



1. The system contains two conveyor belts. The conveyor carries balls and boxes. If the start button is pushed, box conveyor will begin to move. When the box triggers the sensor SE2, the box conveyor stops and the ball conveyor begins to move. The weight sensor WS measures the ball weights. If the ball weight is 500 g, the sensor WS is ON state. The ball conveyor carries two different sizes of the balls, 250 g and 500g. If weight of the first ball is 500 g, the box is filled with 3 balls. Otherwise the box filled with five balls with 250g. In the system, the sensor SE1 is used to count the balls. After the box is filled with the balls as specified above, the ball conveyor stops and box conveyor begins to move.

The system can be reset by a stop button any time. Construct the ladder program for this process using only:

- a. jump instruction
- b. subroutine instruction.

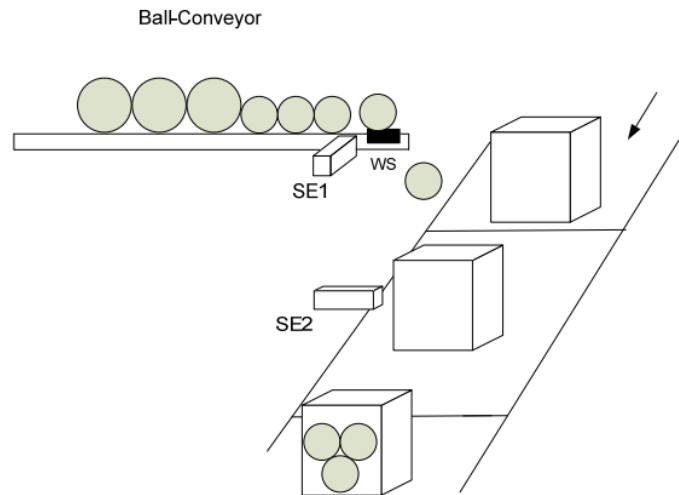


Figure 2: Two conveyors process

Input	Output
Start and stop buttons Sensors SE1, SE2 and WS	Ball conveyor motor Box conveyor motor

2. Write a program that uses the **FAL instruction** to copy 20 words of data from the integer data file, starting with N7:40, into the integer data file, starting with N7:80.
3. Write a program for the following: The temperature reading from a thermocouple is to be read and stored in a memory location every 4 minutes for 5 hours. The temperature reading is brought in continuously and stored in address N7:150. File #7:200 is to contain the data from the last full 5-hour period.