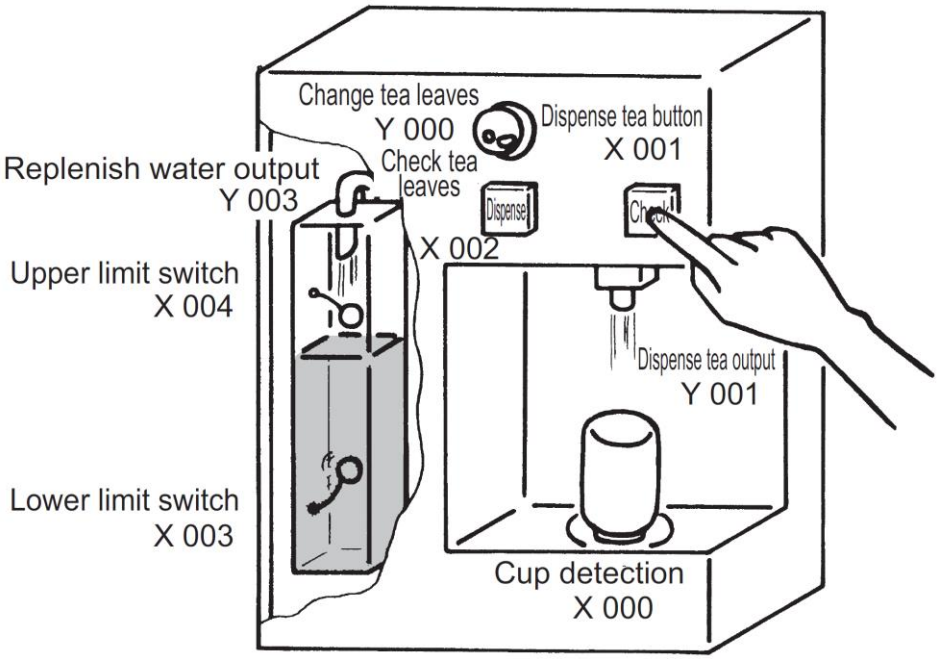
Trường Đại Học Bách Khoa
Khoa Cơ Khí
PTN Điều khiển & Tự động hóa

# BÀI TẬP THÊM

**BÀI 1:**




Let's consider a PLC program for a tea dispenser

**I/O assignments**

| | | |
|---|---|---|
| **Input** | Cup detection | X000 (ON when cup is present) |
| | Dispense tea button | X001 |
| | Check tea leaves button | X002 |
| | Replenish water tank lower limit switch | X003 |
| | Replenish water tank upper limit switch | X004 |
| **Output** | Change tea leaves indicator lamp | Y000 |
| | Dispense tea output | Y001 |
| | Replenish water output | Y003 |

**Explanation of operation**

(1) When cup detection X000 is ON, and dispense tea button X001 is pressed (X001 turns ON), dispense tea output Y001 operates, and hot water is poure into the cup. Hot water is poured only for the duration that the button is pressed, and stops being poured when you release your hand from the button.
When cup detection X000 is OFF, hot water is not poured even by pressing dispense tea button X001.

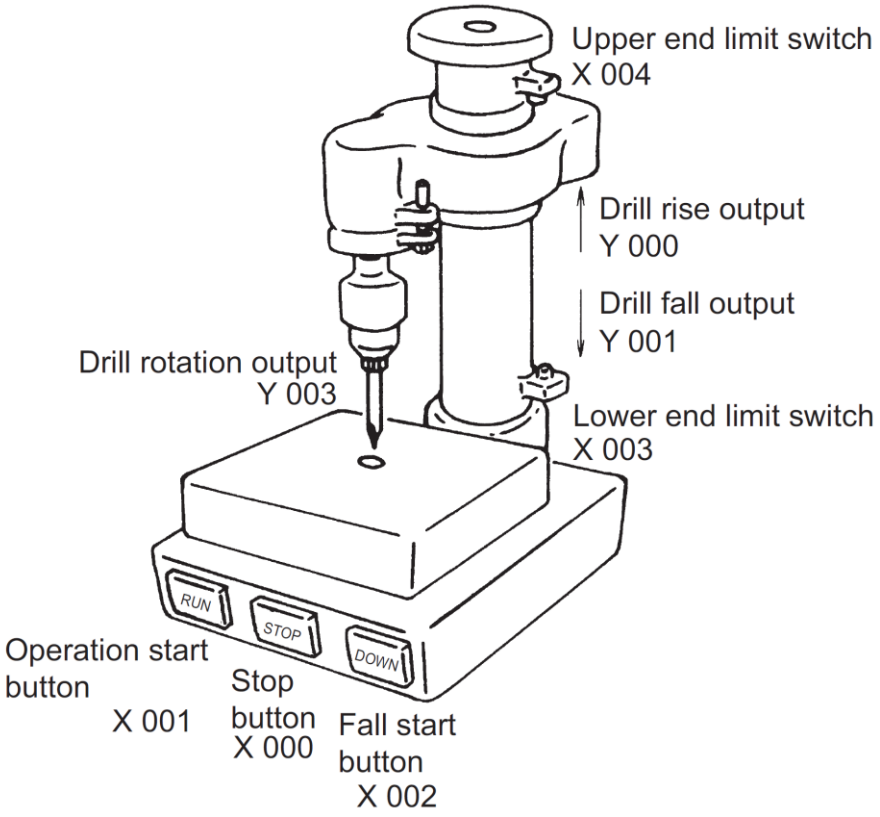
(2) When water in the replenish water tank gets low, lower limit switch X003 turns ON and replenish water output Y003 operates.

When replenish water output Y003 operates and water is poured into the tank, upper limit switch X004 finally turns ON, and replenish water output Y003 becomes non-operational.

(3) When water is replenished five times, the change tea leaves indicator lamp lights.

(4) When the check button is pressed, the change tea leaves indicator lamp goes out.

**BÀI 2:**




Let's consider a PLC program for drilling on a drilling machine.

**I/O assignments**

| | | |
|---|---|---|
| **Input** | Stop button | X000 |
| | Operation start button | X001 |
| | Fall start button | X002 (Consider this to be an auto-return type pushbutton.) |
| | Fall end limit switch | X003 |
| | Rise end limit switch | X004 |
| **Output** | Drill rise output | Y000 |
| | Drill fall output | Y001 |
| | Drill rotation output | Y003 |

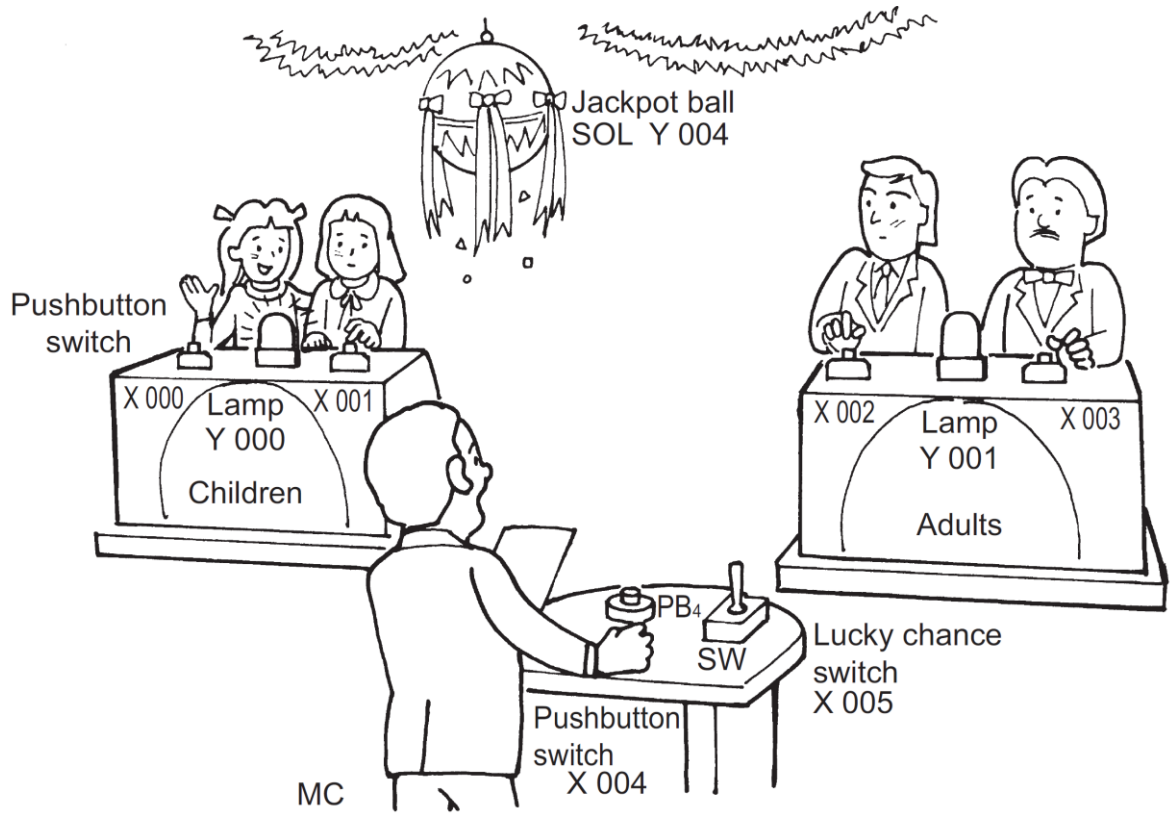
**Explanation of operation**

When operation start button X001 is pressed, drill rotation output Y003 operates and the drill starts to rotate.

When stop button X000 is pressed, drill rotation output Y003 becomes nonoperational, and drill operation stops.

If fall start button X002 is pressed during drill rotation, drill fall output Y001 operates, and the drill starts to fall. When the drill finally reaches the position of the fall end limit switch, fall end limit switch X003 turns ON, and the drill fall operation stops.
Three seconds after the drill fall operation stops, drill rise output Y000 operates, and the drill rises.
The drill rise operation ends when rise end limit switch X004 turns ON after drill rise operation has begun.

**BÀI 3:**




Let's try considering a sequence program for a quiz program.

**I/O assignments**

| **Input** | | **Output** | |
|---|---|---|---|
| Children's buttons | X000 X001 | Children's lamp | Y000 |
| Adult's buttons | X002 X003 | Adult's lamp | Y001 |
| MC's button | X004 | Jackpot ball open button | Y004 |
| Lucky chance switch | X005 | | |

**Explanation of operation**

(1) Light the lamp that is the quickest to respond to the MC's question.
(2) The lamp lights until the MC presses pushbutton X004. Note, that the children's team has an advantage as lamp Y000 can be made to light whichever of pushbuttons X000 and X001 is pressed.
The adults' team have a disadvantage as lamp Y001 does not light unless both pushbuttons X002 and X003 are pressed.
(3) When the MC has turned lucky chance switch X005 ON, the children have a lucky chance to open the jackpot ball if they press the button within ten seconds.