

# Hydraulics & Pneumatics

## Chapter 4: Programmable Logic Controller (PLC for Repeated Sequence)

by

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# Lesson Outcome

- By the end of this lecture, student should be able to:
  - Design and analyze the pneumatics and hydraulics components with PLC to perform repeated sequence.

# Content

- Definition of Repeated Sequence
- Approach to Solve Repeated Sequence
- Example of Problem

# Repeated Sequence

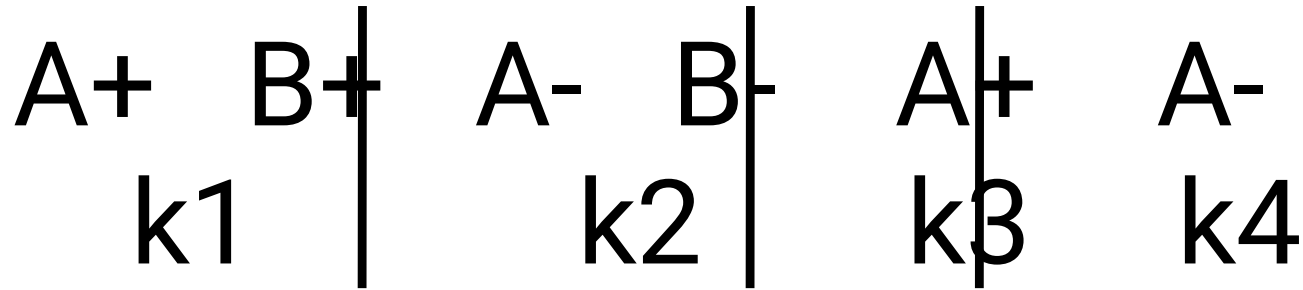
- Example: Design a hydraulic system with the following sequence using double solenoid valves.

A+ B+ A- B- A+ A-

# Solution

- Identify sequence
- Group – **one group** will have **one relay**
- Identify limit switch status
- Start operation with turn ON relay group 1
- Turn ON every subsequent relay group
- Turn OFF all relay group
- Finish by turn OFF last relay group

# Example



## Group 1

Start with turn ON  
k1

k1 → Start.a0


A  → k1  k3.b0

B  → k1.a1

## Group 2

Start with turn ON  
k2

k2 → b1.k1

A- → k2.b1  k4.  
a1

B- → k2.a0

# Group 3

Start with turn ON k3

k3 → k2.b0

A $\square$ : Was set in  
Group 1

# Group 4

Start with turn ON k4

k4 → k3.a1

A-: Was set in Group 2

Using the **last sensor**  
turn OFF k4 → k4.a0

# Summary

k1 → Start.a0

A<sub>≡</sub> → k1 <sub>≡</sub> k3.b0

B<sub>≡</sub> → k1.A1

k2 → b1.k1

A- → k2.b1 <sub>≡</sub> k4.

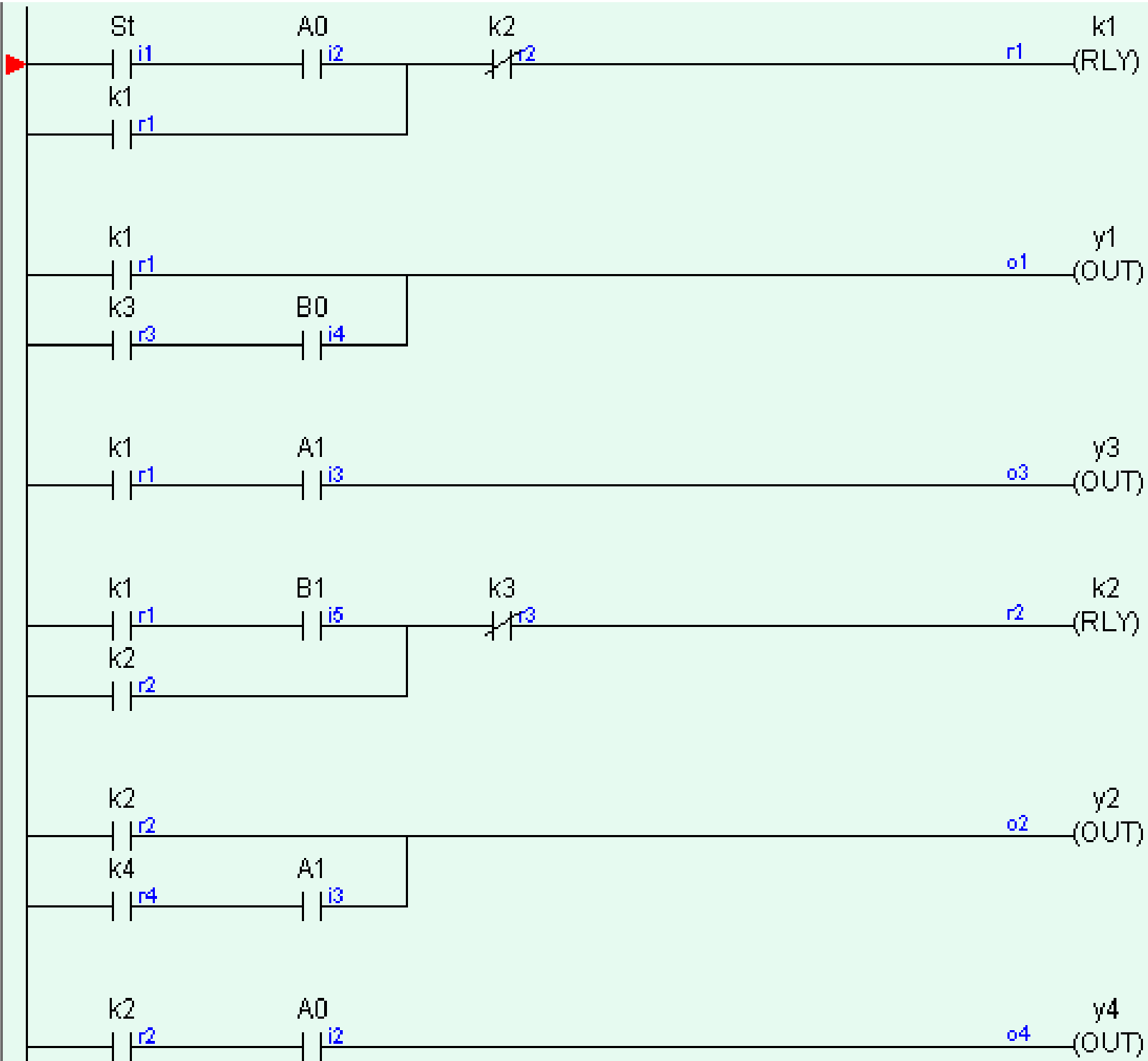
a1

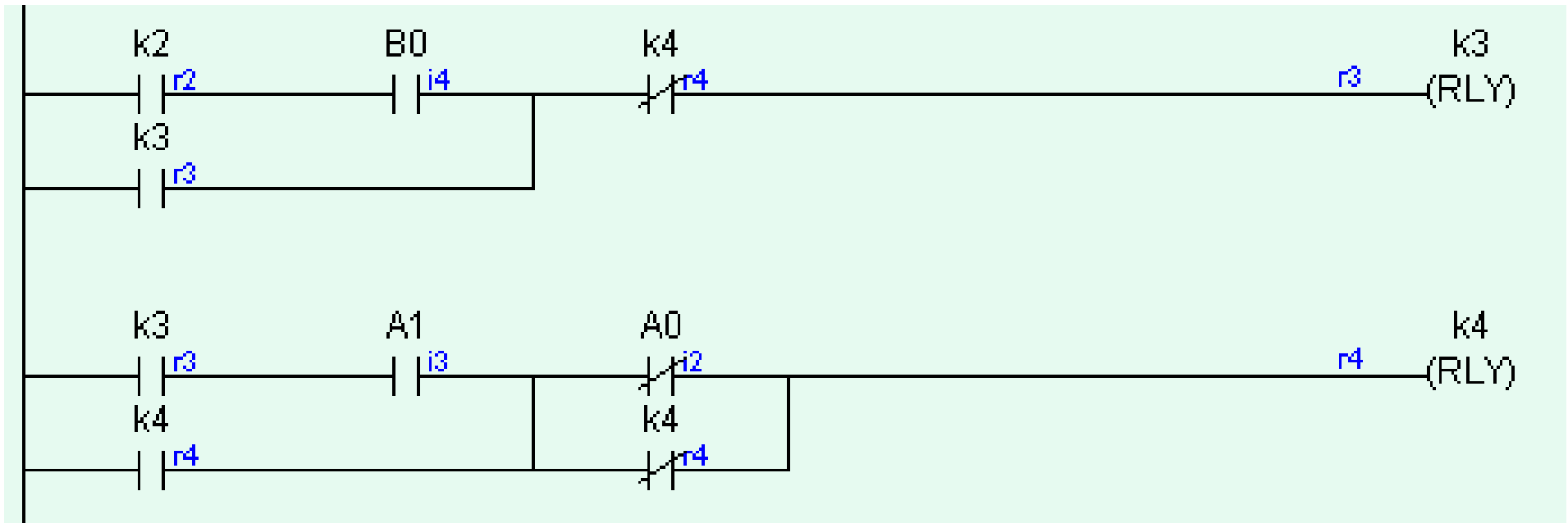
B- → k2.a0

k3 → k2.b0

k4 → k3.a1





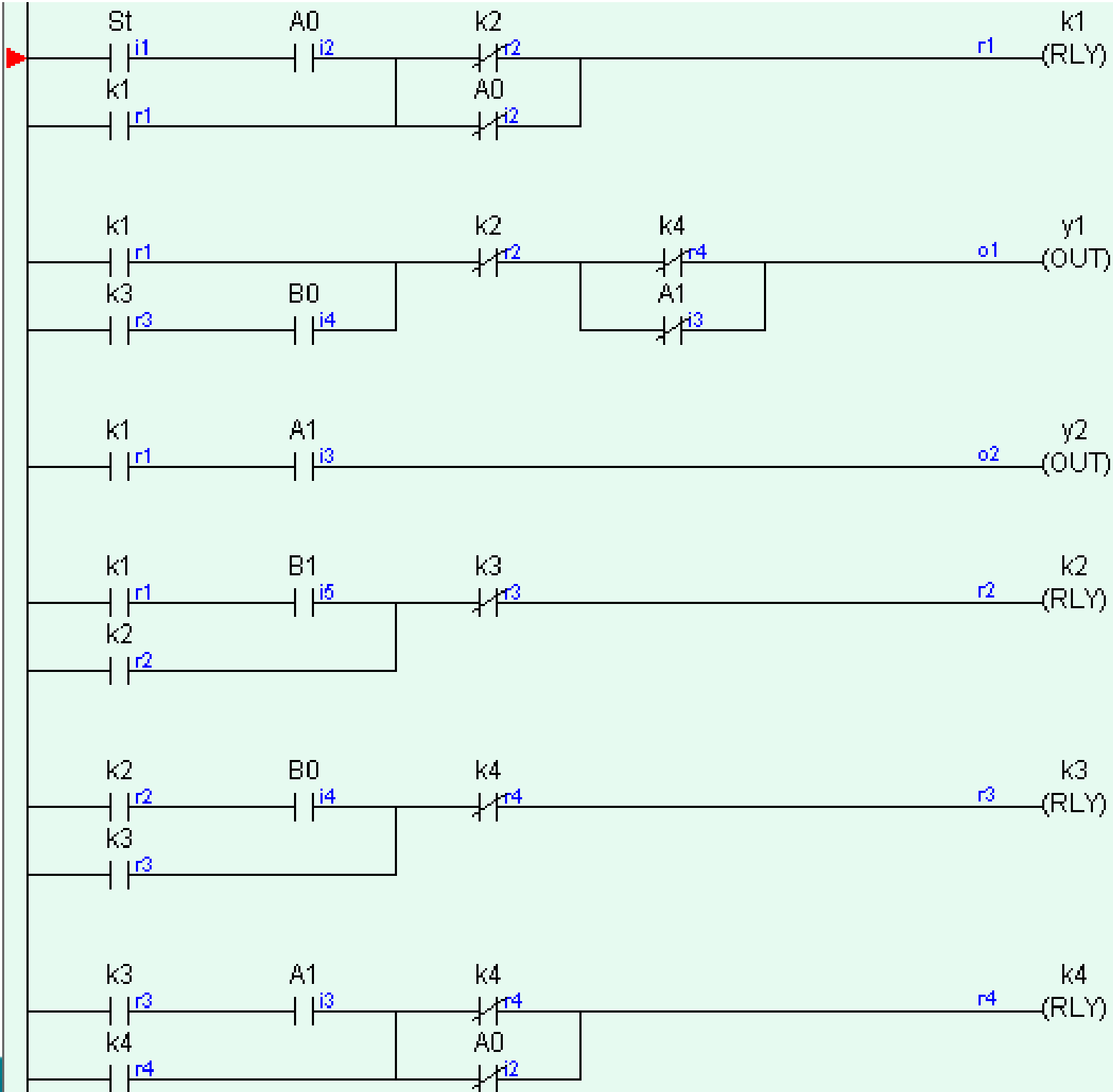


**Remember!**  
 Dots are **SERIES**  
 Pluses are **PARALLEL**

# Example

- Similar Example: Design a hydraulic system with the following sequence using SINGLE solenoid valves.

A+   B+   A-   B-   A+   A-



# Summary

- In this lesson, we have learn how to design PLC ladder diagram for repeated sequence.