

柒、PLC應用實例

Jun-Bin Wang

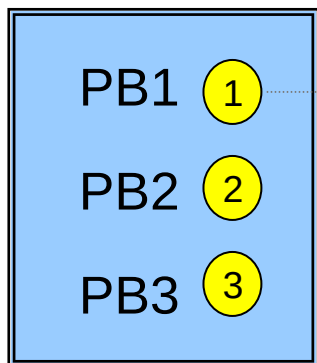


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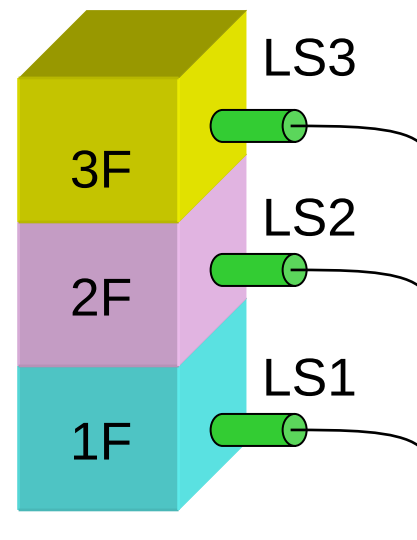
實例一：貨物電梯控制

	點 數	說 明
輸入	6	3個極限開關,3個按鈕開關
輸出	2	馬達正反轉(U/D)

電梯內控制面板



樓層呼叫按鈕



送貨電梯動作分析

按鈕開關			極限開關			動作	
PB1	PB2	PB3	LS1	LS2	LS3	U	D
1	0	0	0	1	0	0	1
1	0	0	0	0	1	0	1
0	1	0	0	0	1	0	1
0	1	0	1	0	0	1	0
0	0	1	1	0	0	1	0
0	0	1	0	1	0	1	0

$$U = L_1 \cdot (P_2 + P_3) + L_2 \cdot P_3$$

$$D = L_3 \cdot (P_1 + P_2) + L_2 \cdot P_1$$

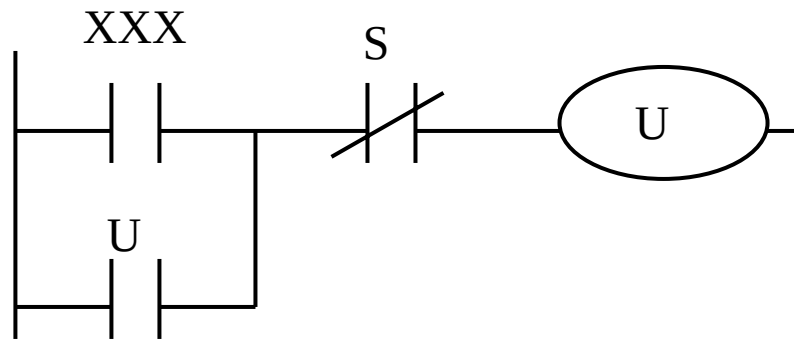
$$S = L_1 \cdot P_1 + L_2 \cdot P_2 + L_3 \cdot P_3$$

$$U = L_1 \cdot (P_2 + P_3) + L_2 \cdot P_3$$

$$D = L_3 \cdot (P_1 + P_2) + L_2 \cdot P_1$$

$$S = L_1 \cdot P_1 + L_2 \cdot P_2 + L_3 \cdot P_3$$

加入自保持：按鈕開關、馬達U/D

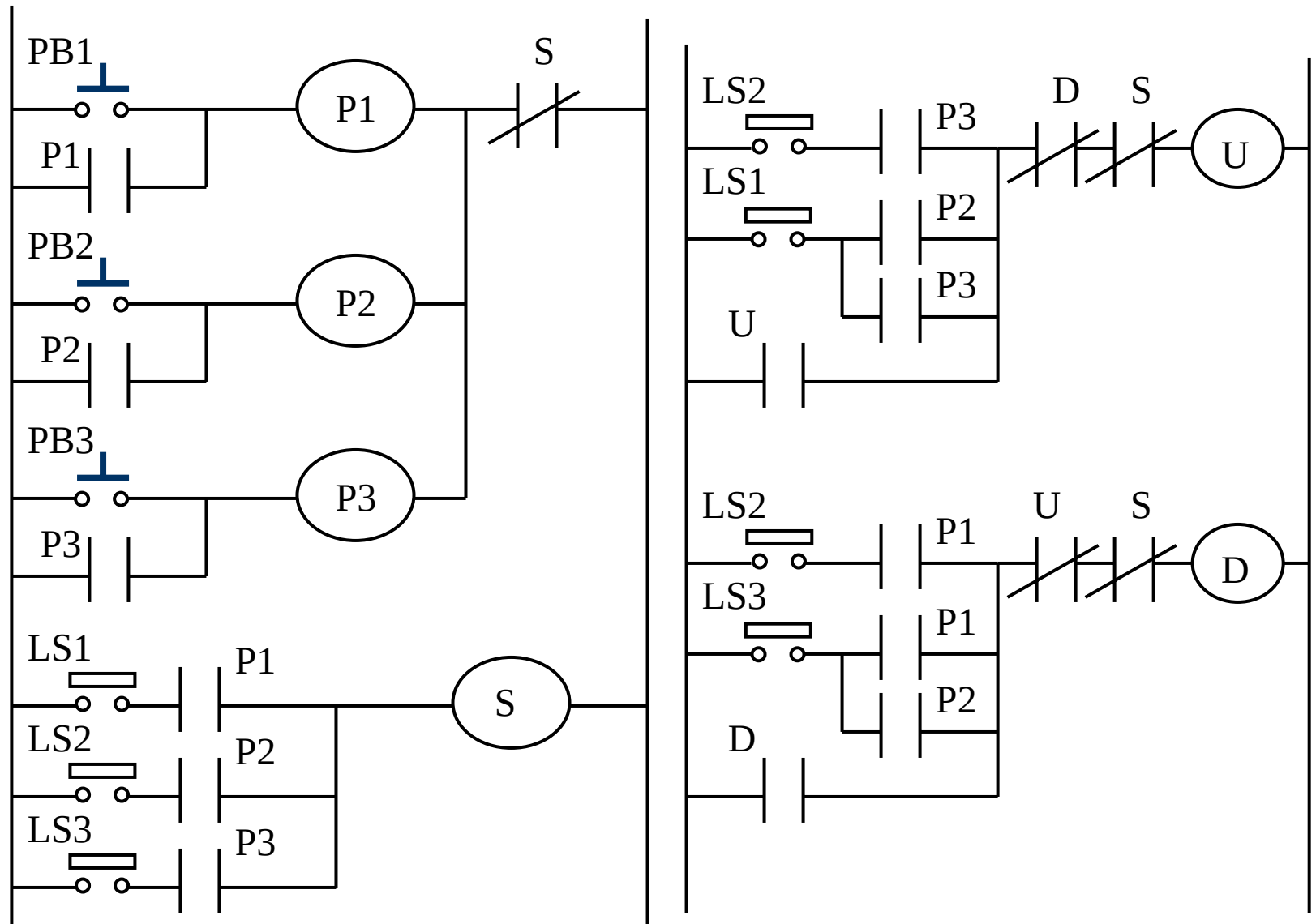


$$U = (U + XXX) \cdot \bar{S}$$

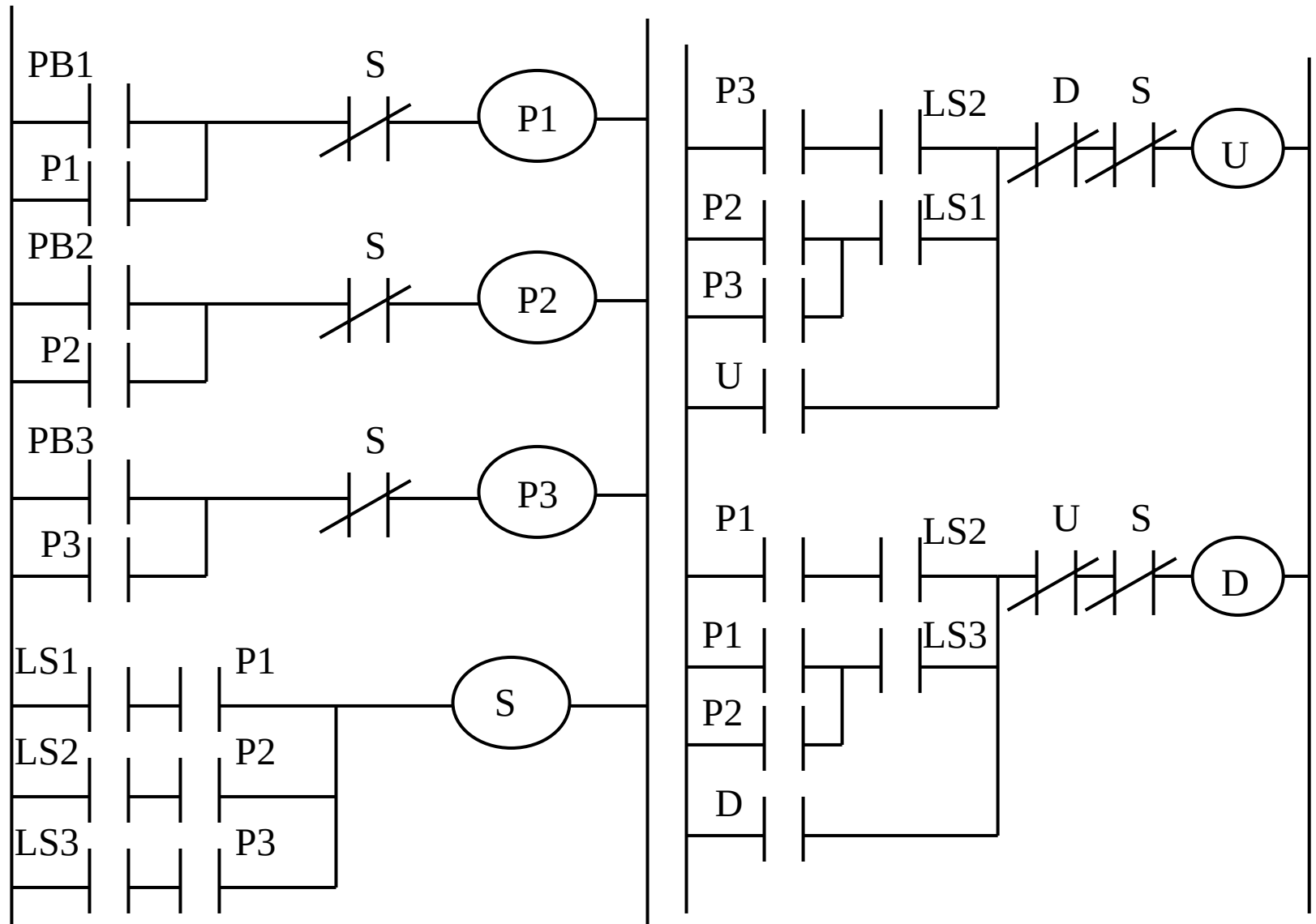
$$U = [U + L_1 \cdot (P_2 + P_3) + L_2 \cdot P_3] \cdot \bar{S} \cdot \bar{D}$$

$$D = [D + L_3 \cdot (P_1 + P_2) + L_2 \cdot P_1] \cdot \bar{S} \cdot \bar{U}$$

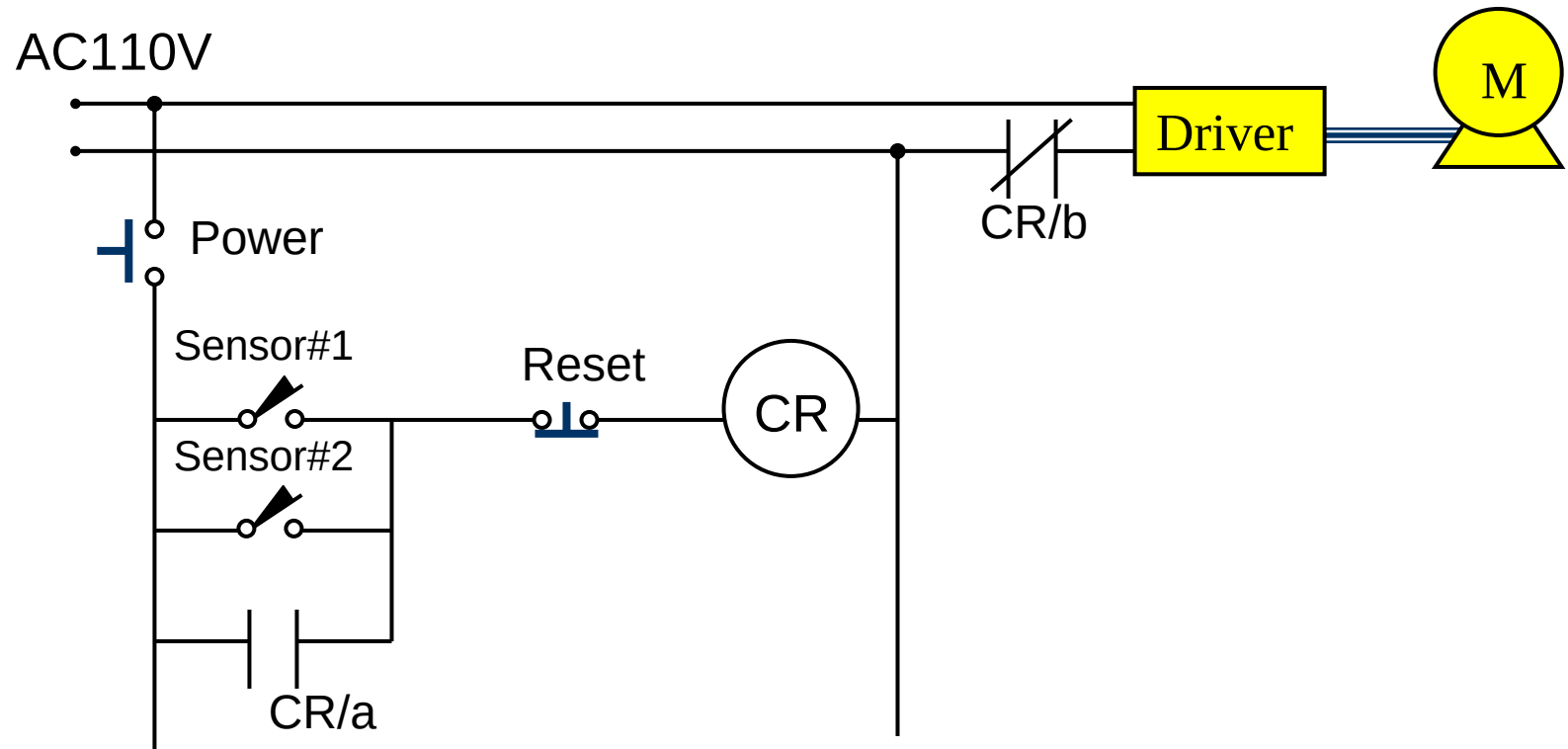
送貨電梯電驛控制電路



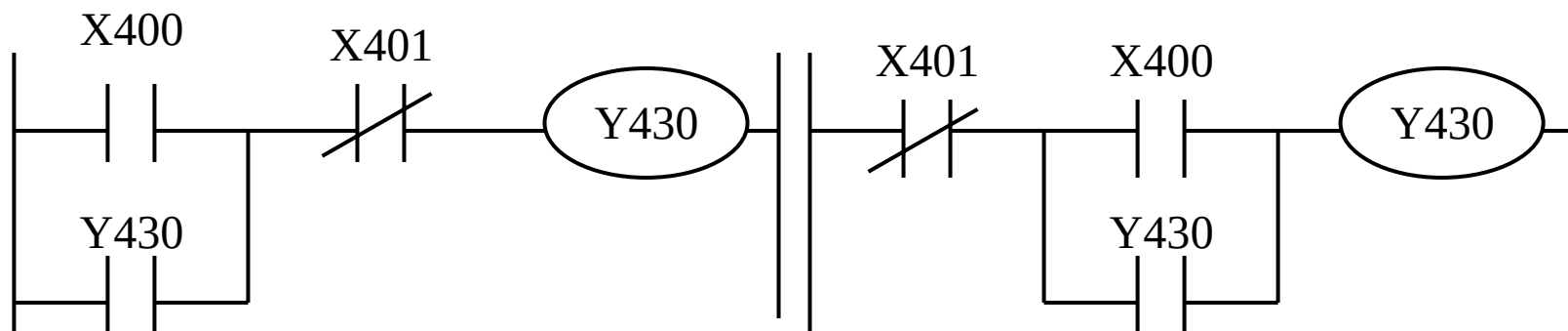
送貨電梯PLC控制迴路



傳統Relay保護電路



1. 復置優先自保



邏輯式表示

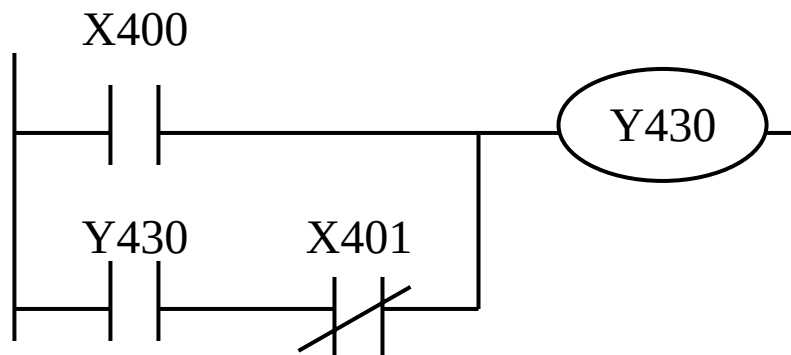
$$Y430 = (X400 + Y430) \cdot \overline{X401}$$

邏輯式表示

$$Y430 = \overline{X401} \cdot (X400 + Y430)$$

當X400及X401均為ON時，Y430為OFF。
故稱之「復置優先自保」。

2.動作優先自保

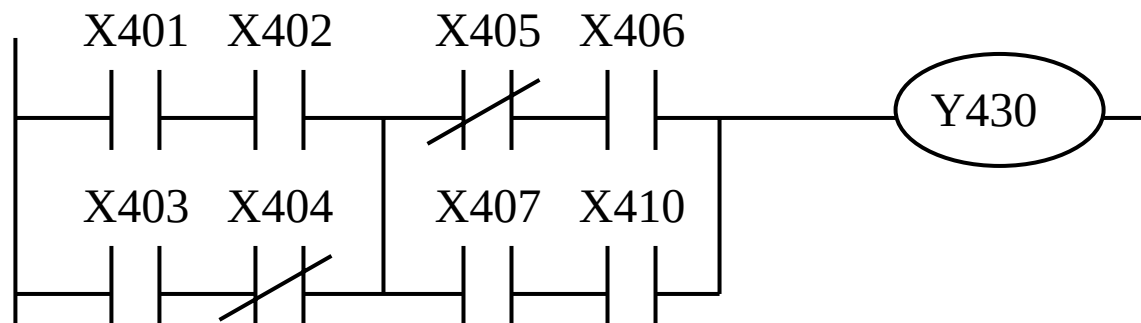


邏輯式表示

$$Y430 = X400 + (Y430 \cdot \overline{X401})$$

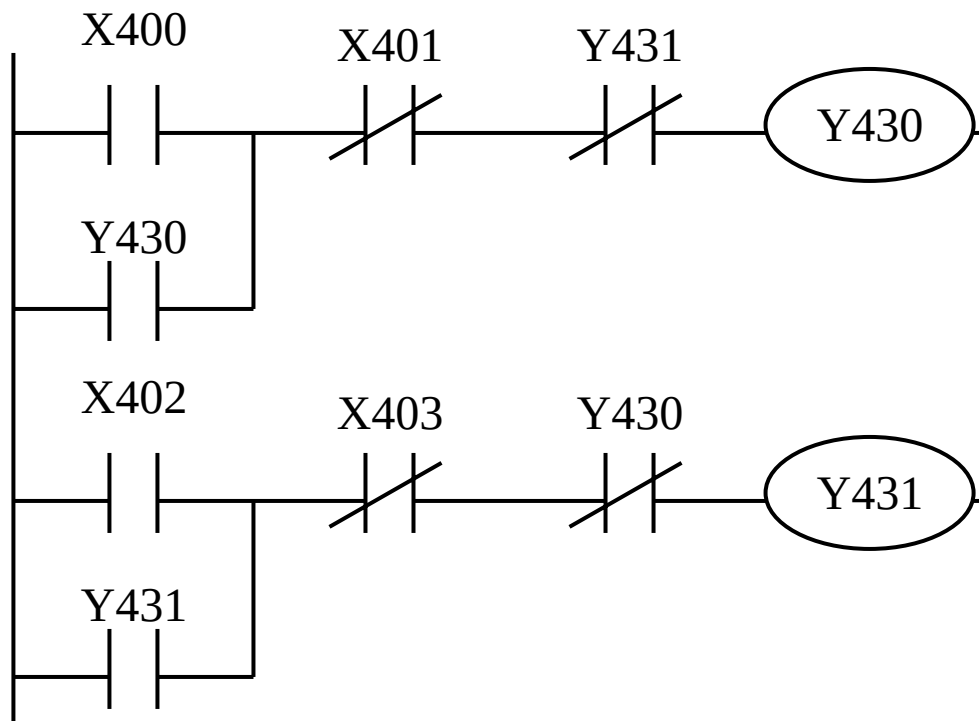
當X400及X401均為ON時，Y430為ON。
故稱之「動作優先自保」。

3. 兩個並連迴路串聯



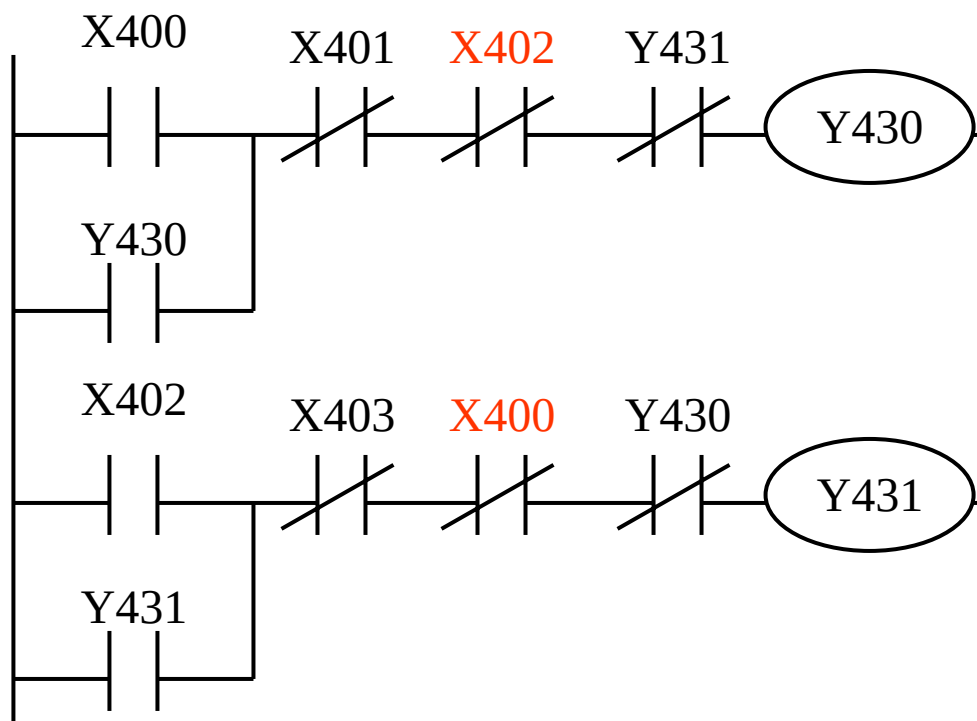
$$Y430 = [(X401 \cdot X402) + (X403 \cdot \overline{X404})] \cdot [(\overline{X405} \cdot X406) + (X407 \cdot X410)]$$

4.電氣連鎖迴路

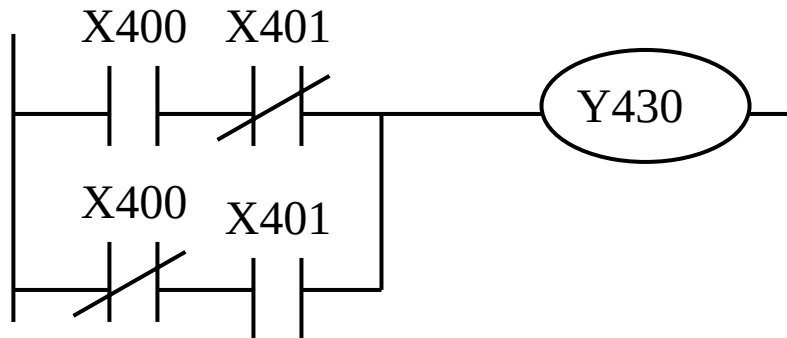


應用：兩輸出禁止同時動作之迴路上。
如馬達正反轉、兩隊按鈴搶答等

5.機械與電氣連鎖迴路



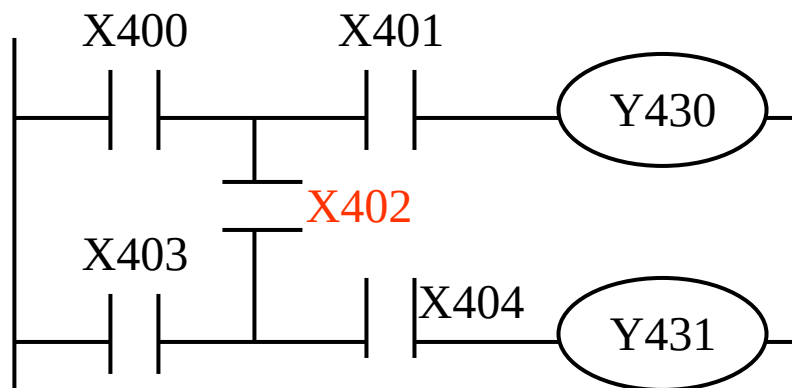
6.互斥迴路



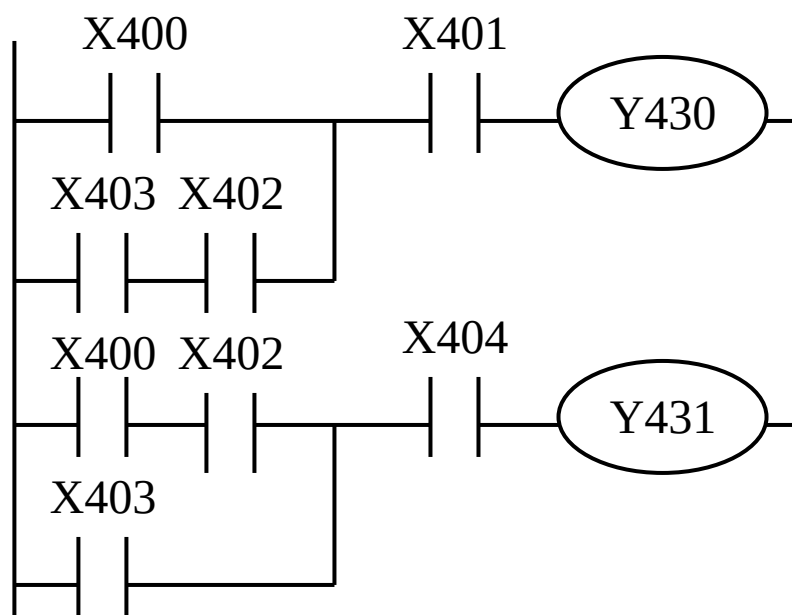
預防兩輸入信號同時為ON時而輸出的場合。

X400	X401	Y430
0	0	0
1	0	1
0	1	1
1	1	0

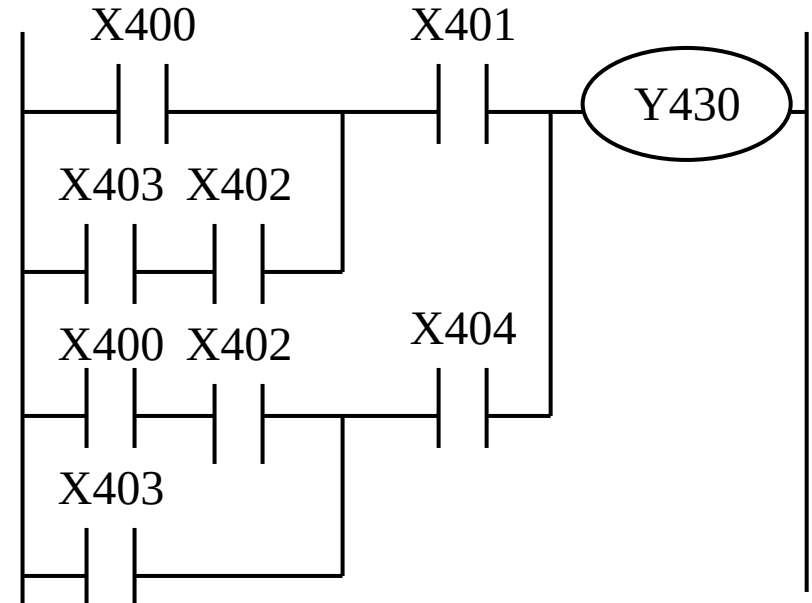
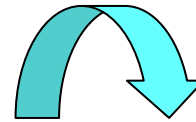
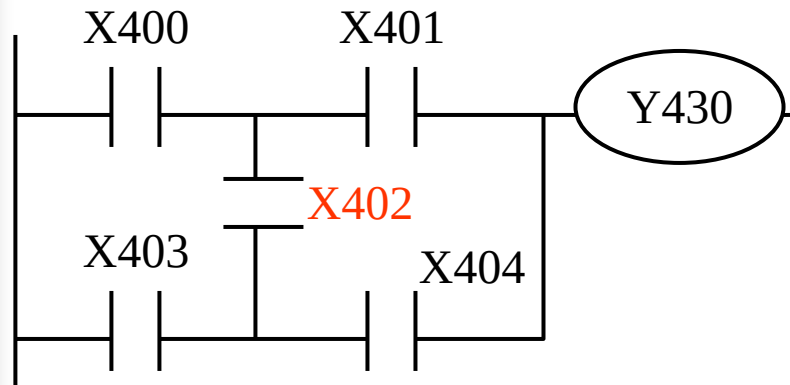
7.排除雙向迴路



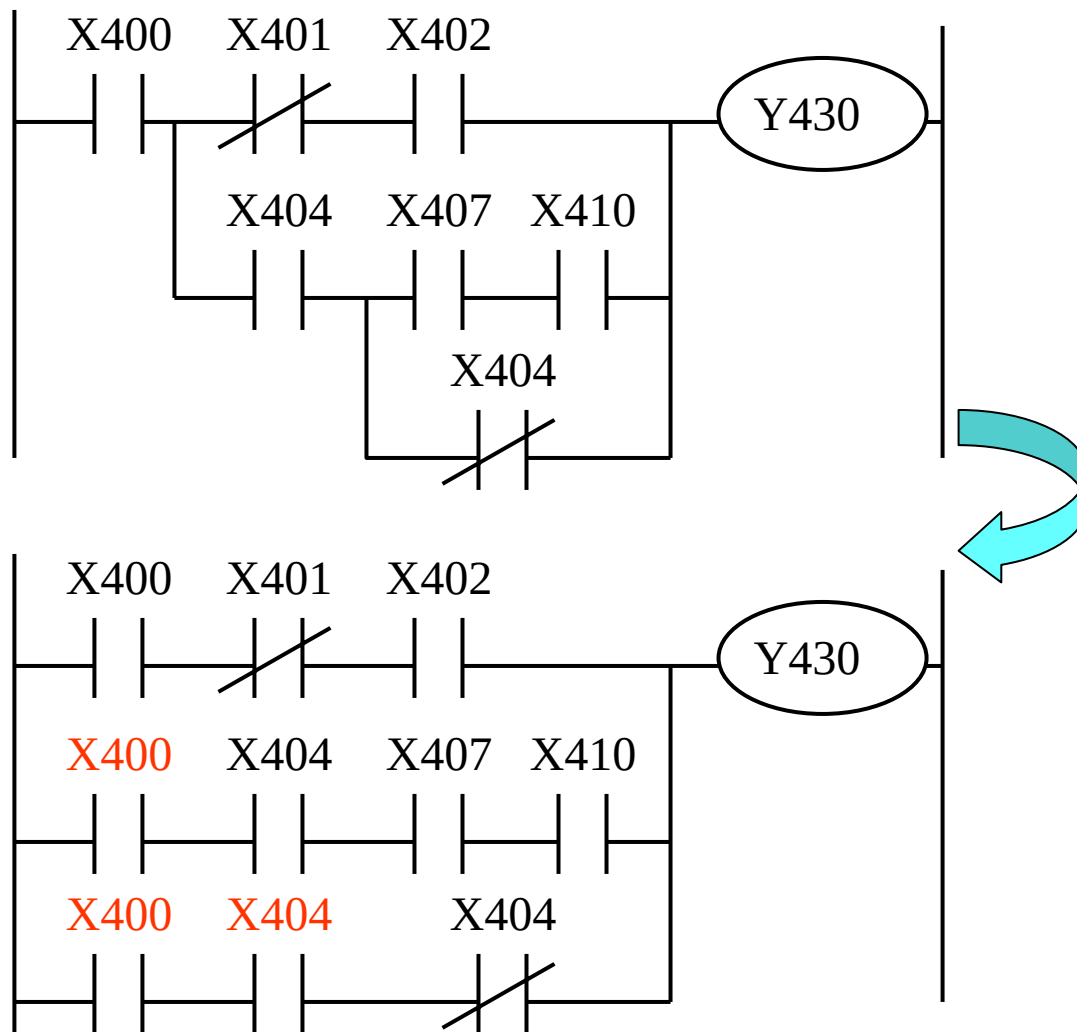
- X402為雙向
- PLC無法執行



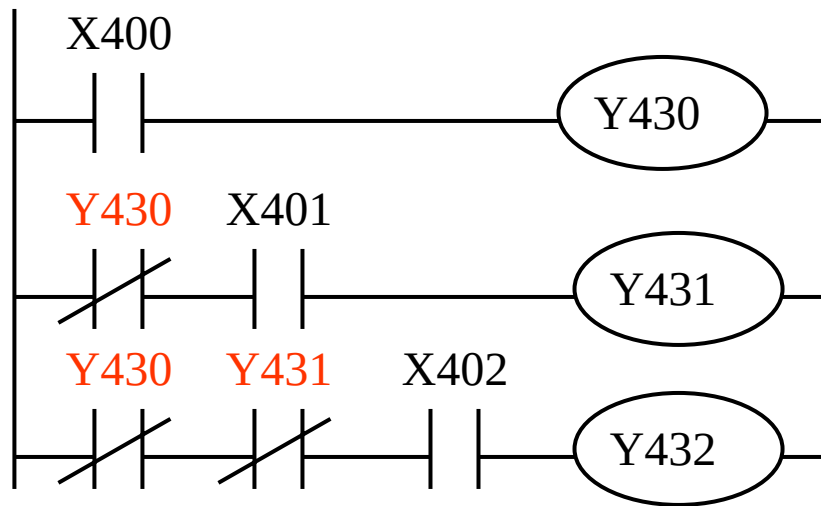
8. 橋式迴路



9.等值迴路

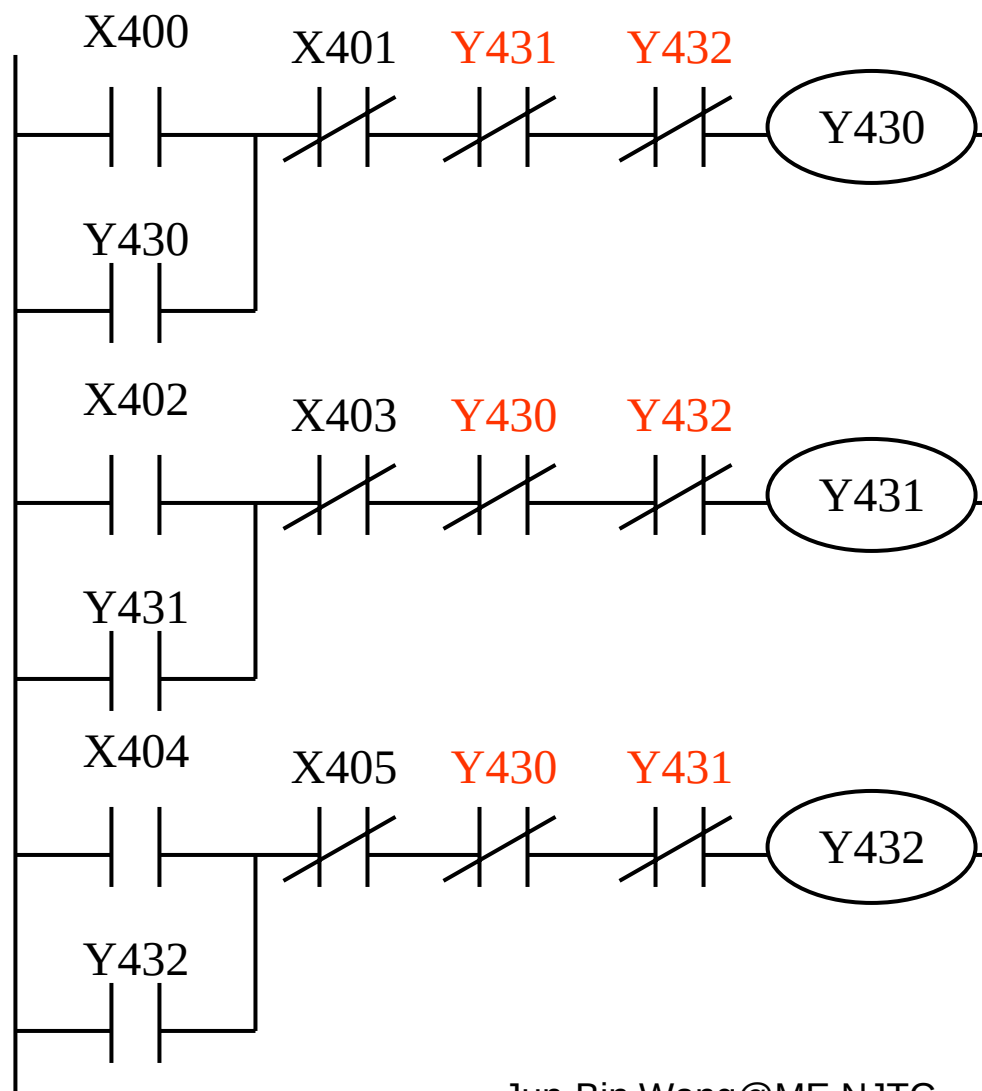


10.前端優先動作迴路

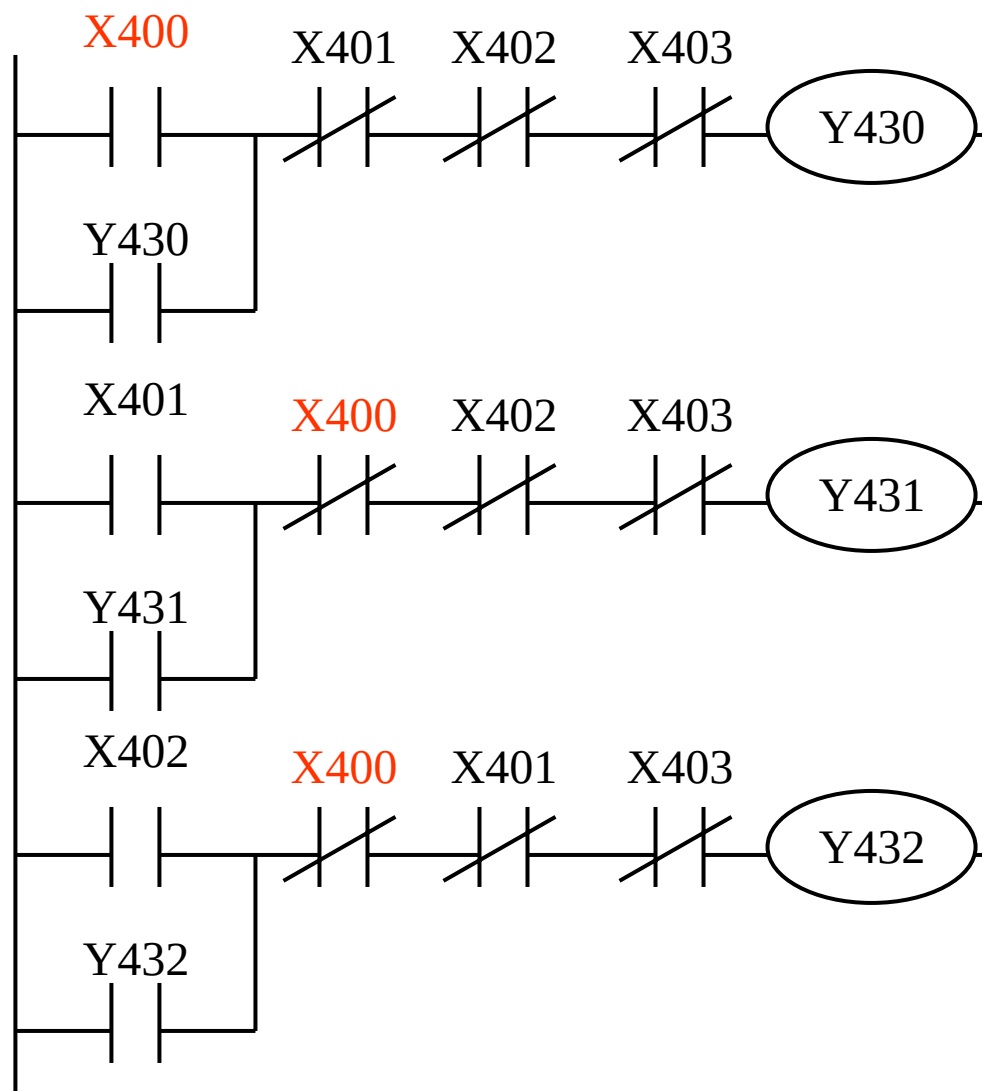


三個按鈕X400、X401、X402中，以X400的優先順序最高，X401次之。

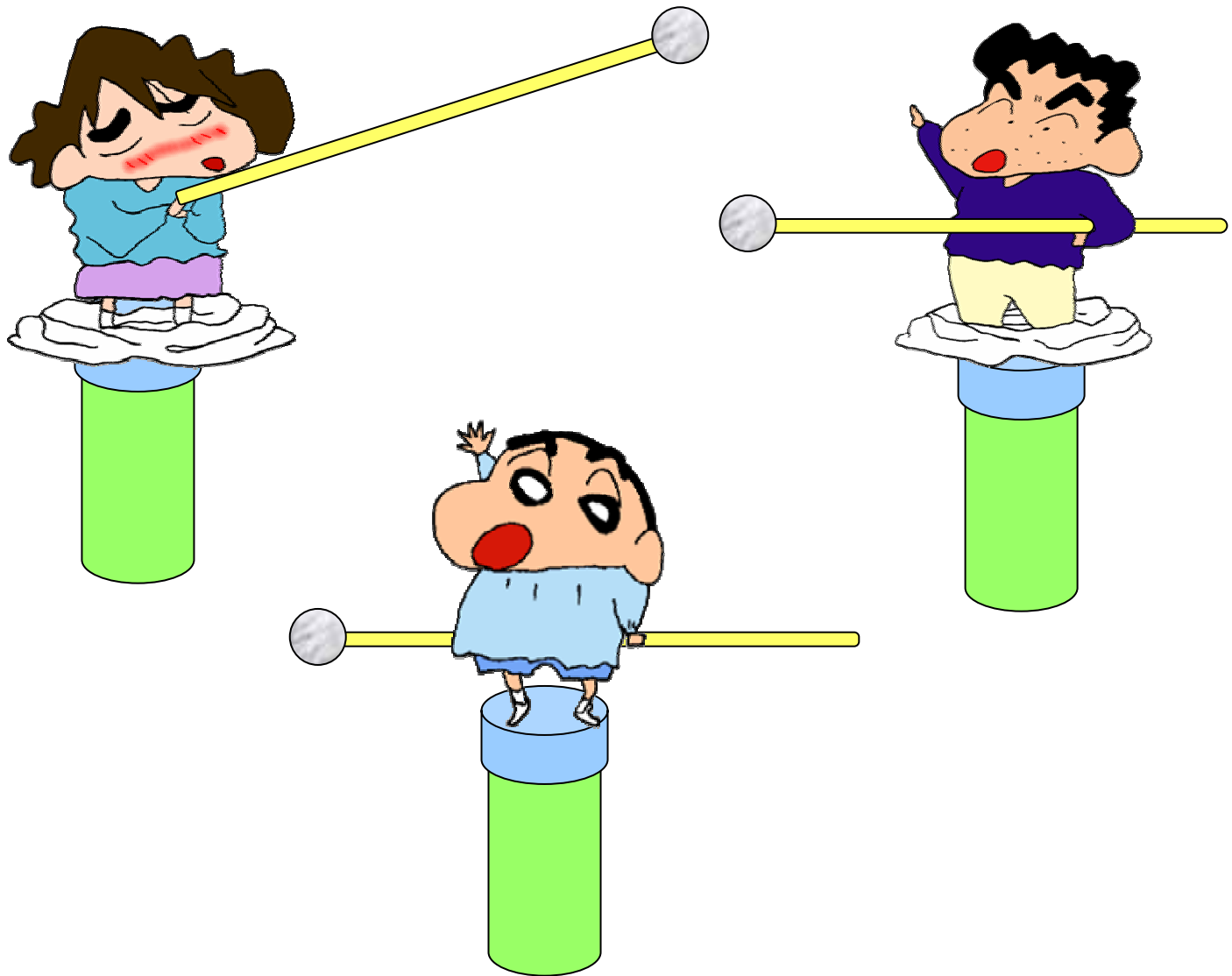
11.先通優先動作迴路(同4.及5.)



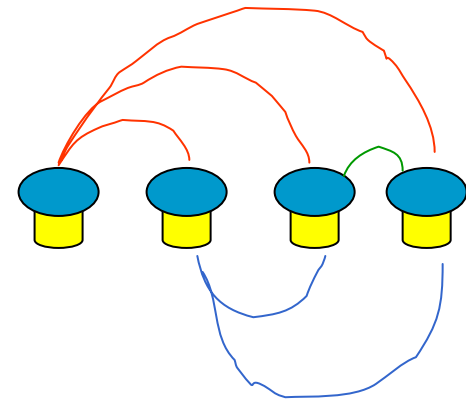
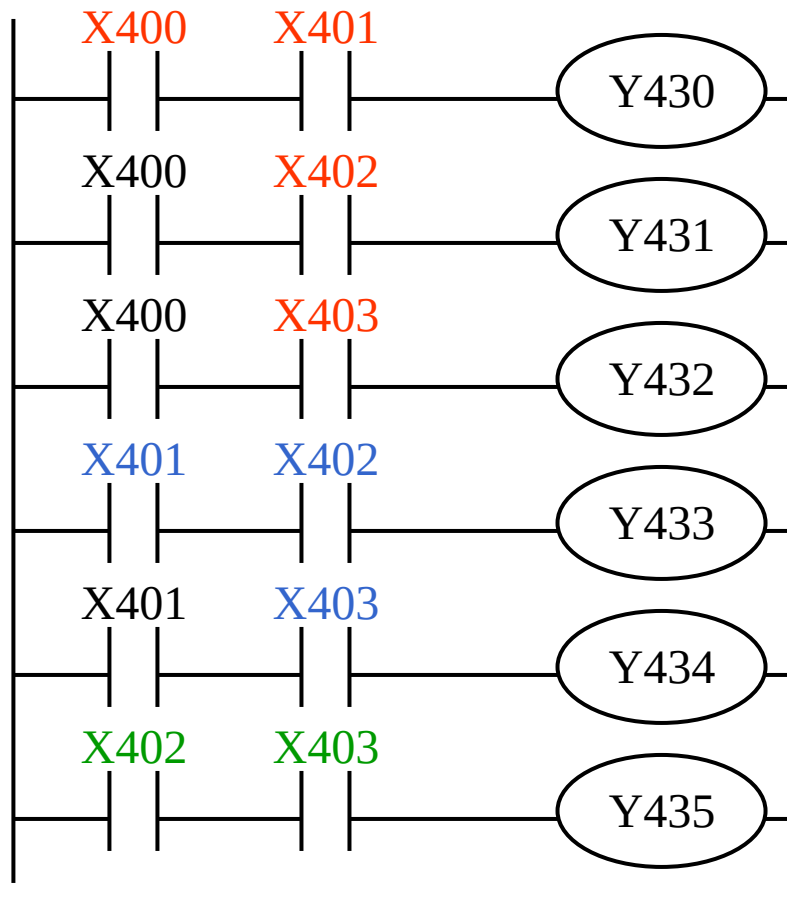
12.後通優先動作迴路



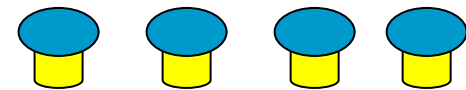
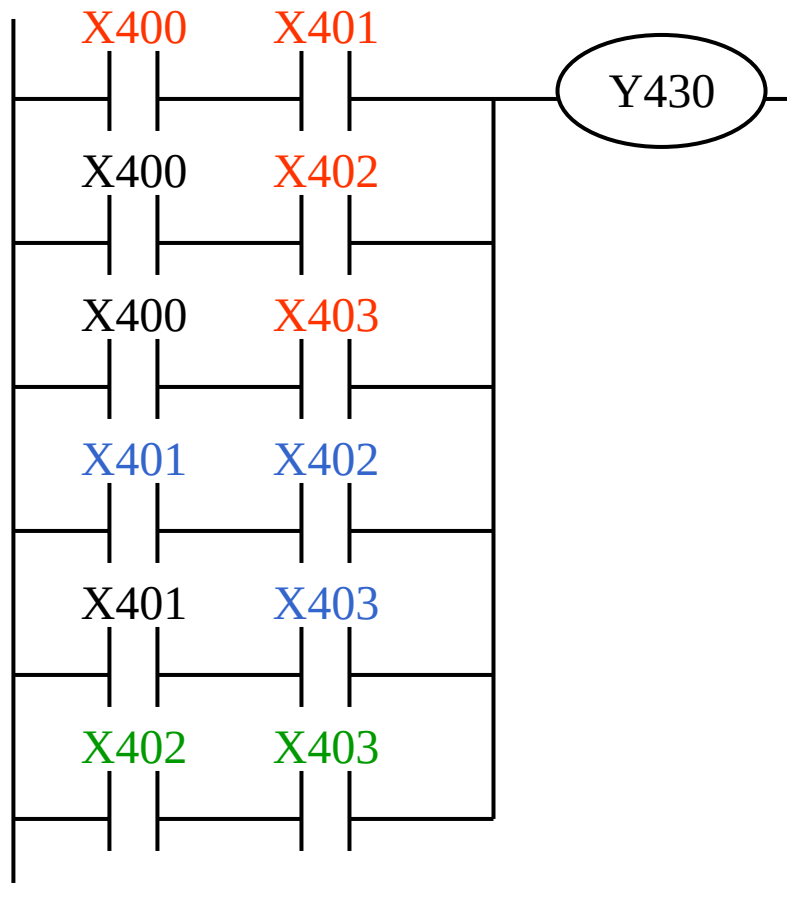
- 按,放→最後放的動作。
- 一直接按→皆OFF



13. 少量接點控制大量輸出迴路

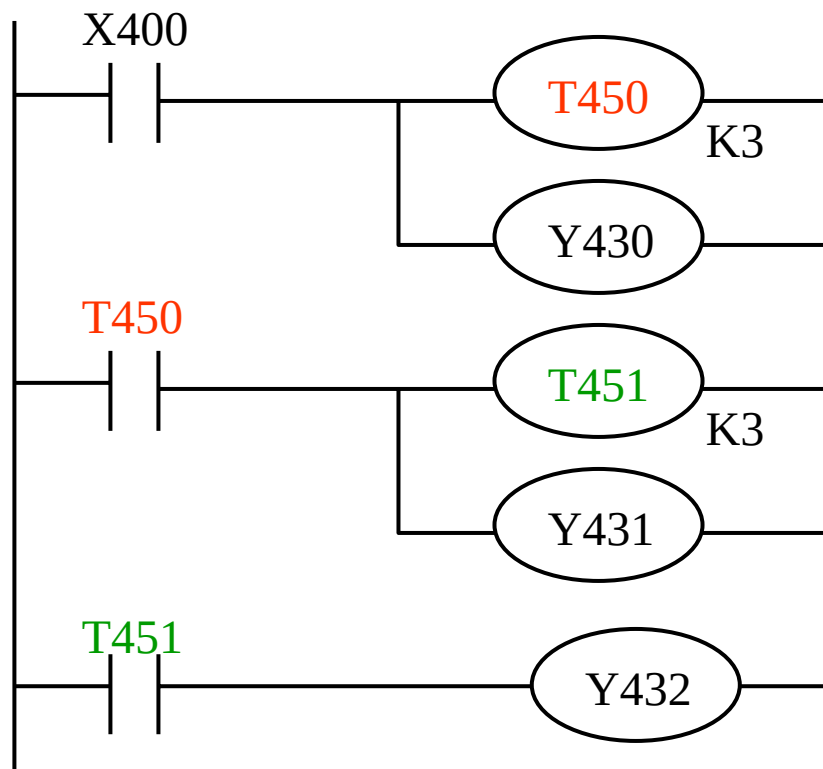


14. 多接點有兩個以上接通才動作之迴路



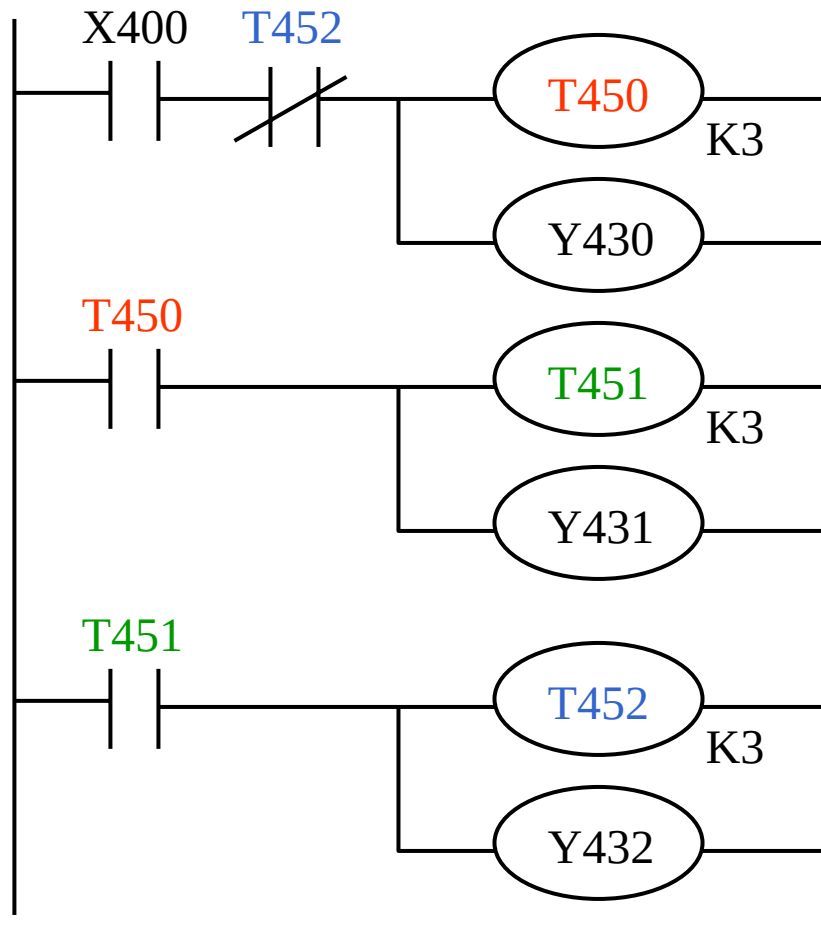
任按兩個

15.依時間順序動作之迴路



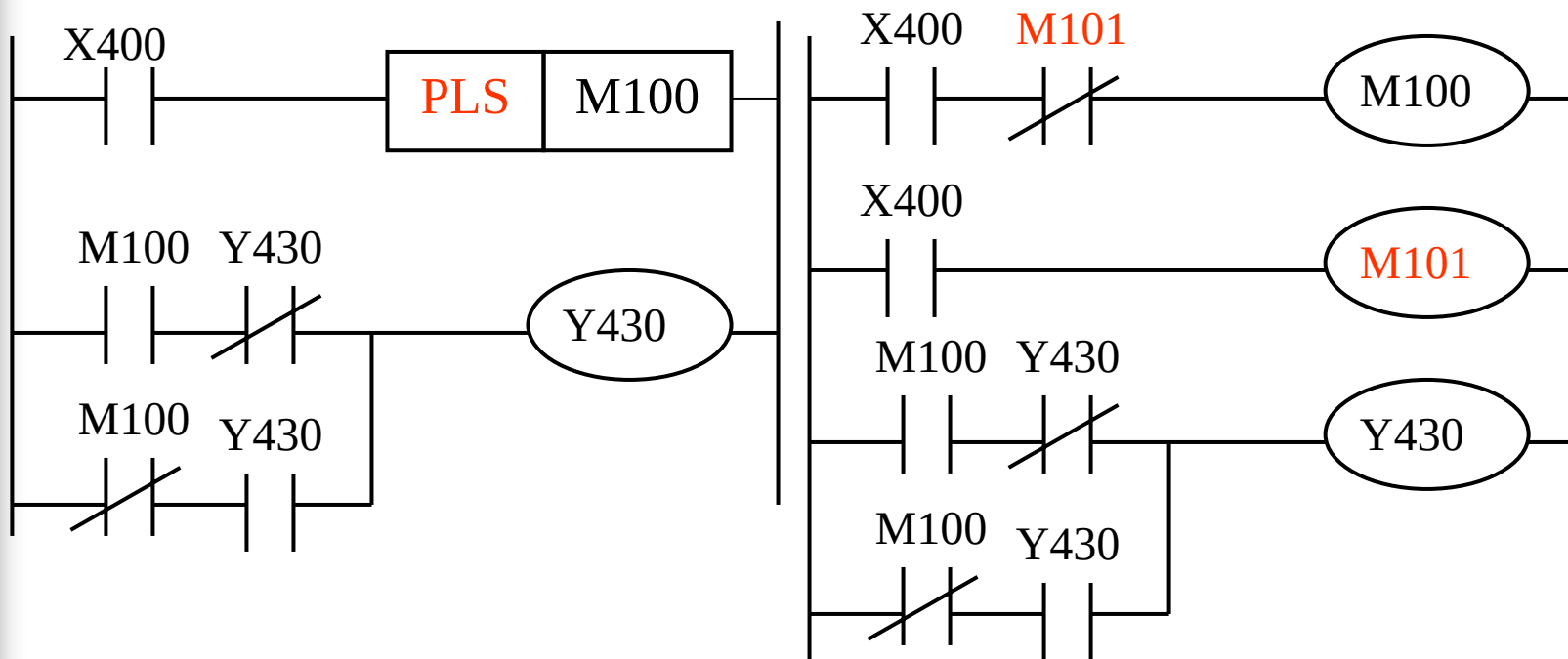
X400要一直ON !

16.依時間順序循環迴路



X400要一直ON !

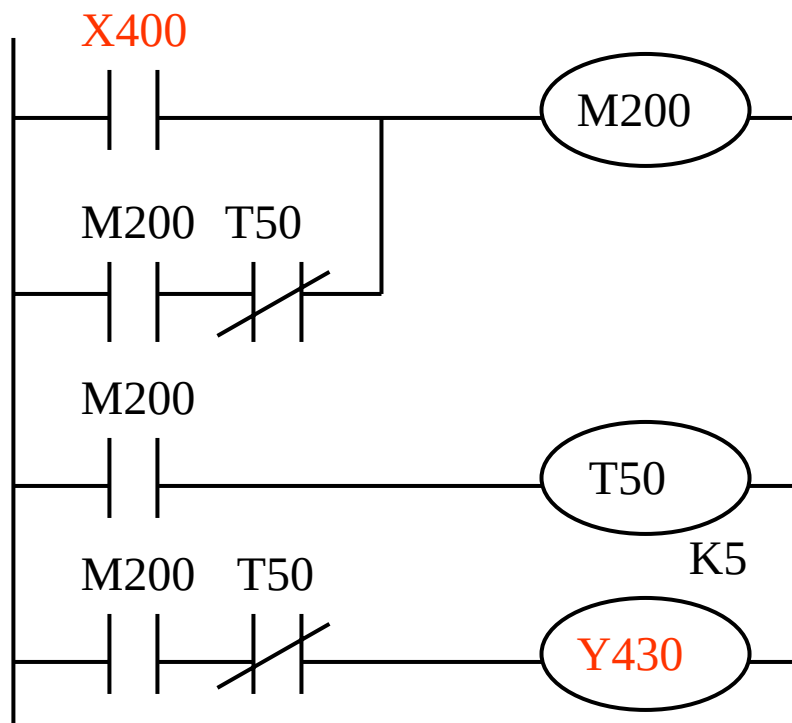
17. 交換迴路



- 按X400→Y430 On
- 再按X400→Y430 Off

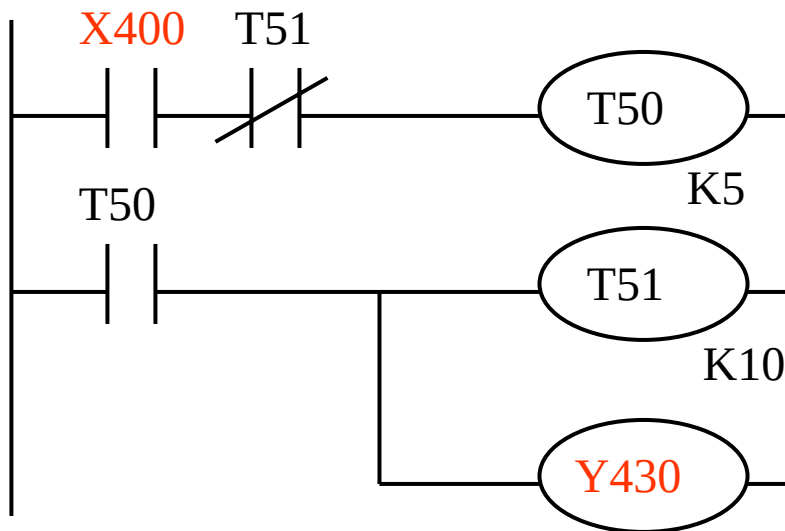
沒有PLC時

18.單擊迴路

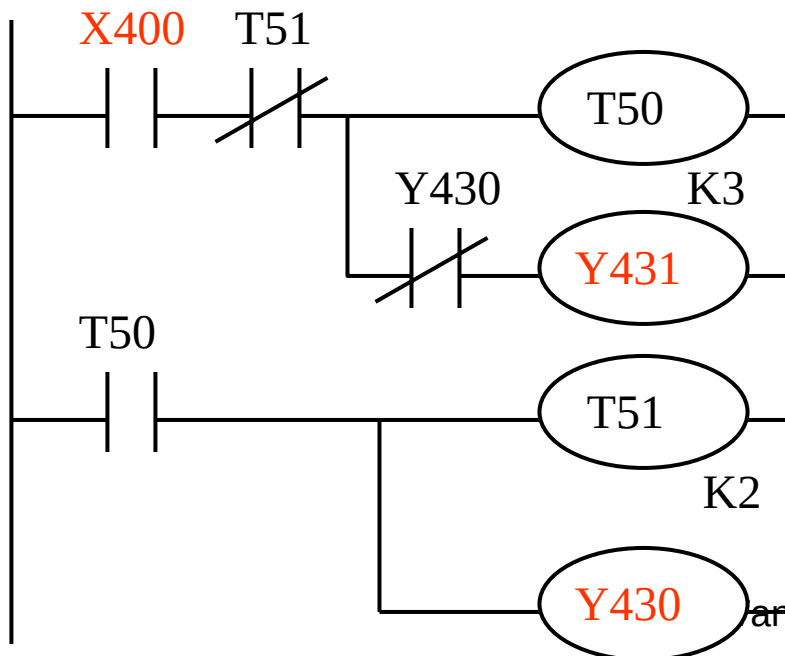


不論X400 On多久，Y430只ON 5秒。

19.閃爍迴路



X400 ON時，Y430會OFF 5秒，ON 10秒，依序循環。



X400 ON時，Y431會ON 3秒，Y430 ON 2秒，依序循環。

防盜系統

