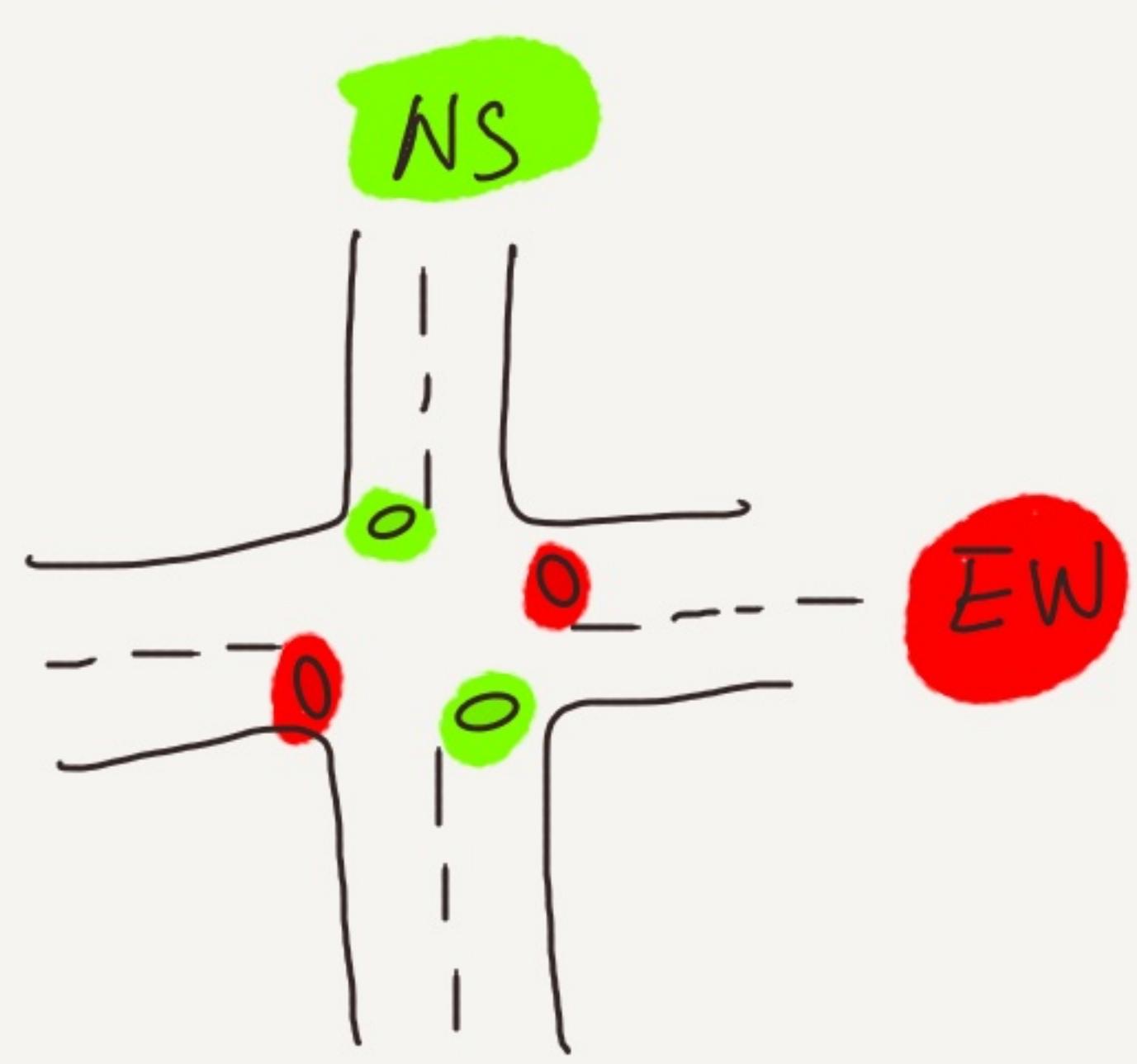
(not enabled)

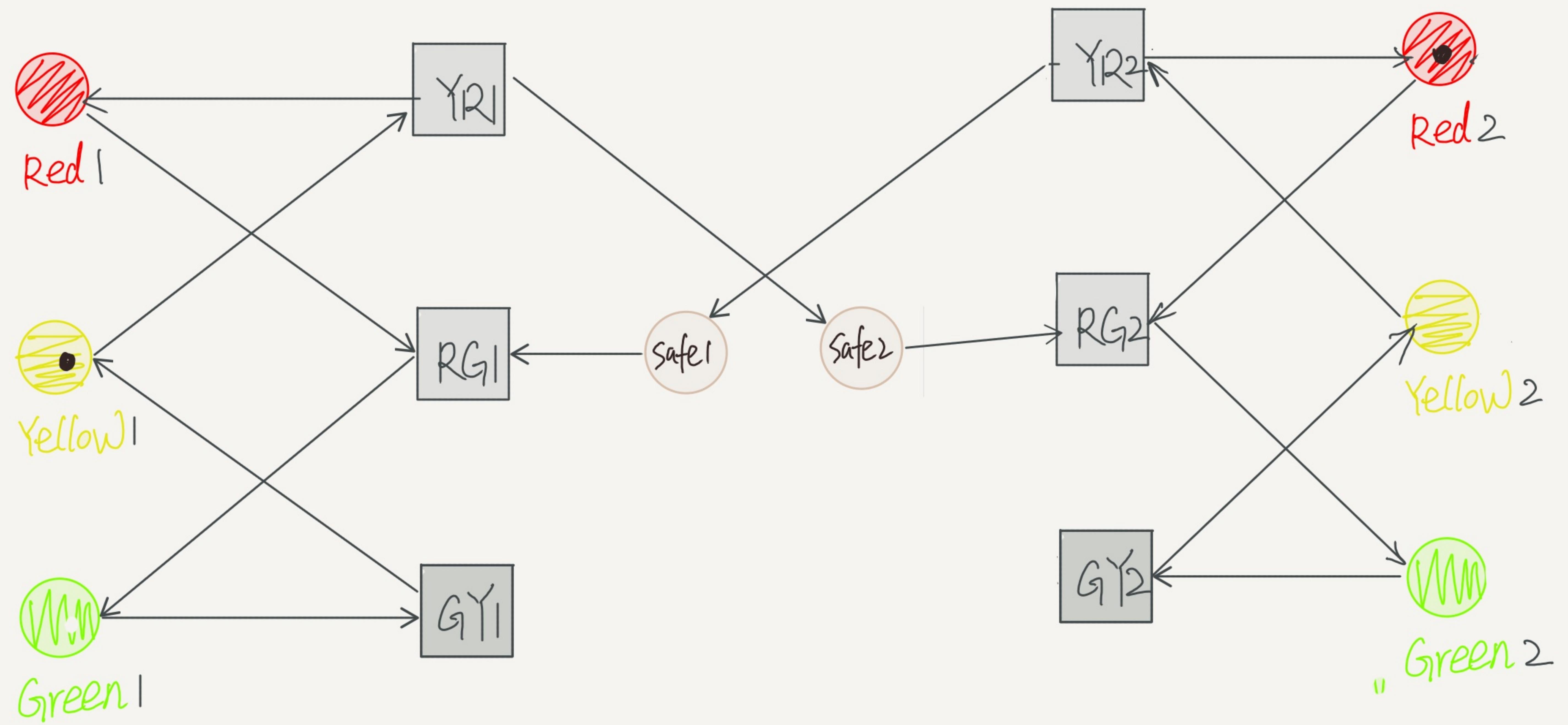
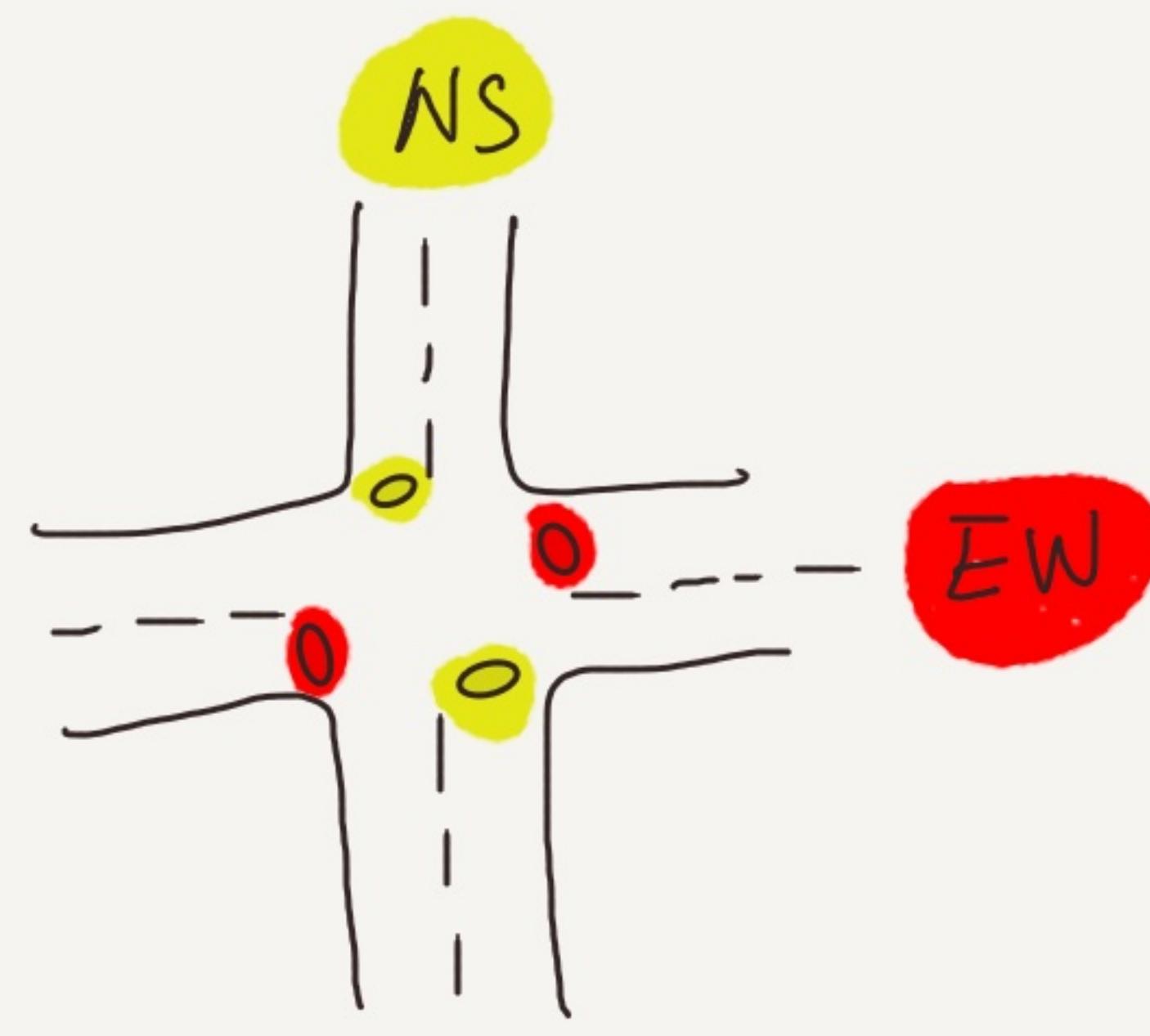
应用一：红绿灯

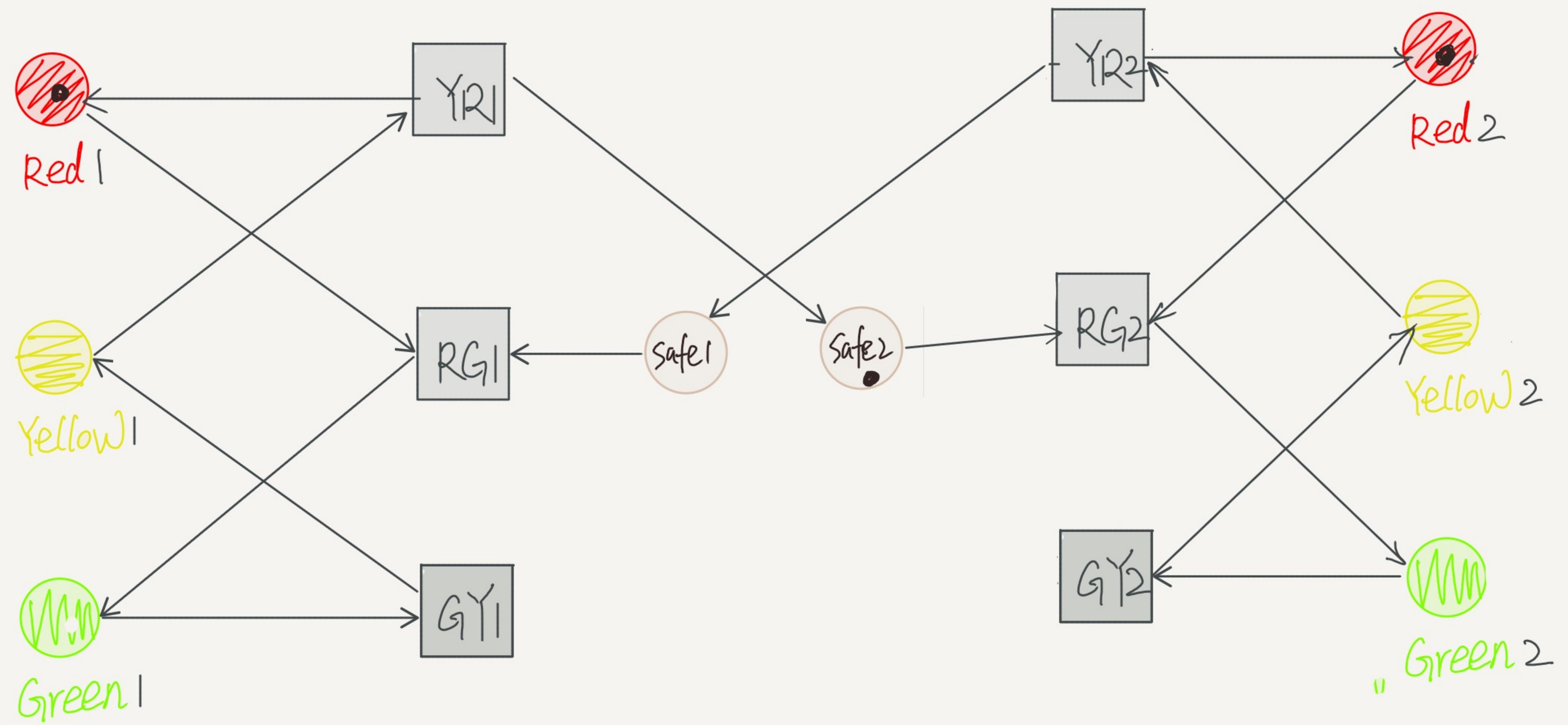
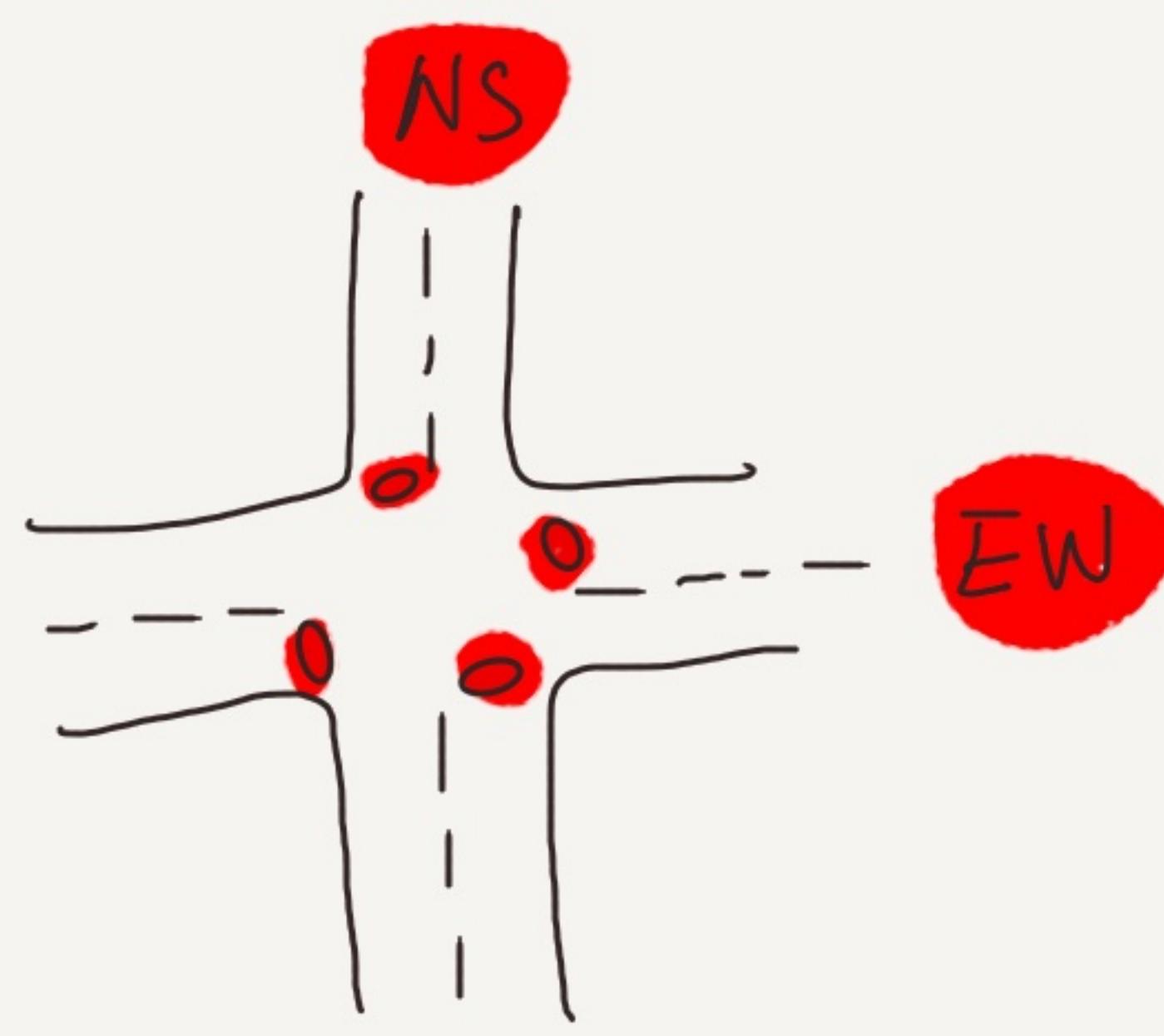


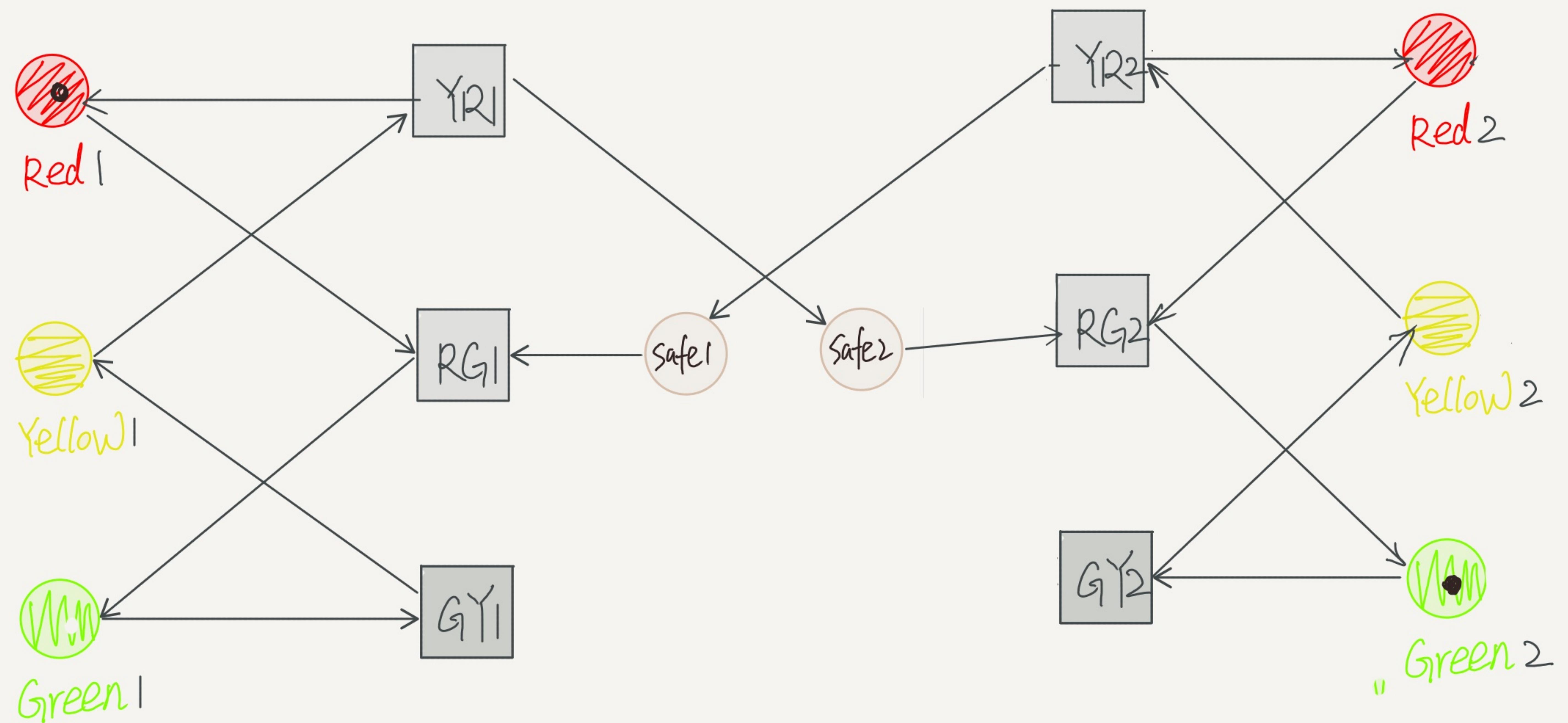
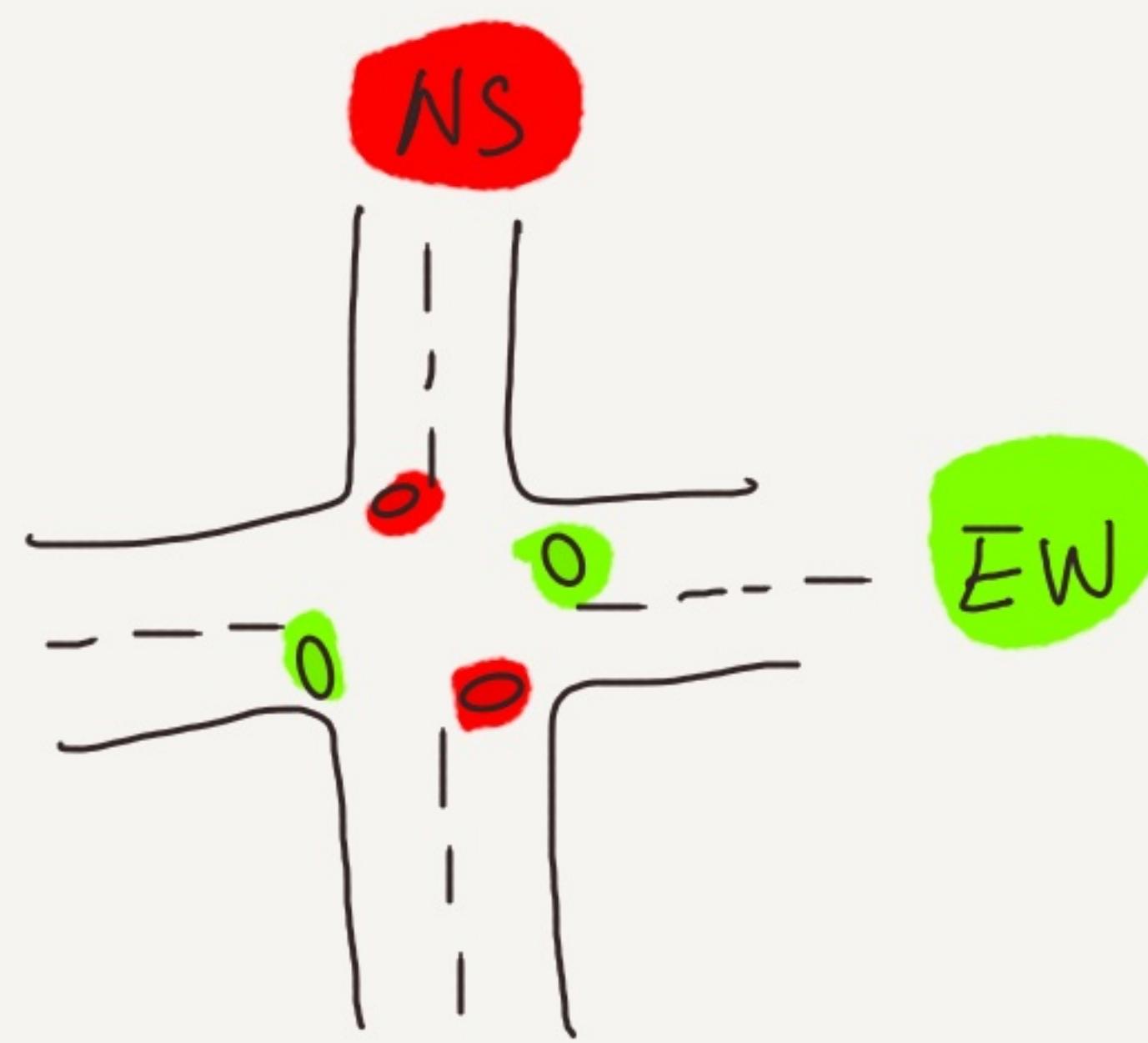
0S	Green	{1, 0, 0}
20S	Yellow	{0, 1, 0}
23S	Red	{0, 0, 1}
53S	Green	{1, 0, 0}
73S	Yellow	{0, 1, 0}
:		

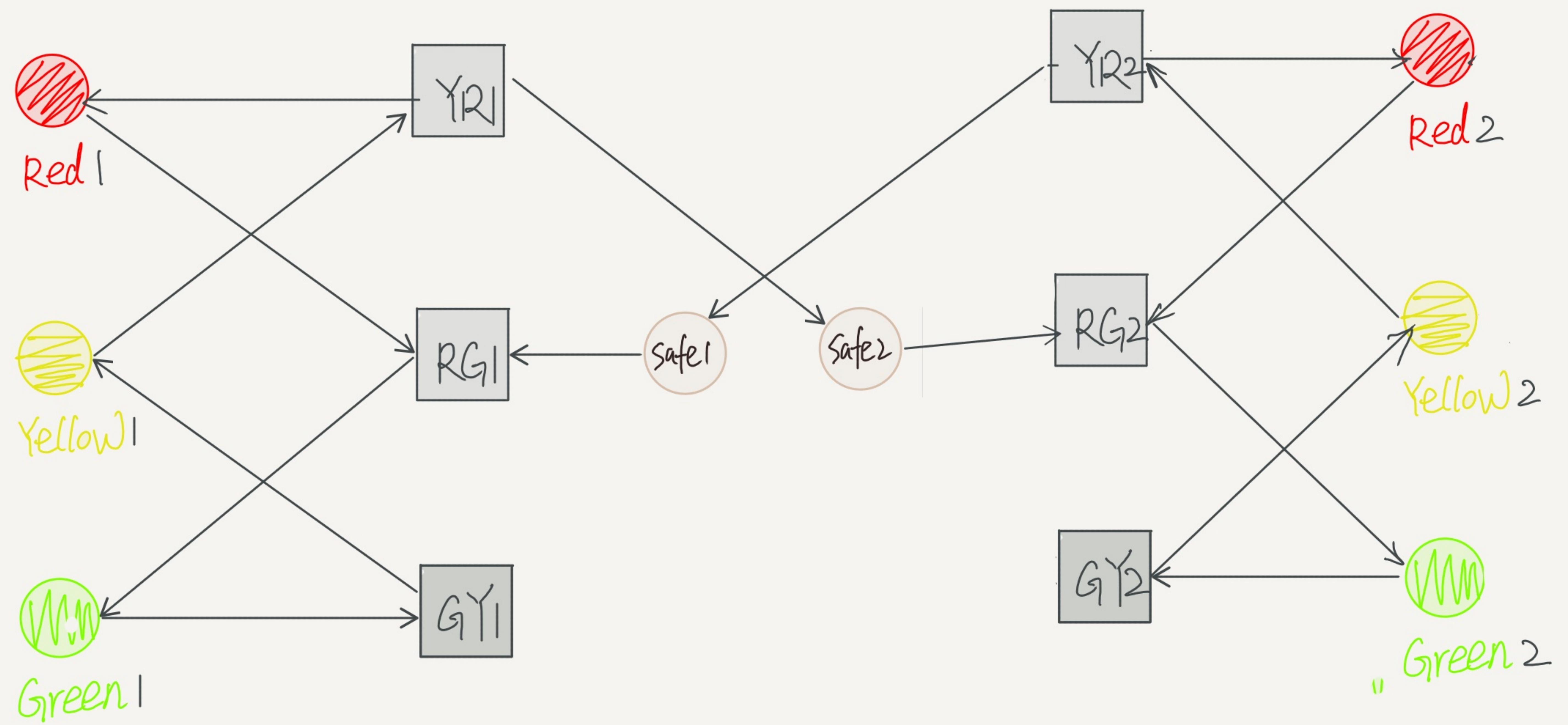
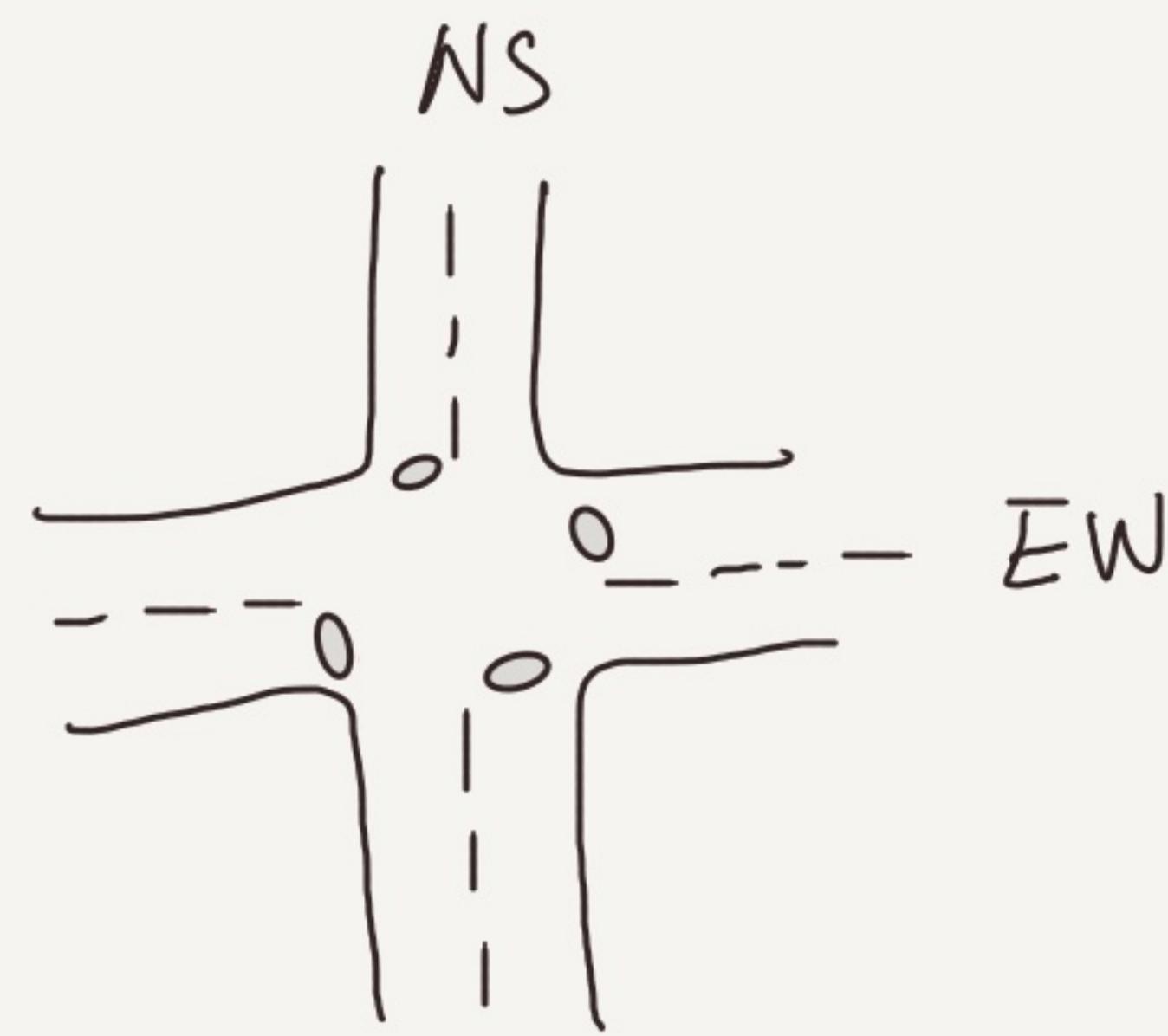




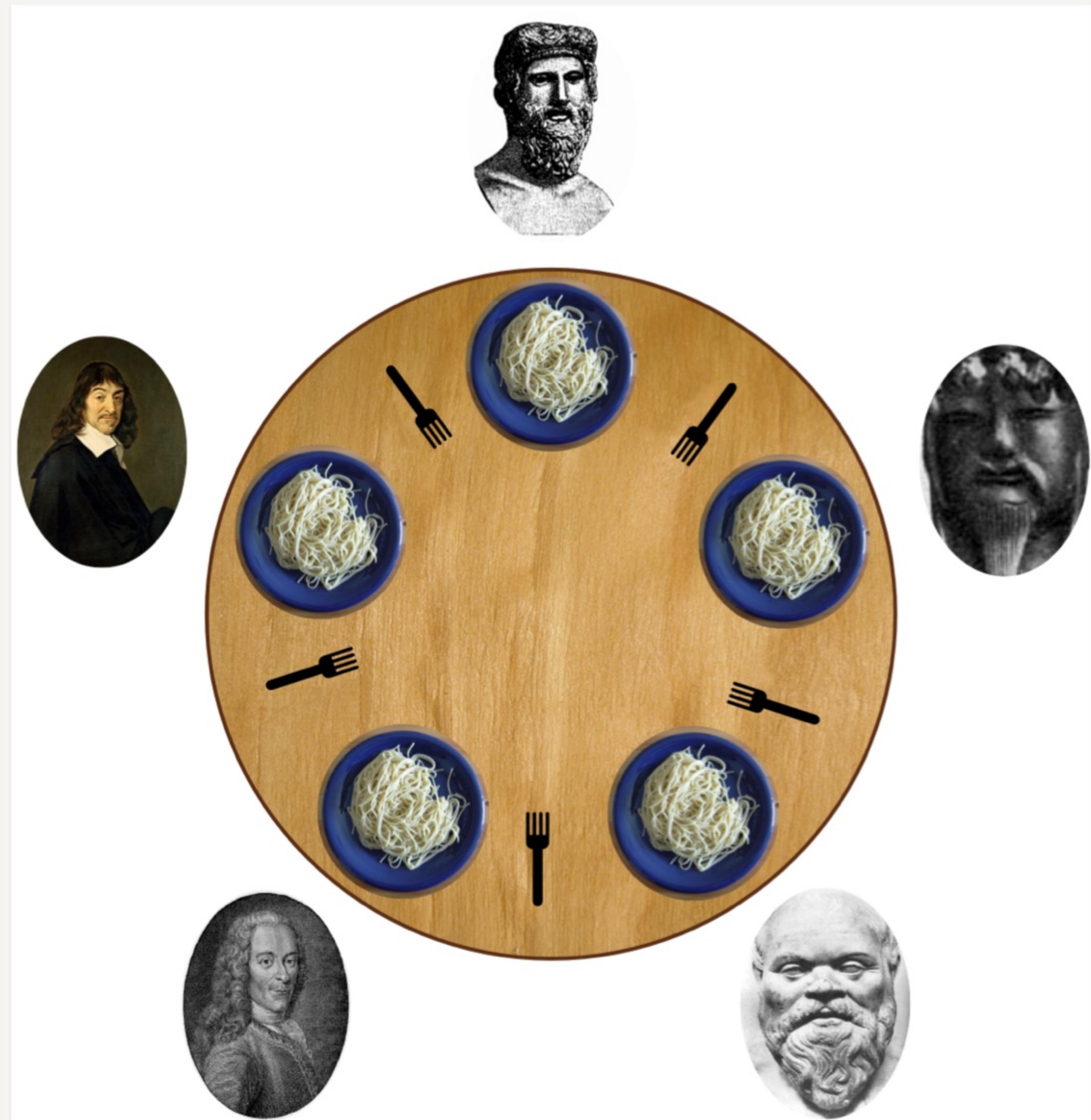








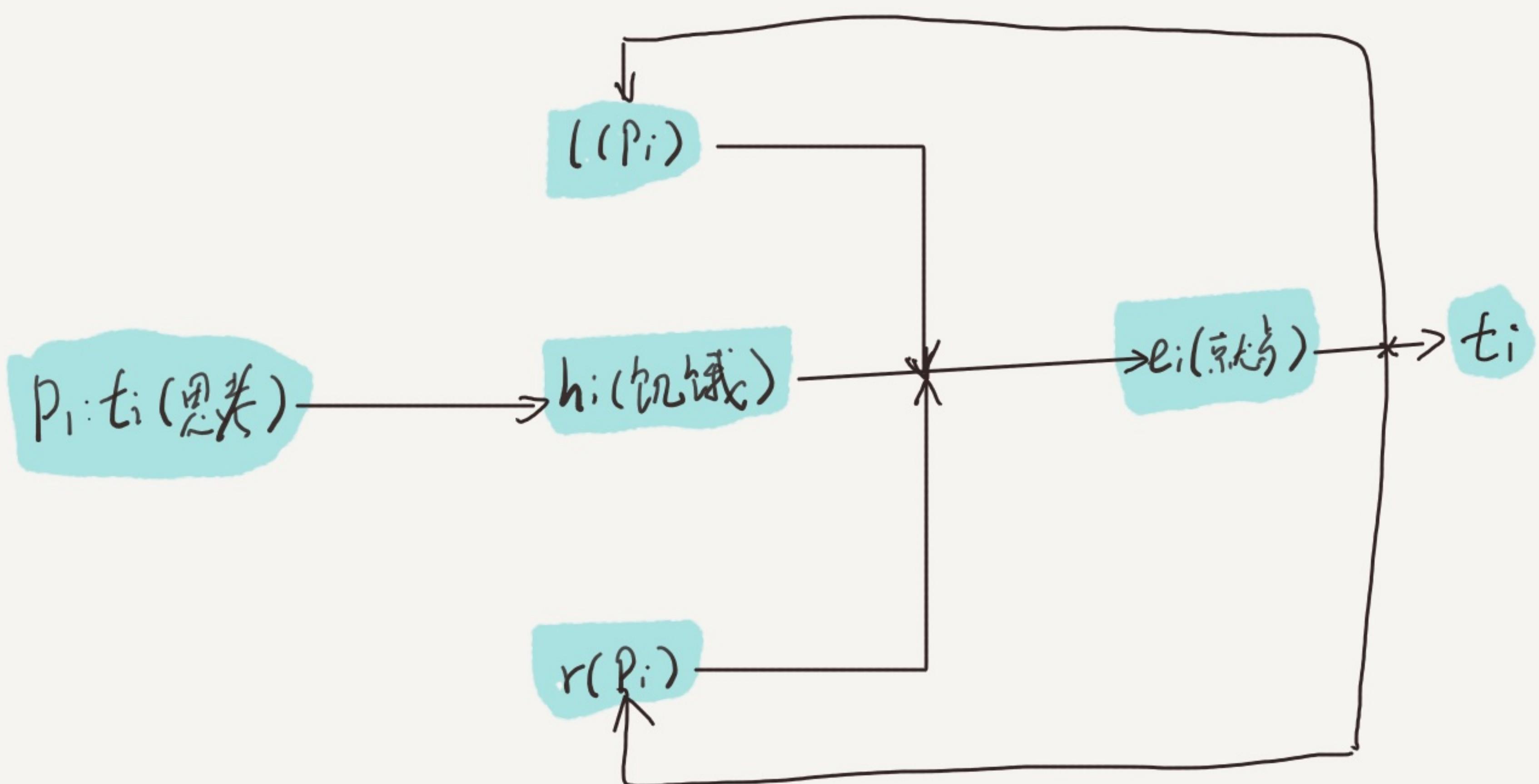
应用二：哲学家就餐问题



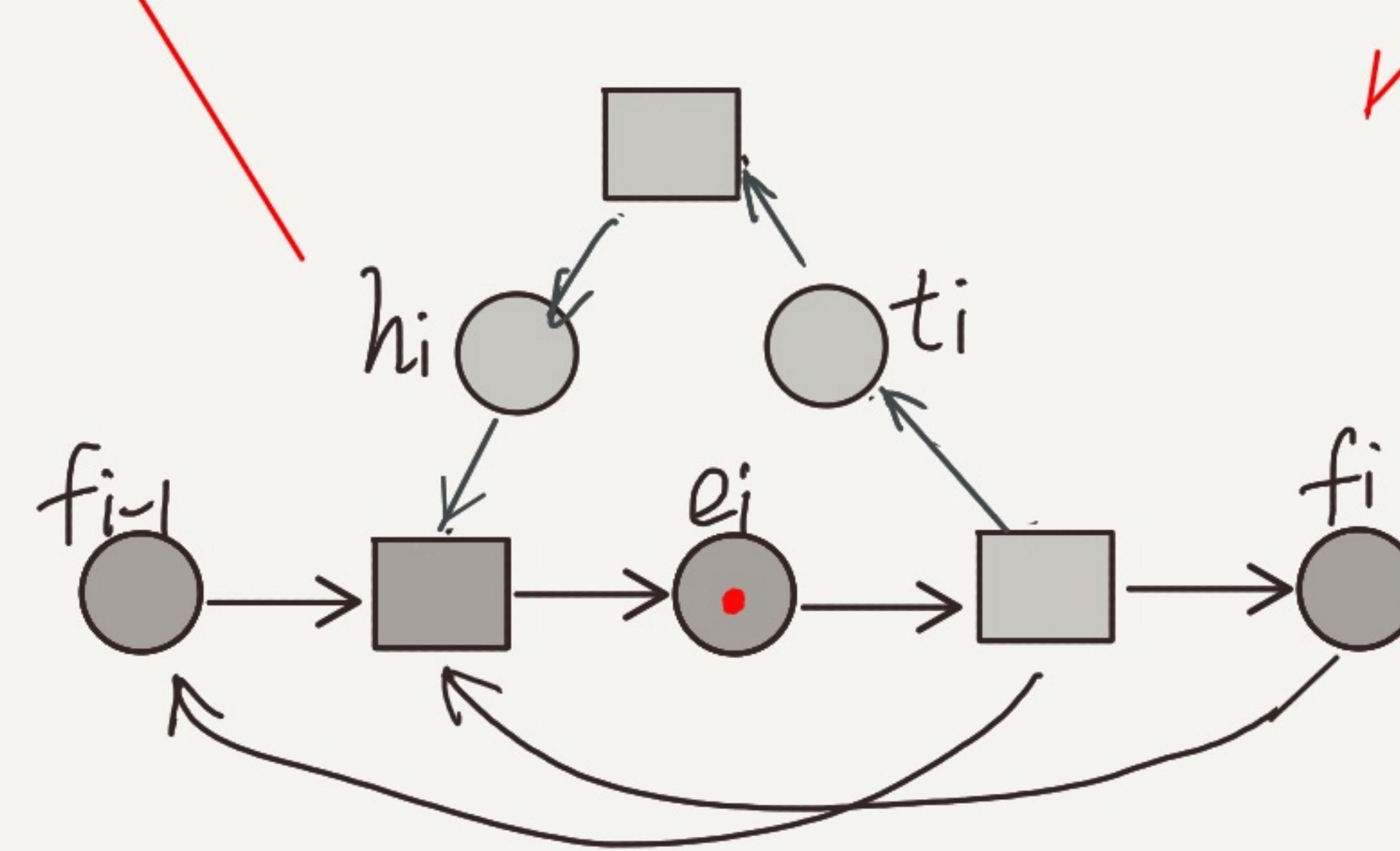
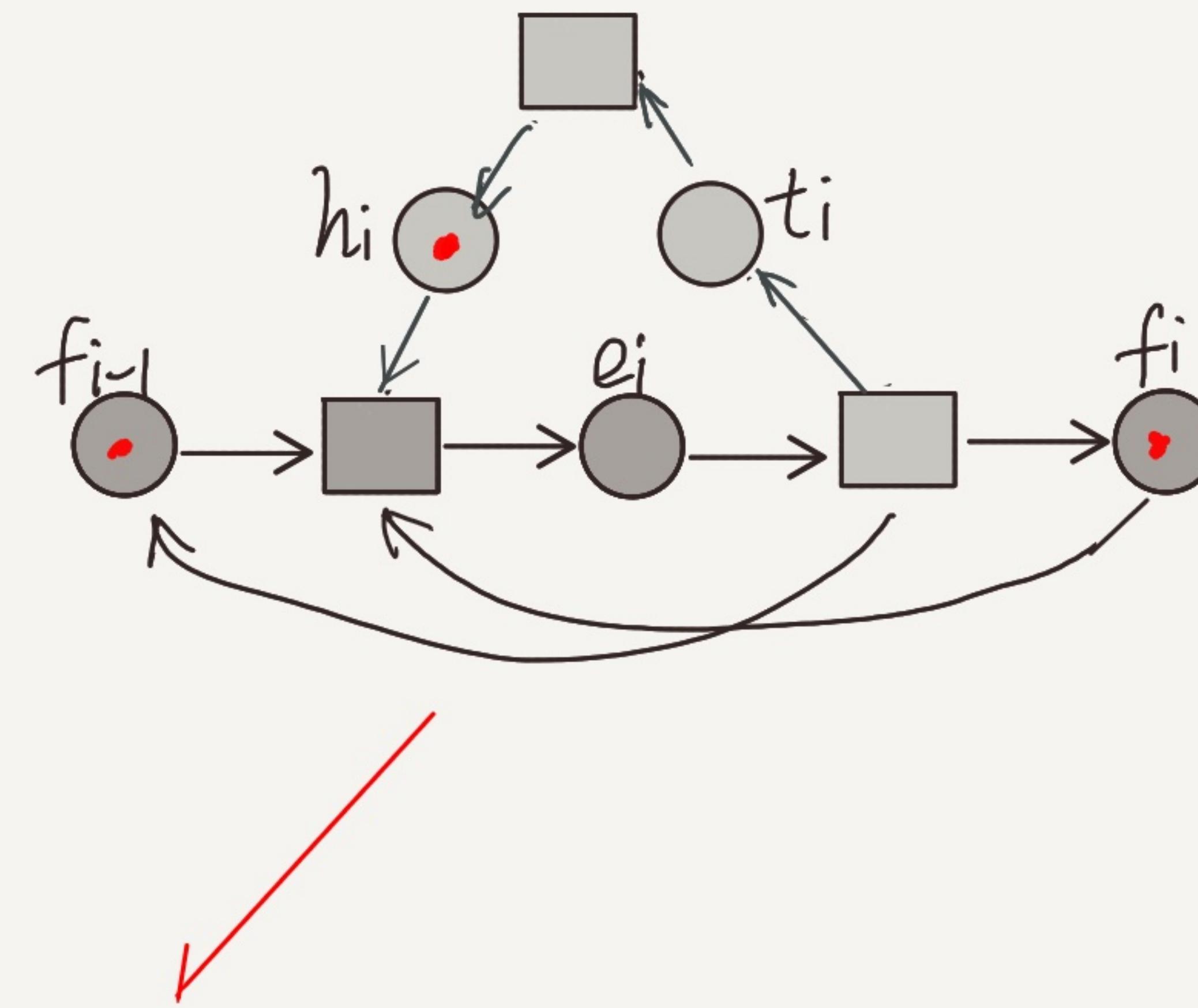
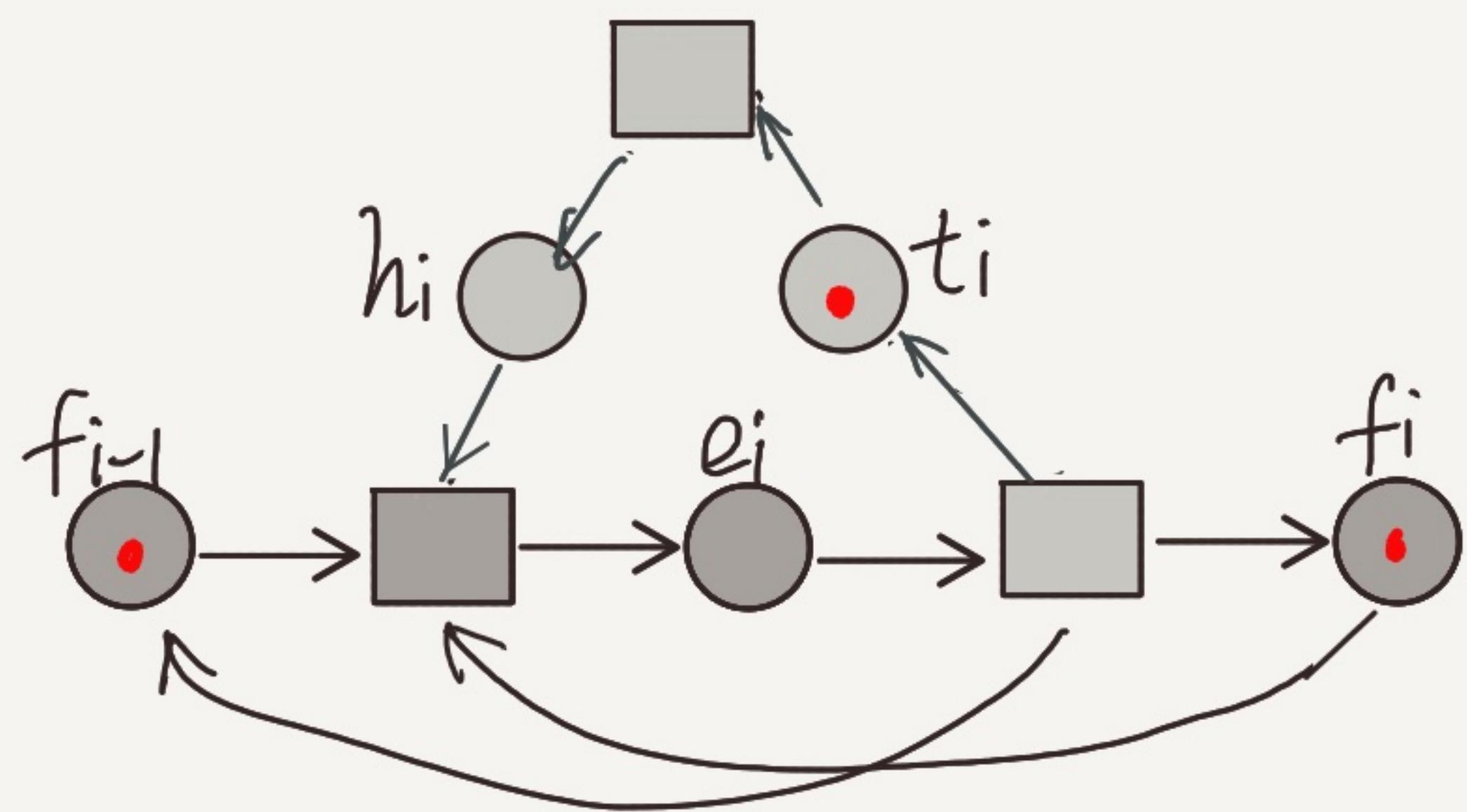
- ① 吃饭
- ② 饿死

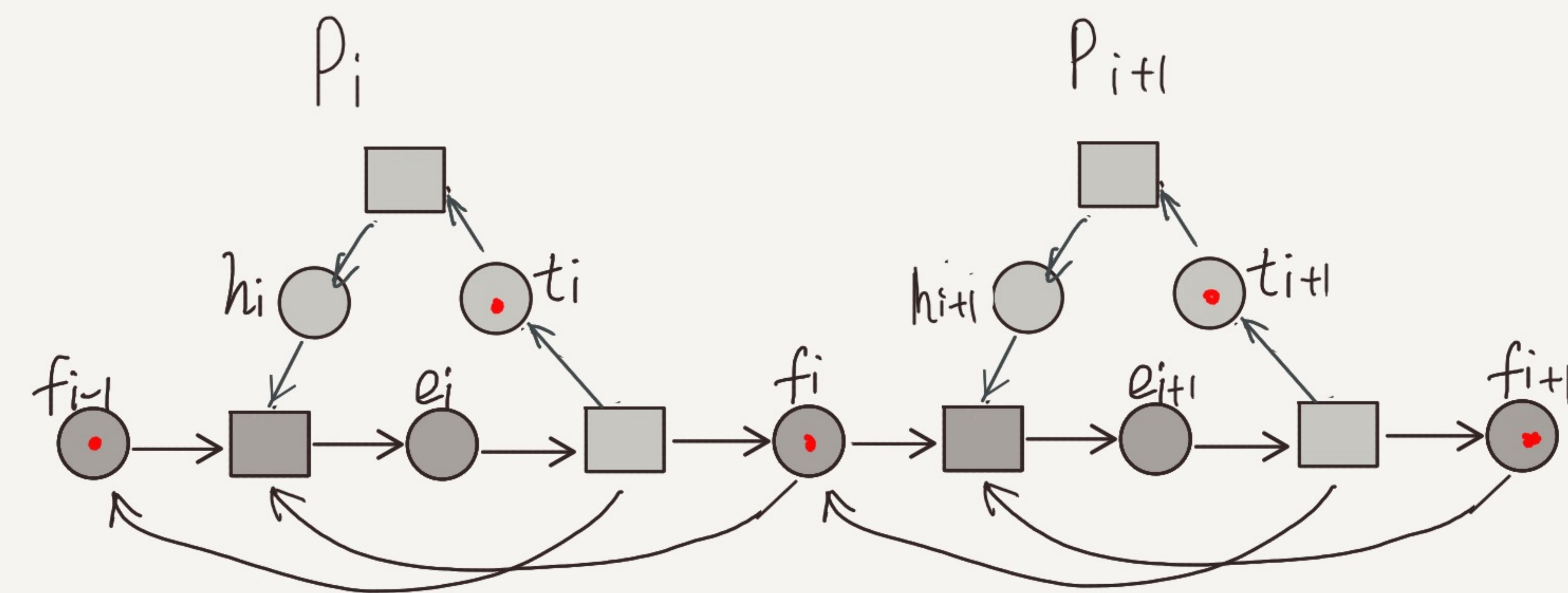
饥者得食

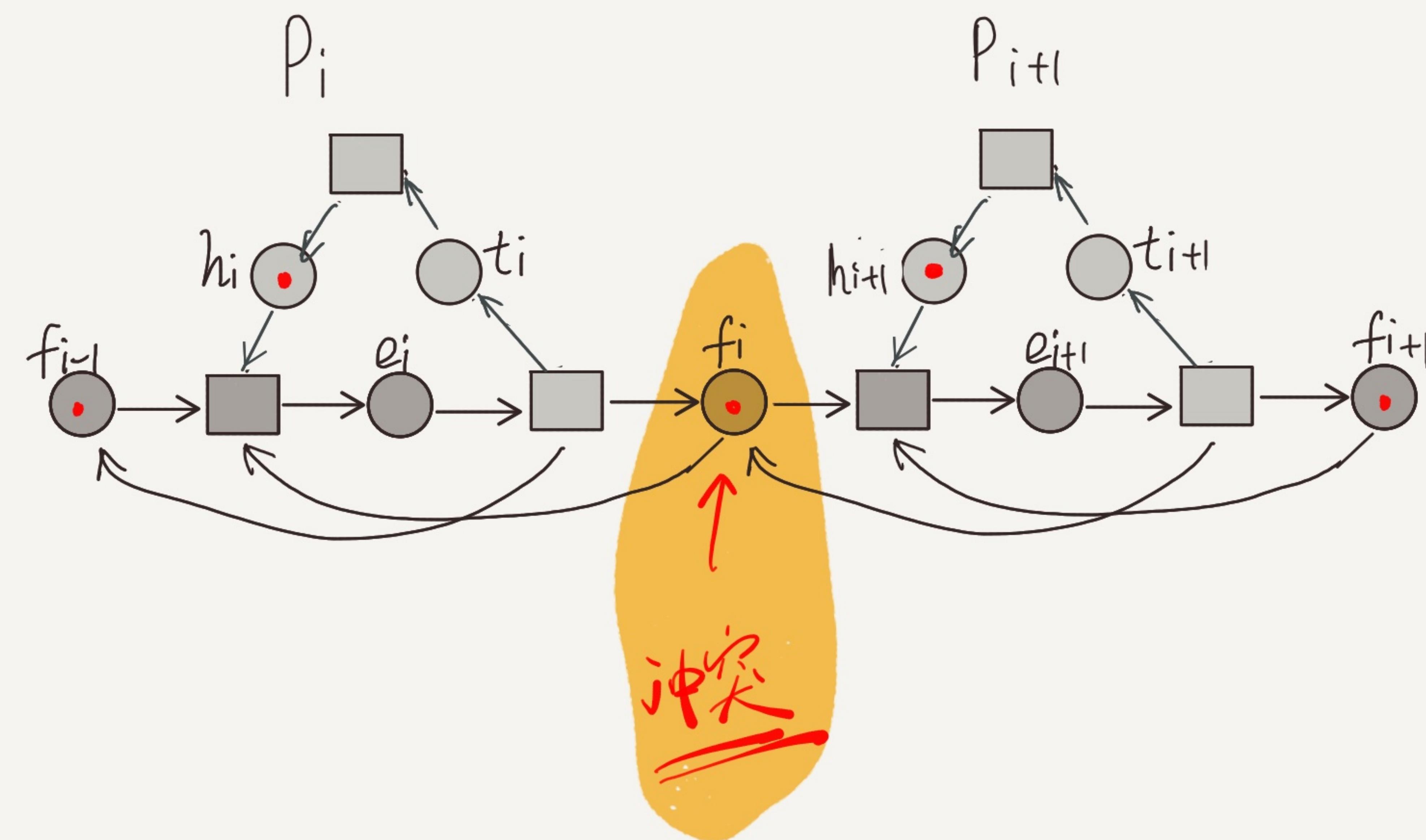
无冲突

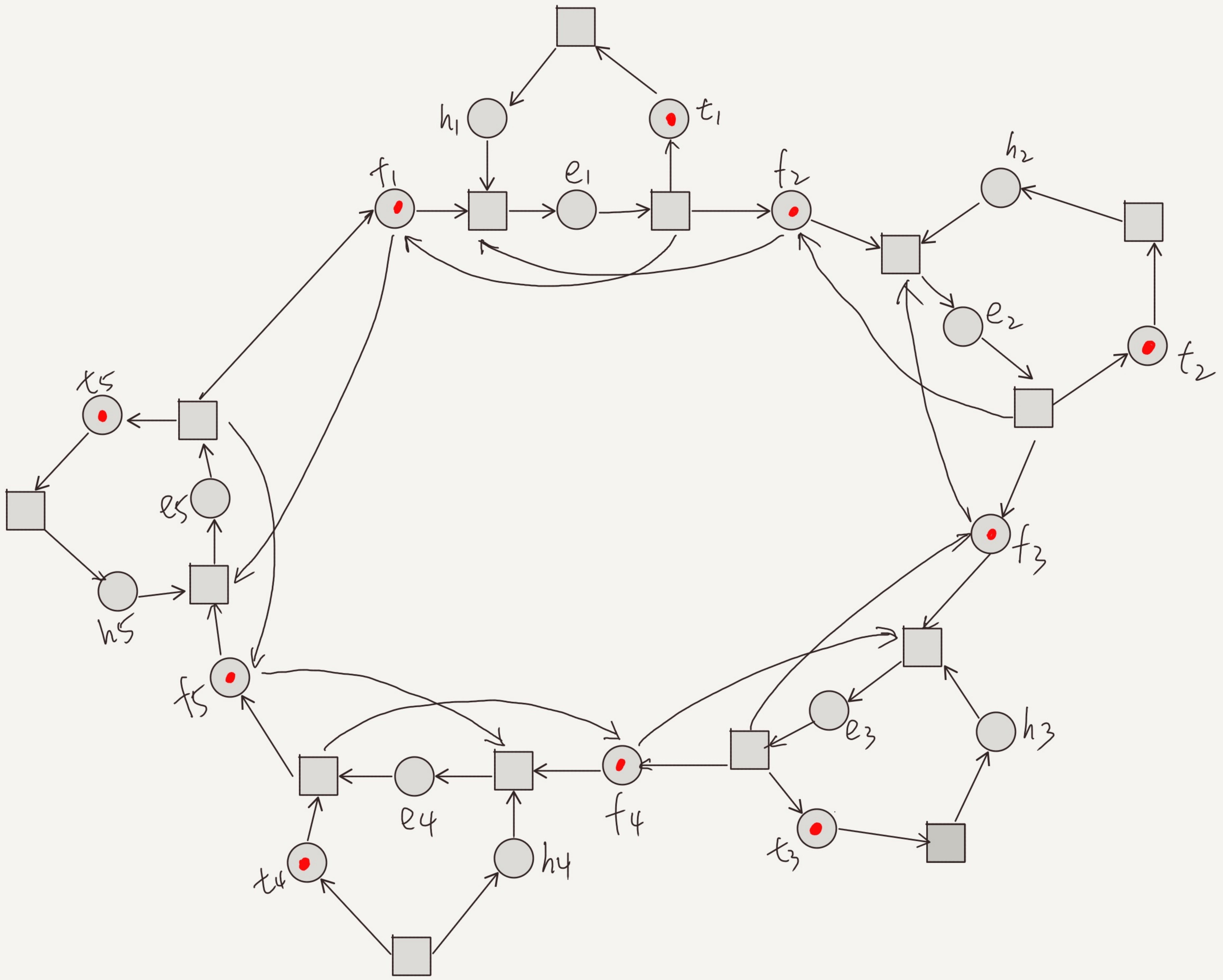


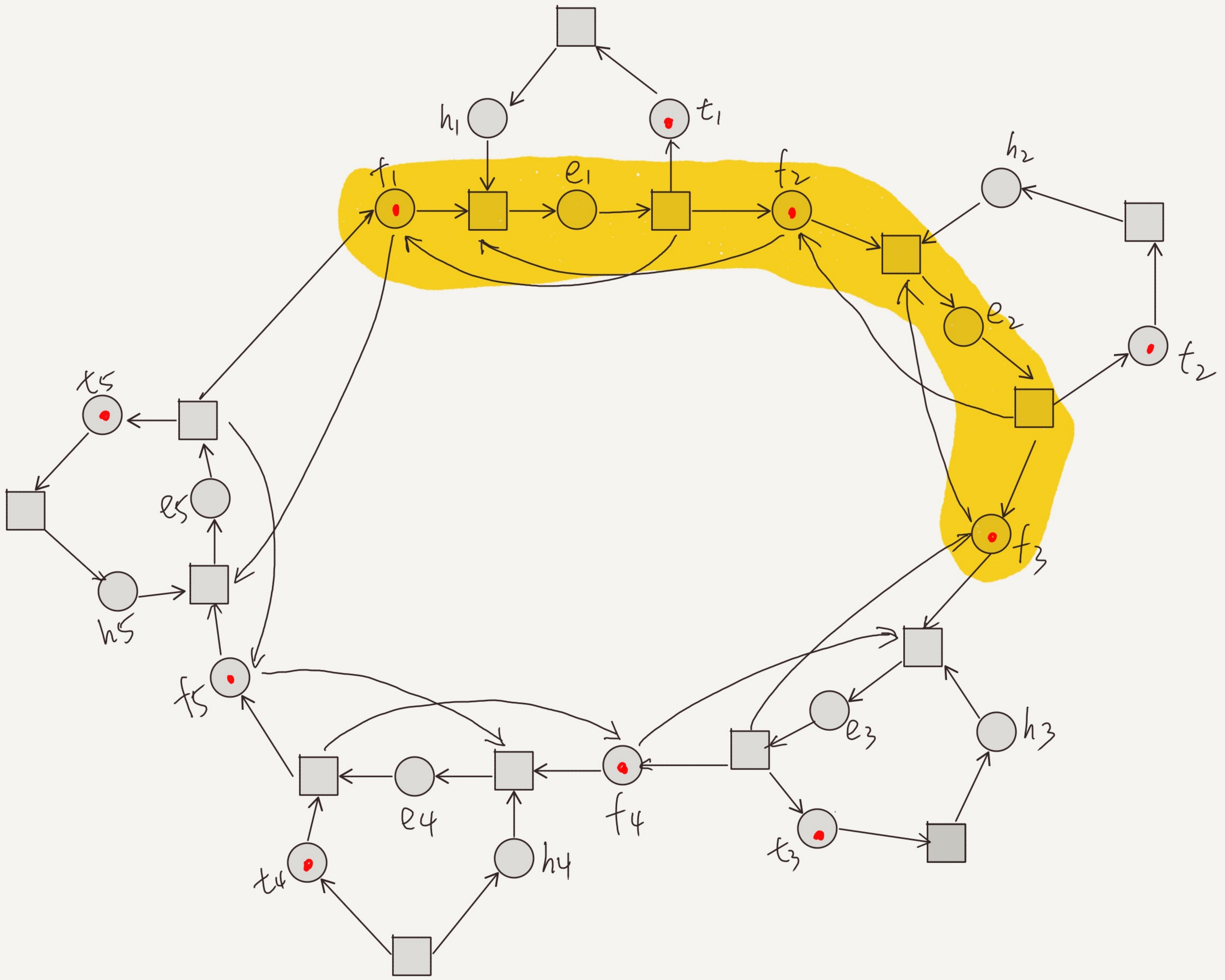
一位哲学家 P_i

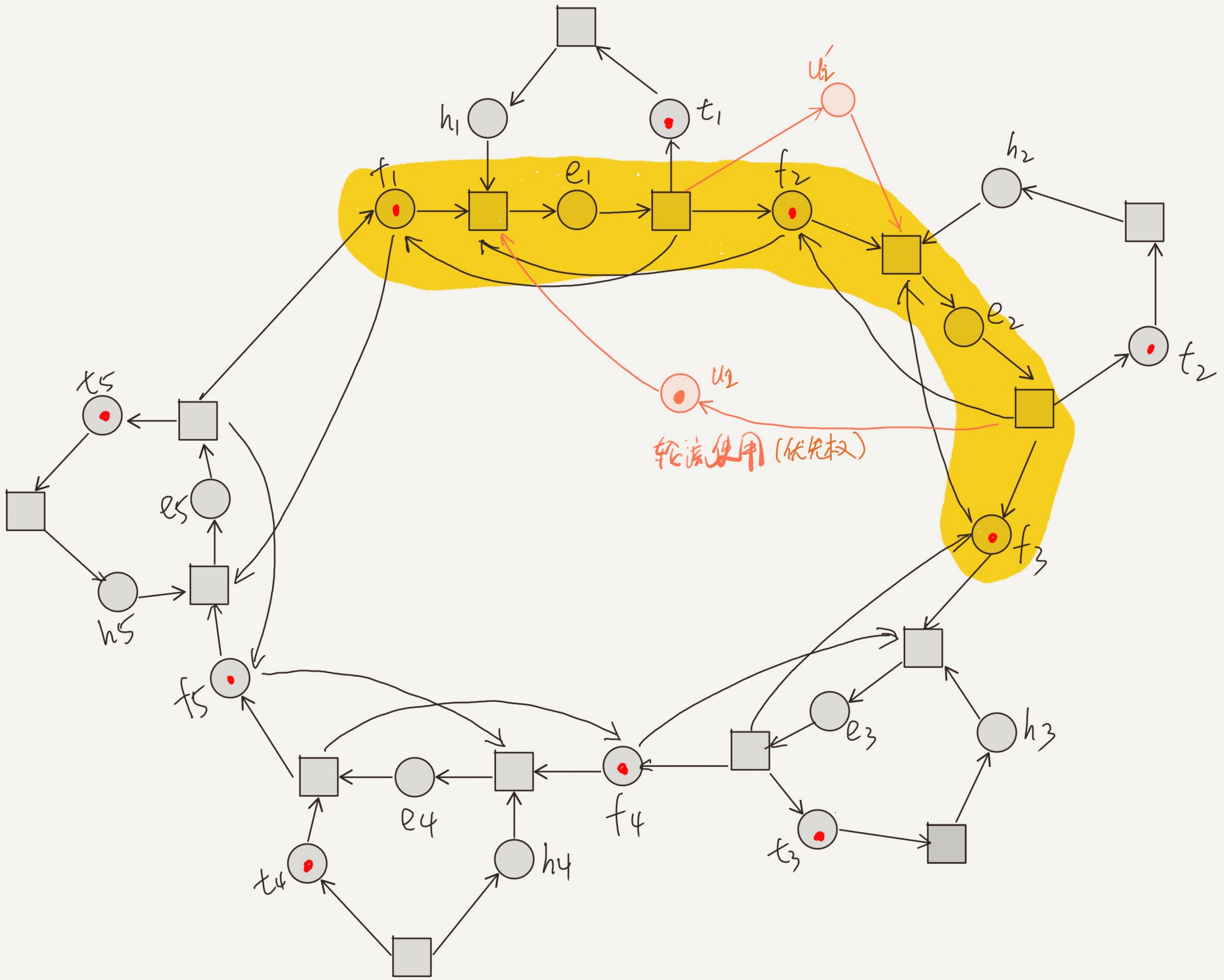


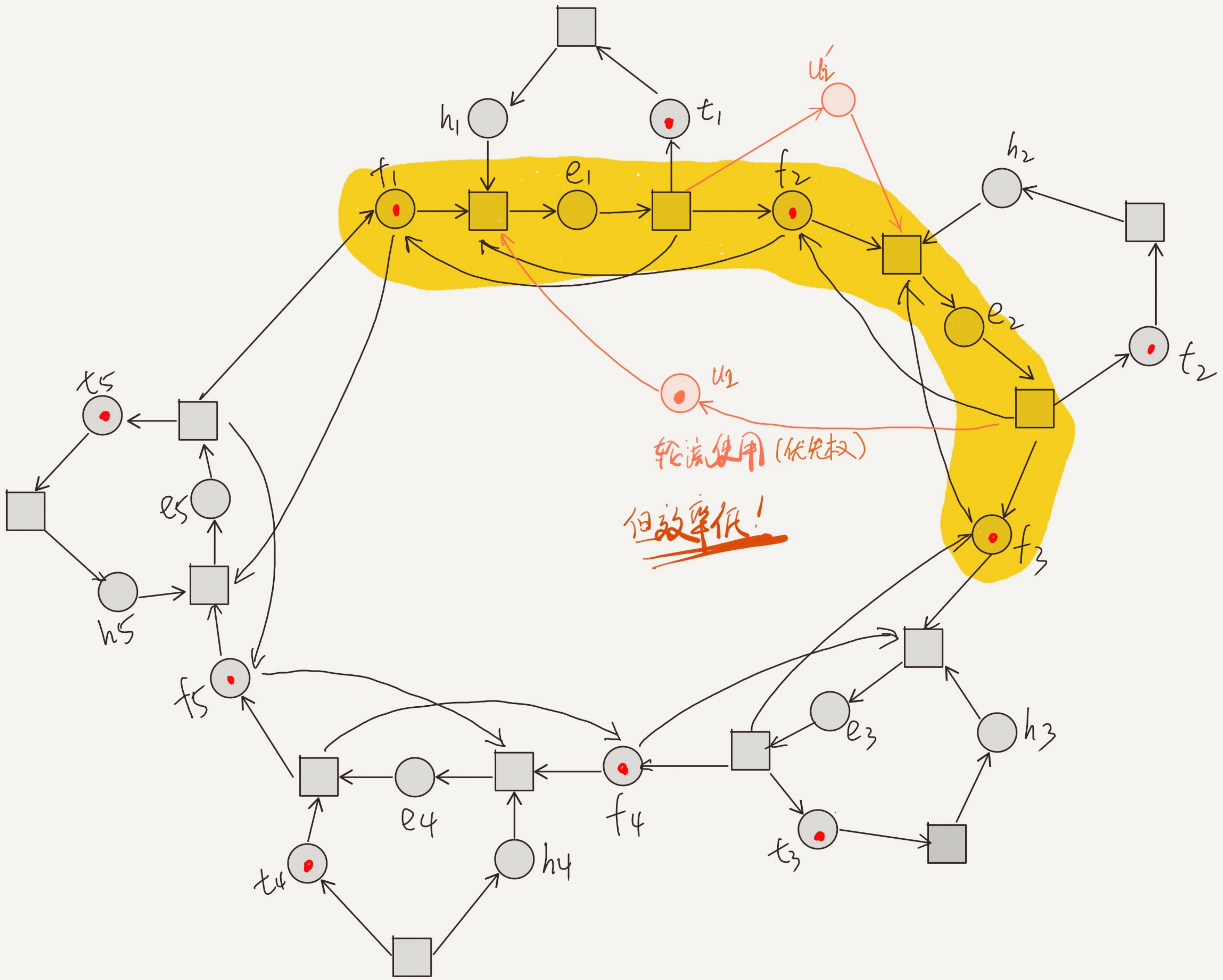


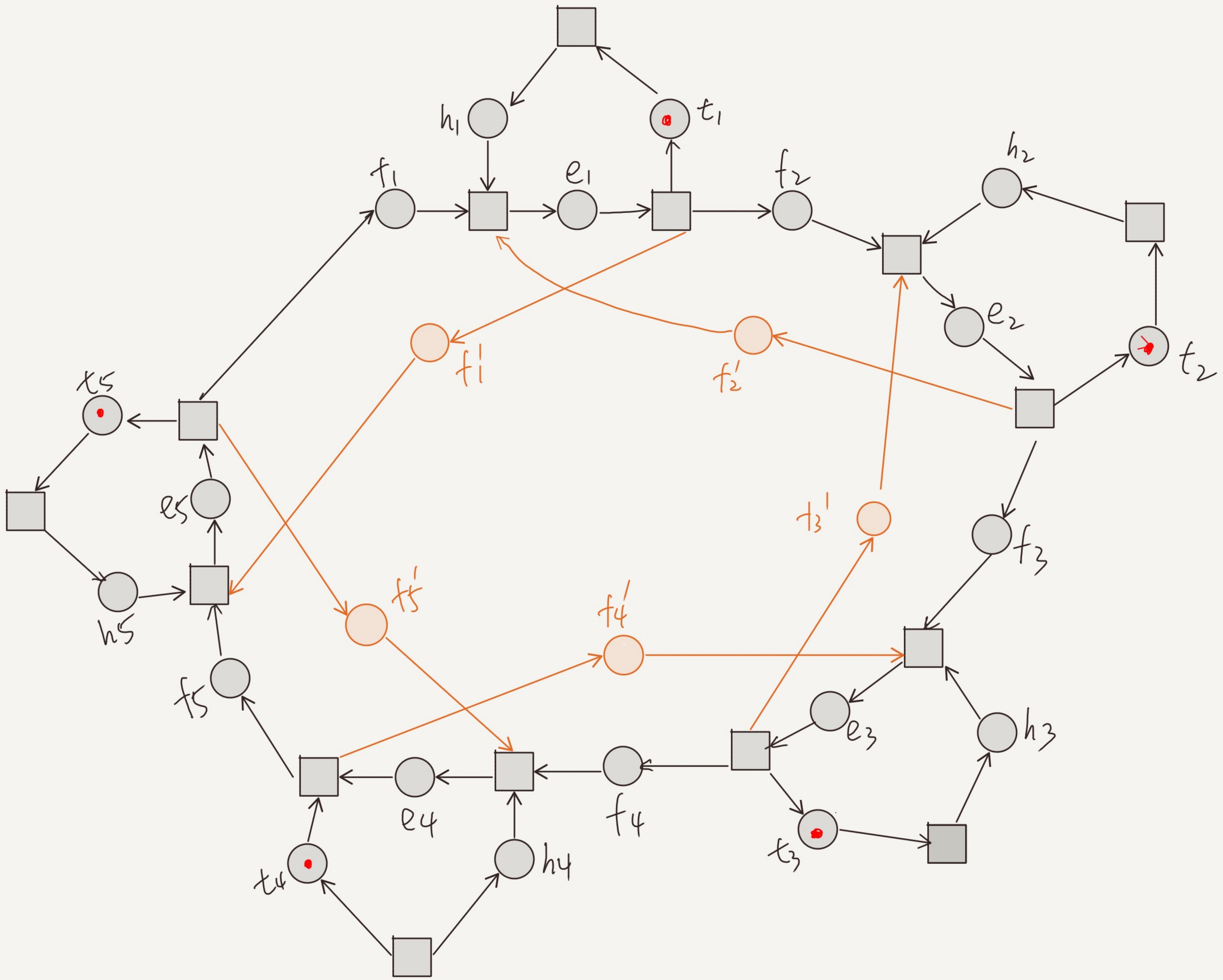


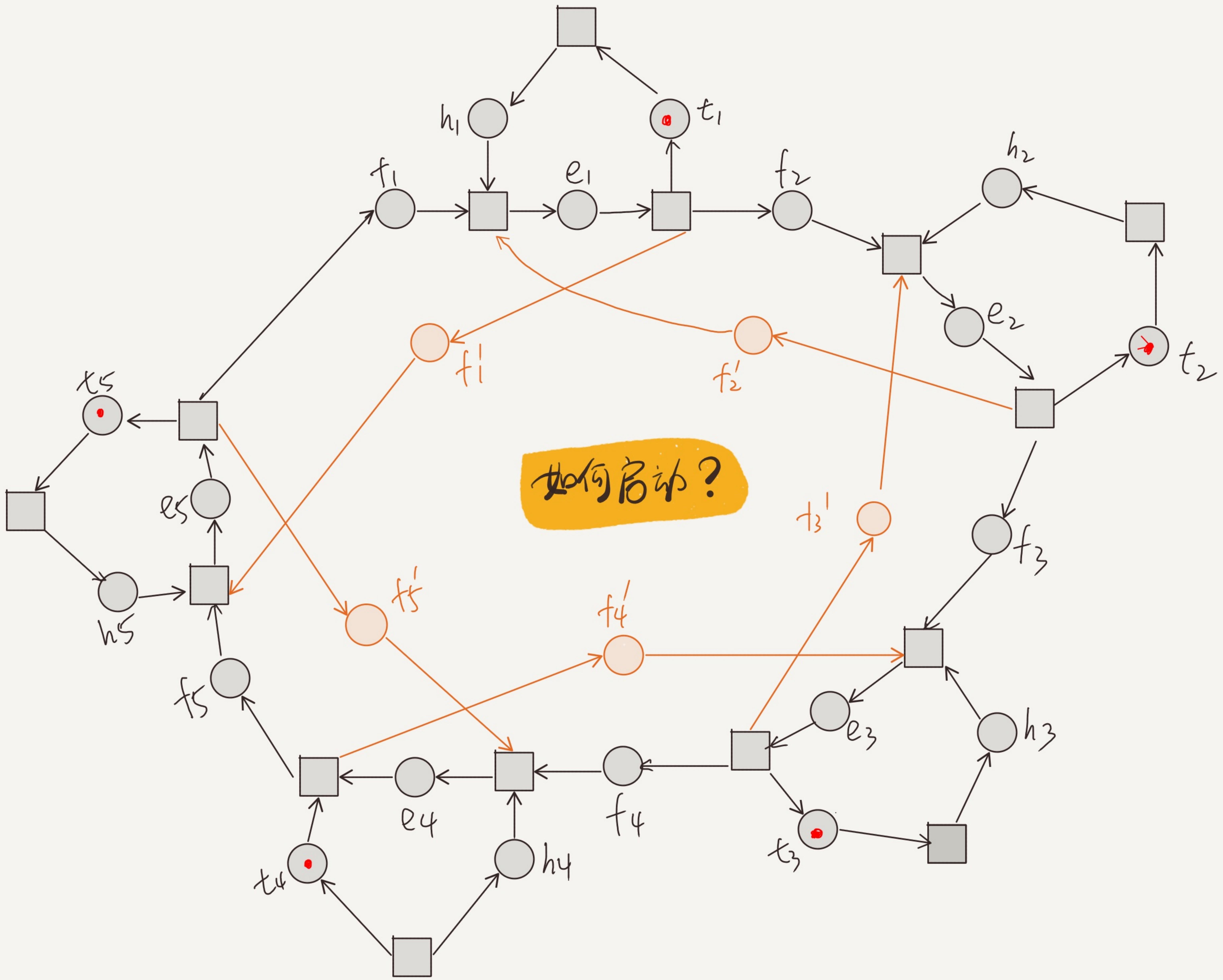


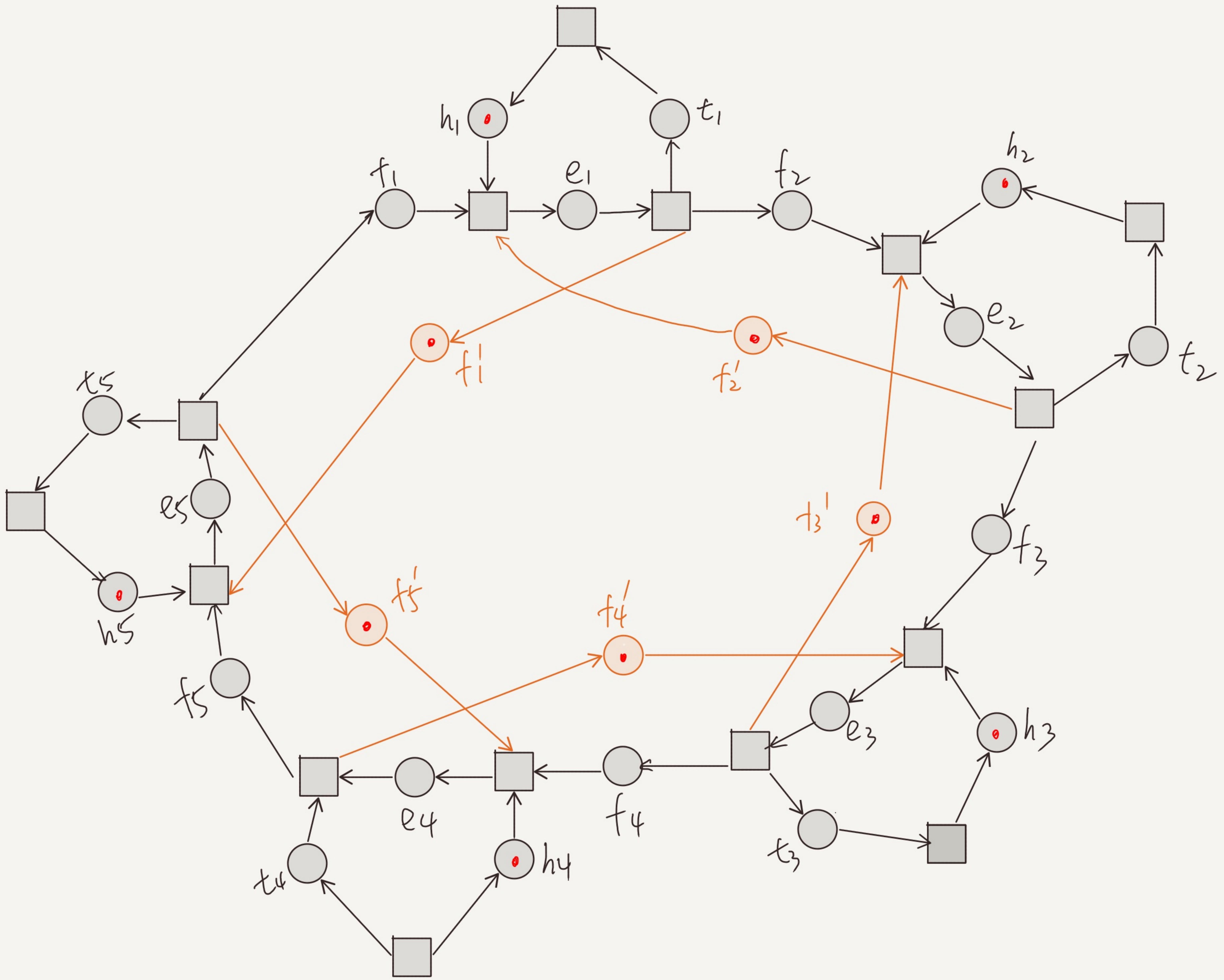


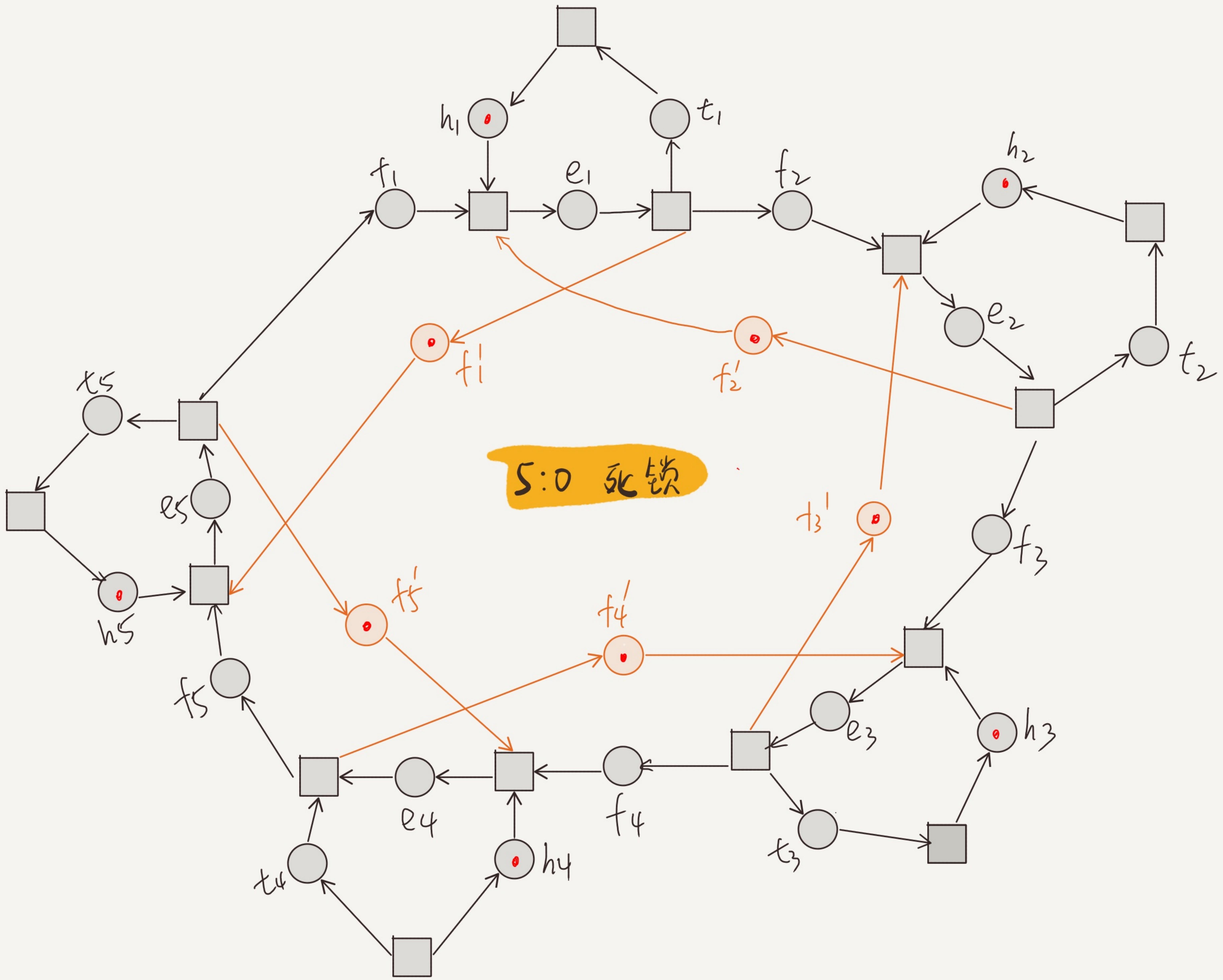


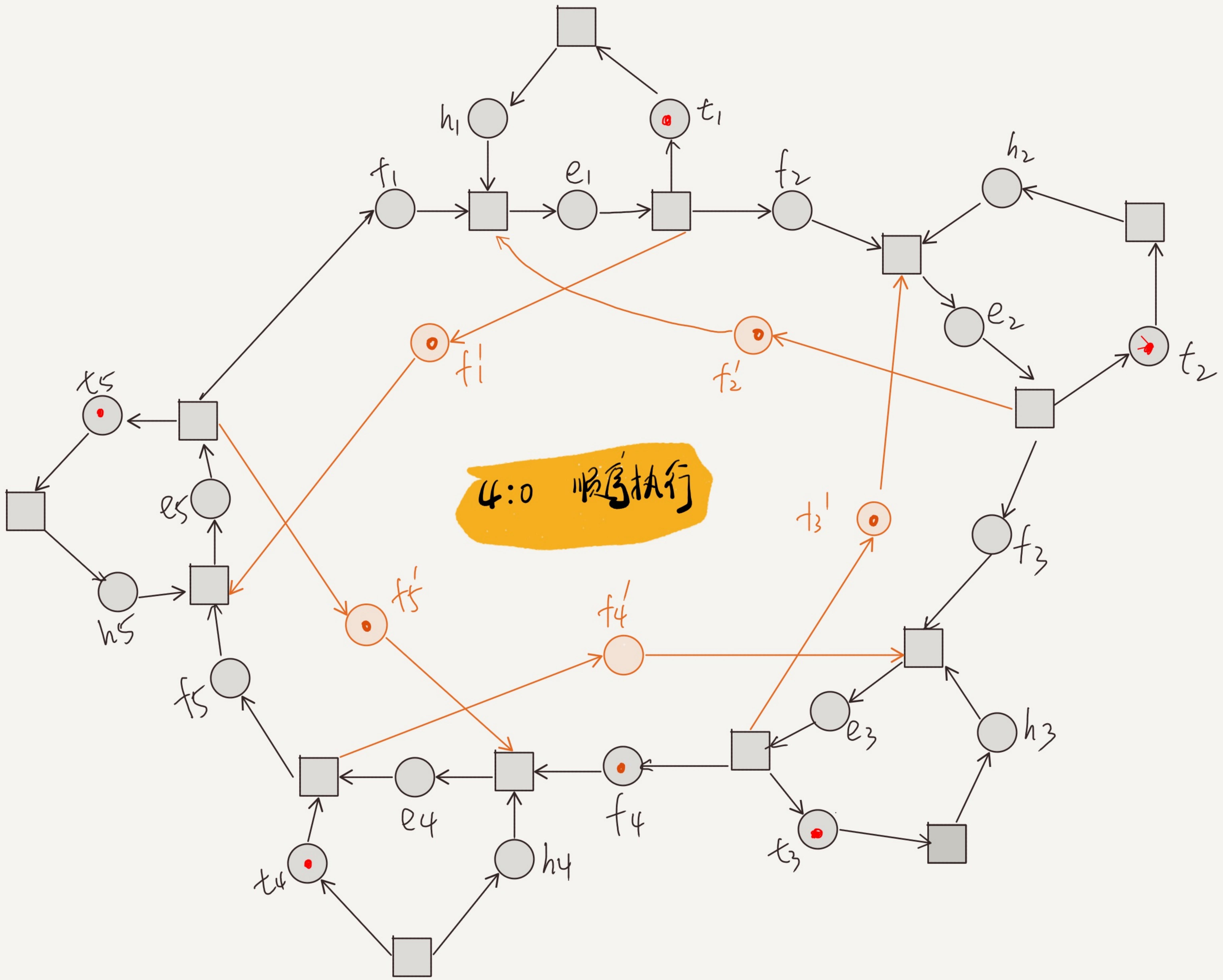


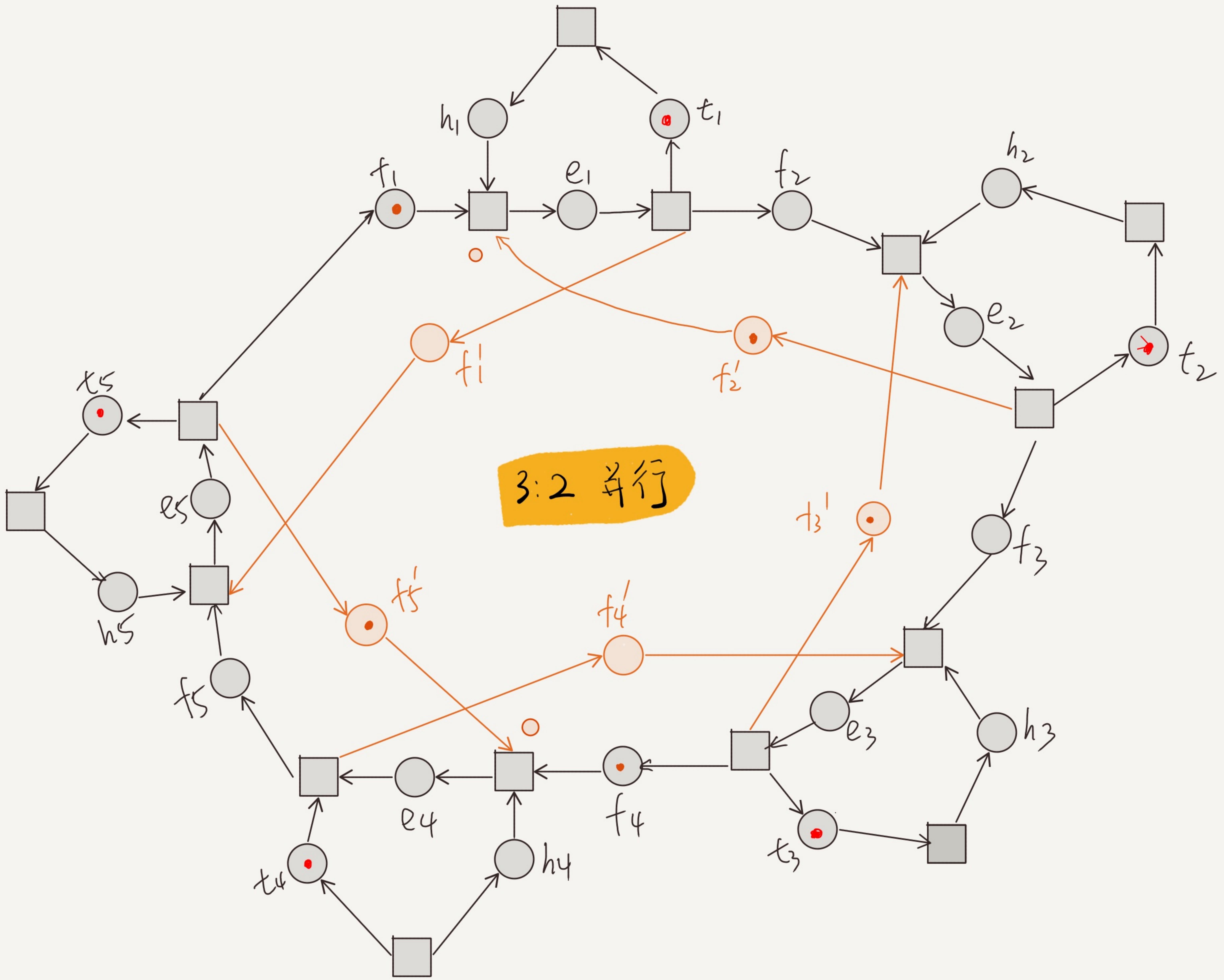


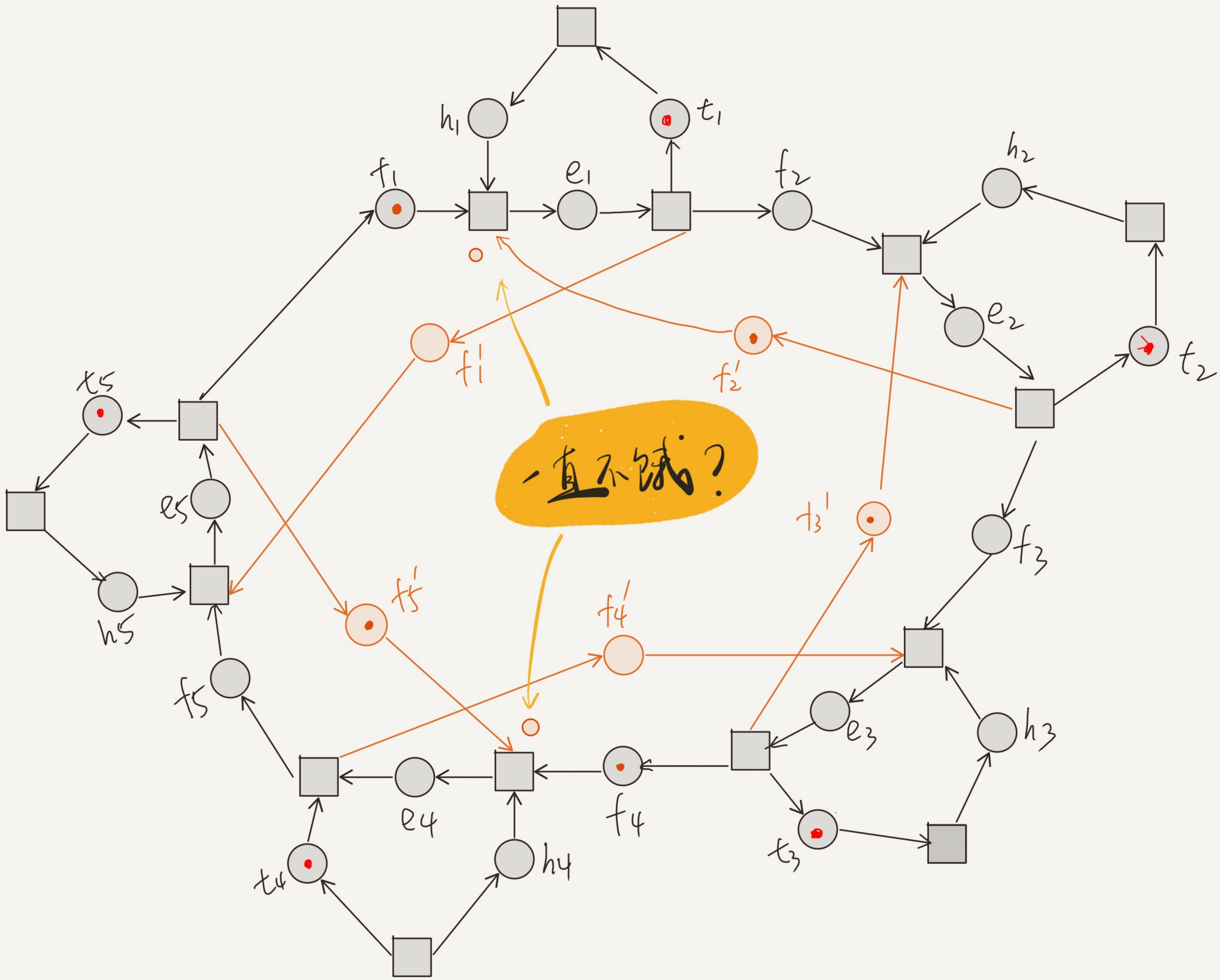


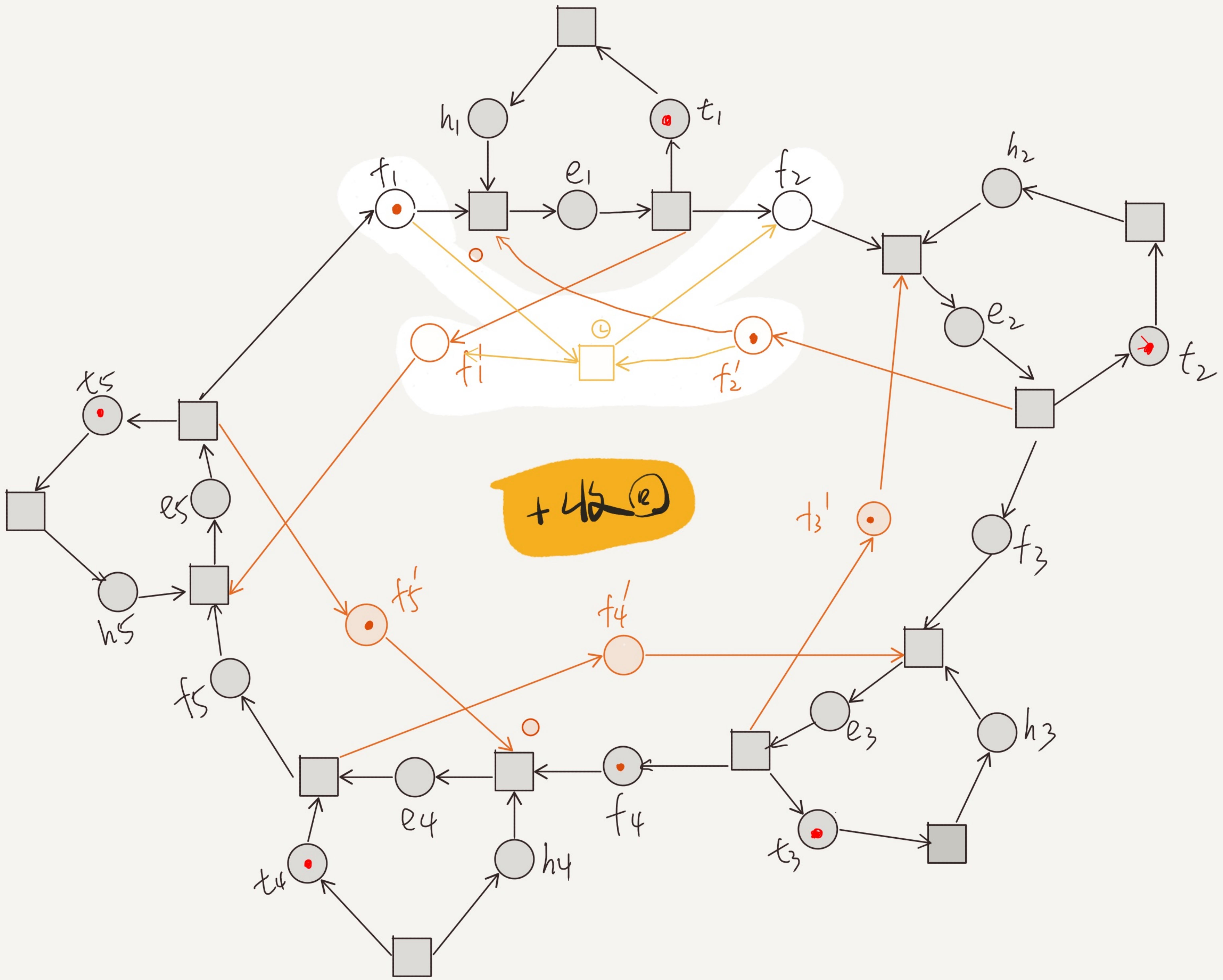


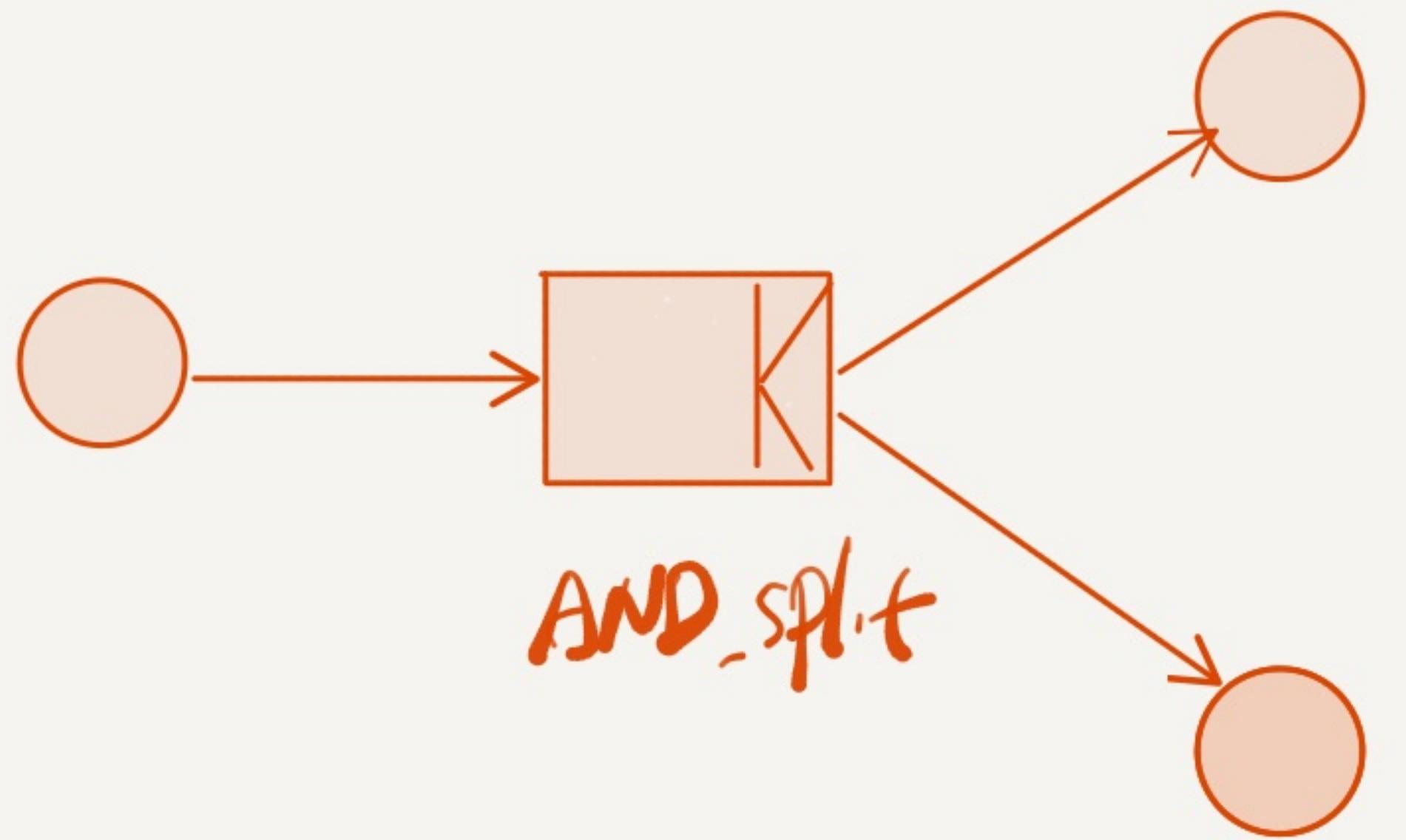




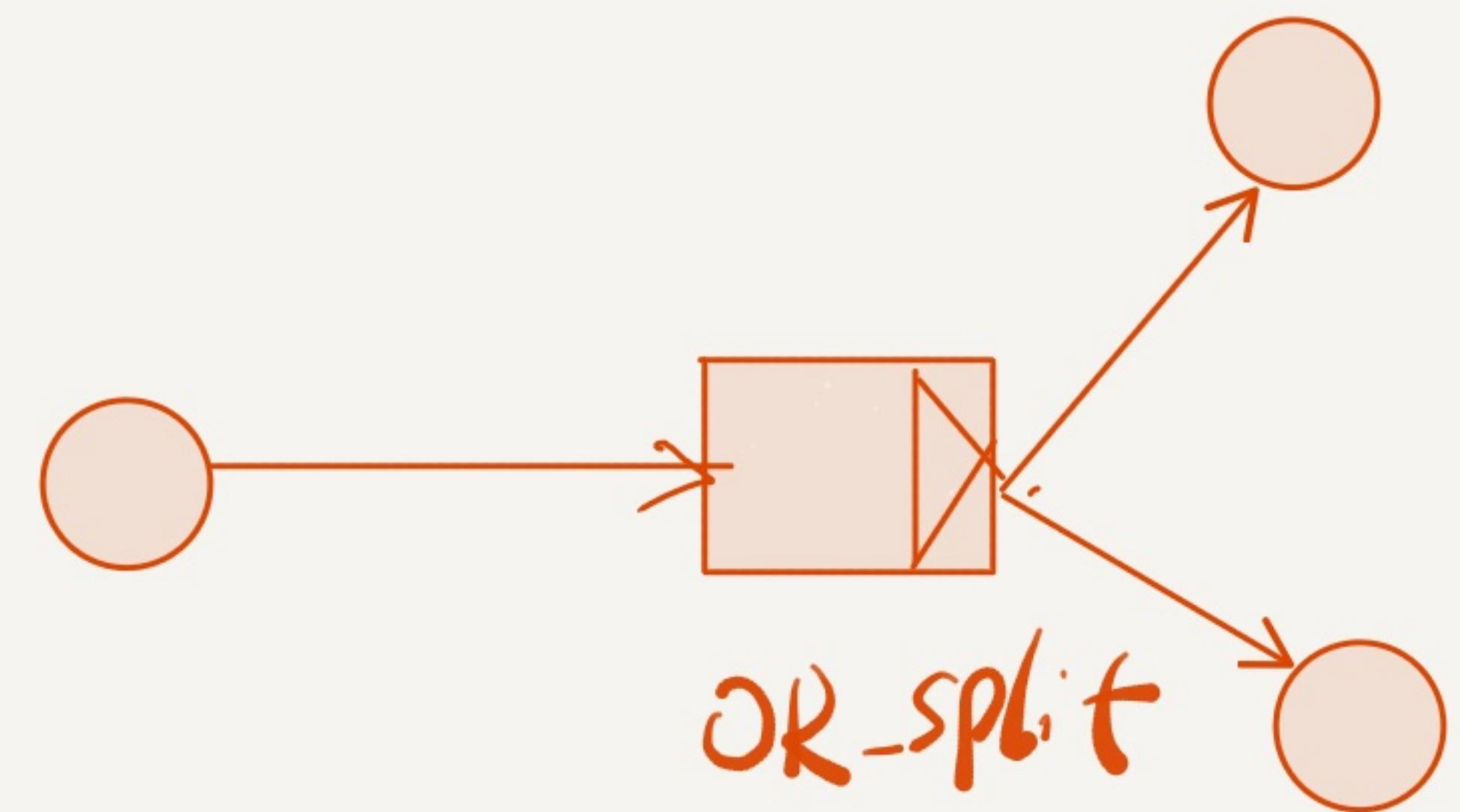






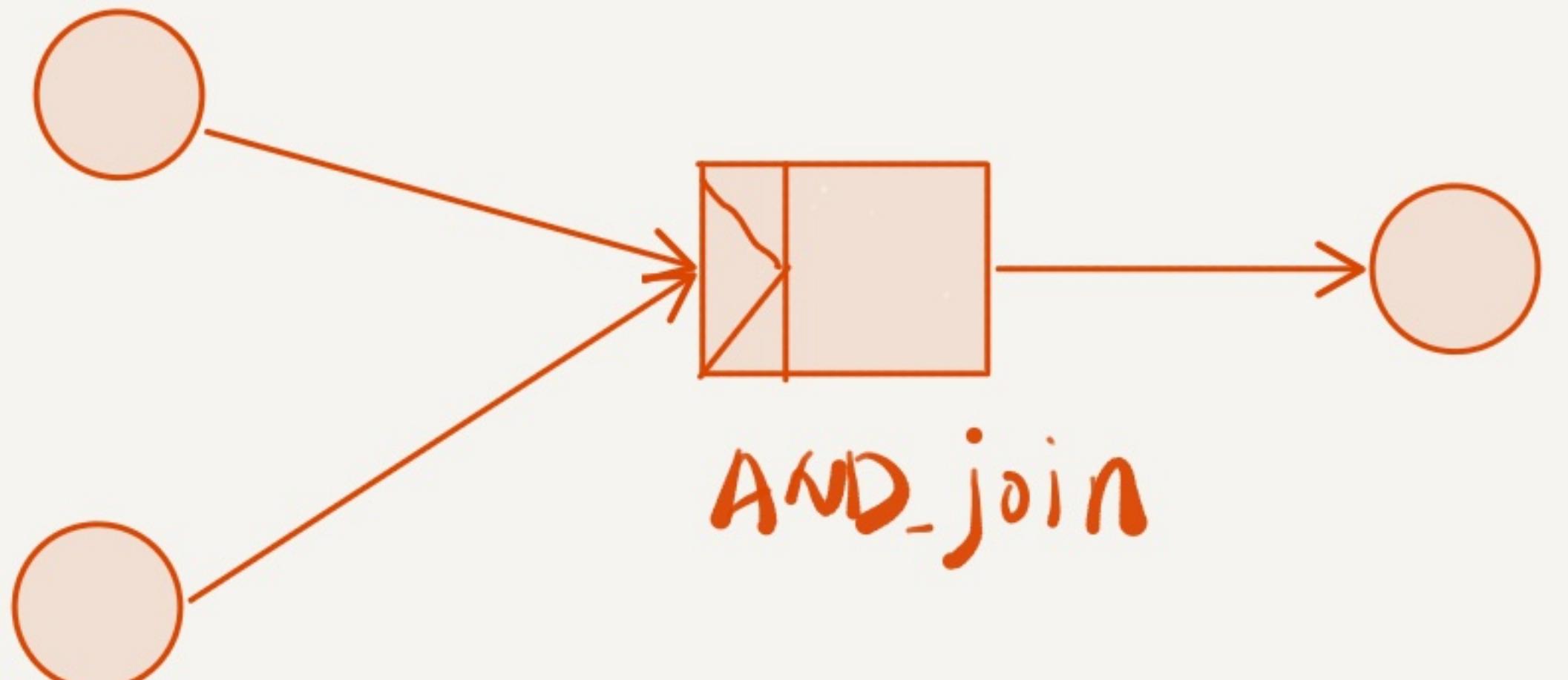


AND-split

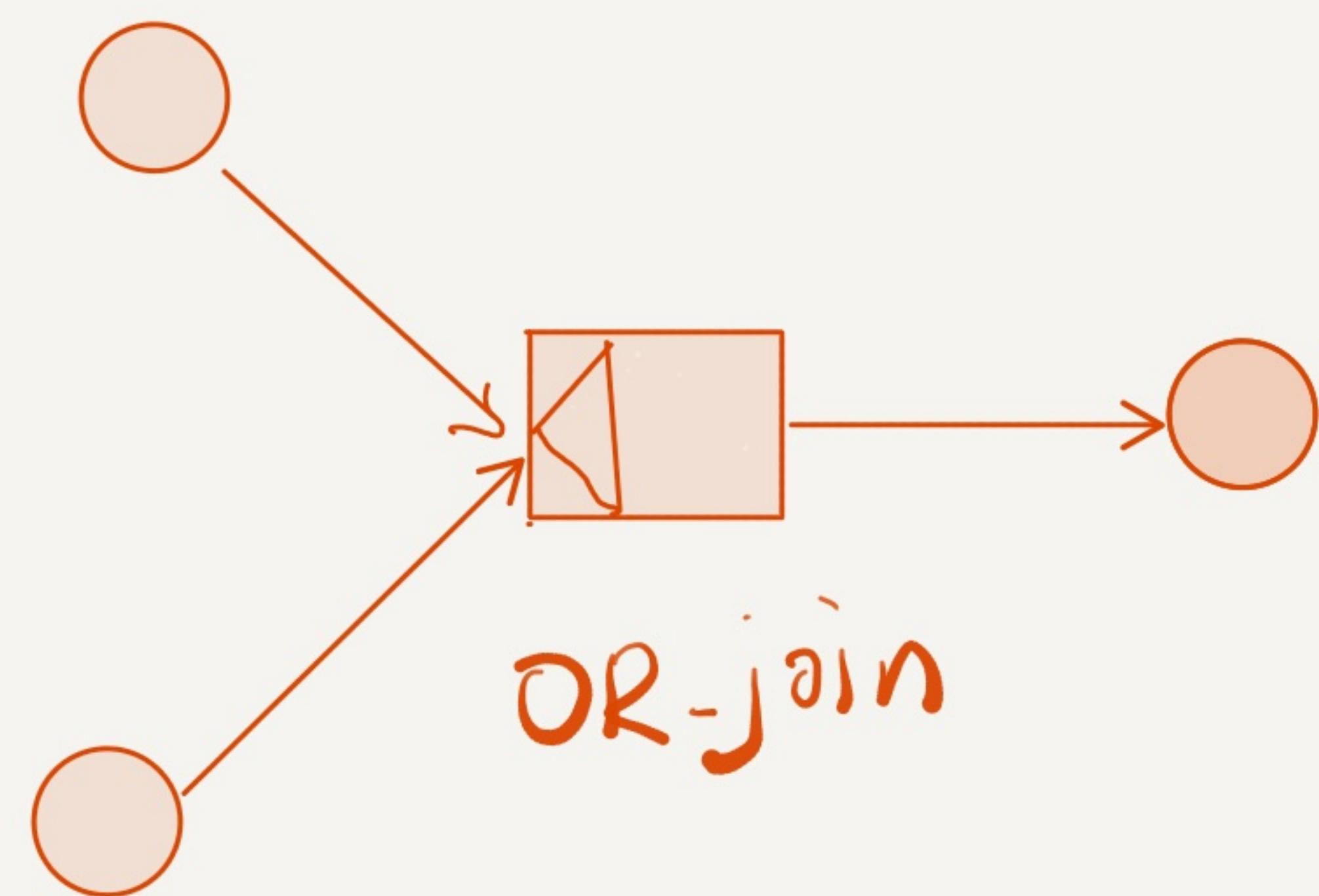


OR-split

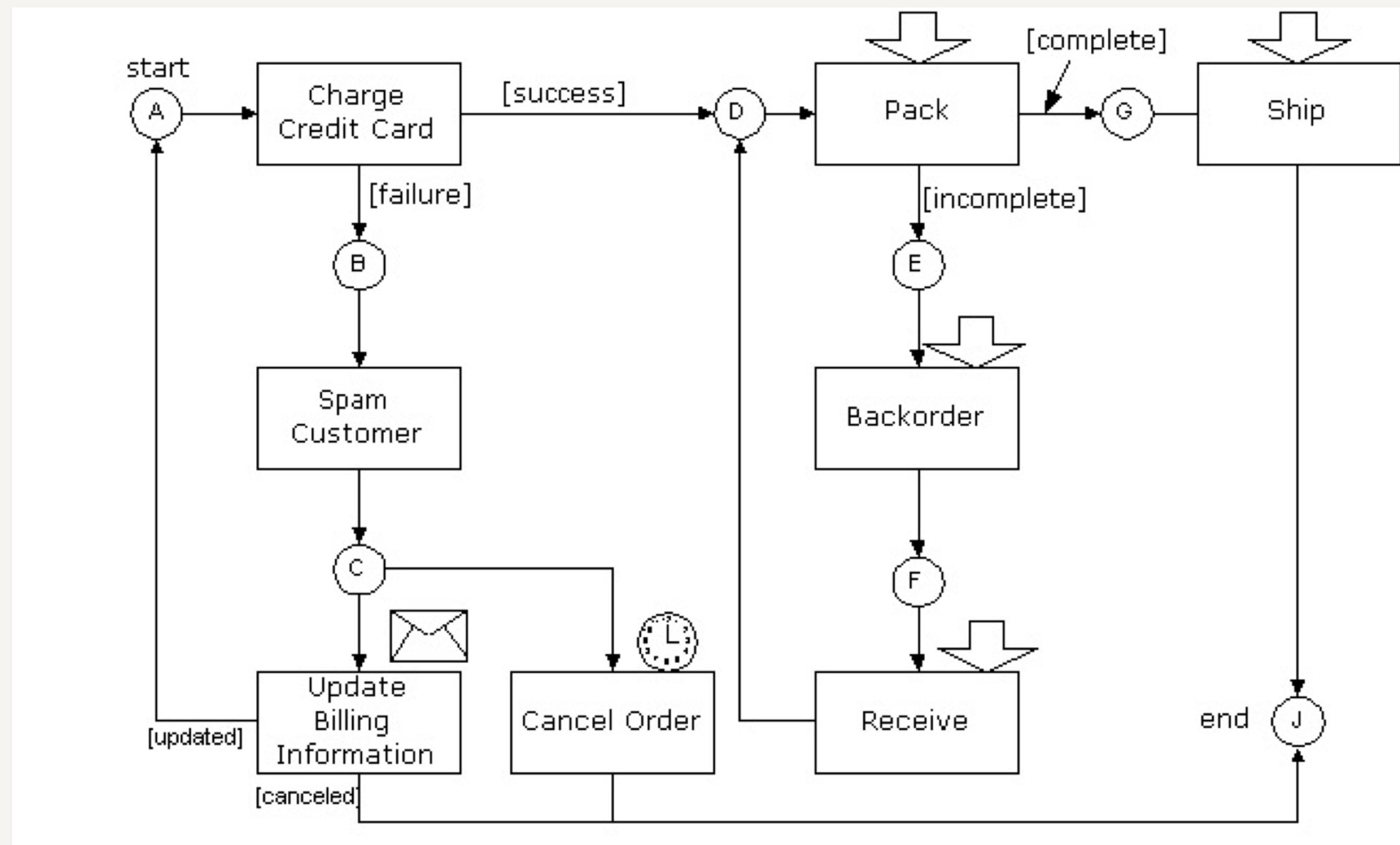
WF-net



AND-join



OR-join



End

