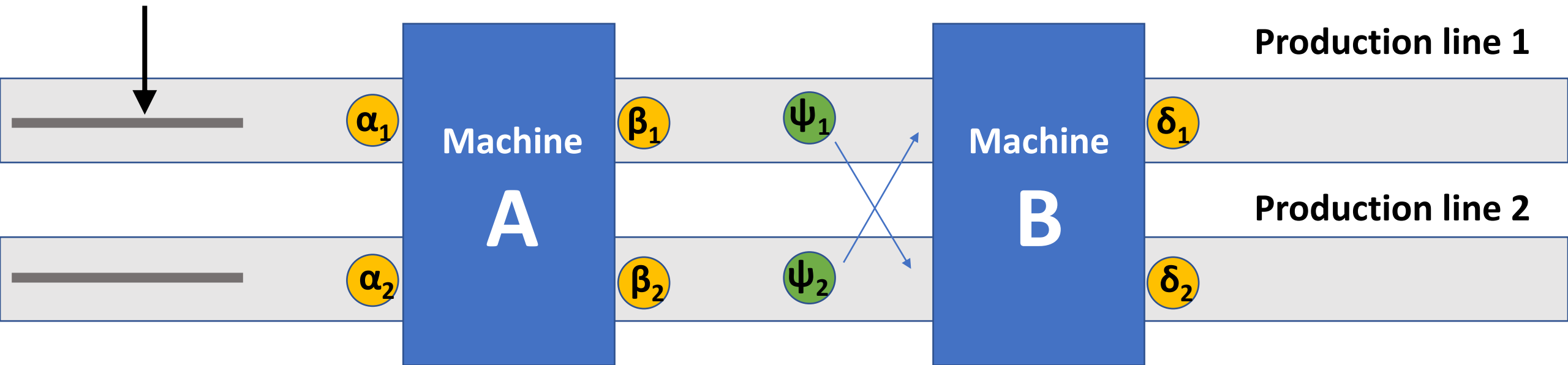


- Detector
- Diverter

Steel Product

Direction of Product Travel  
→

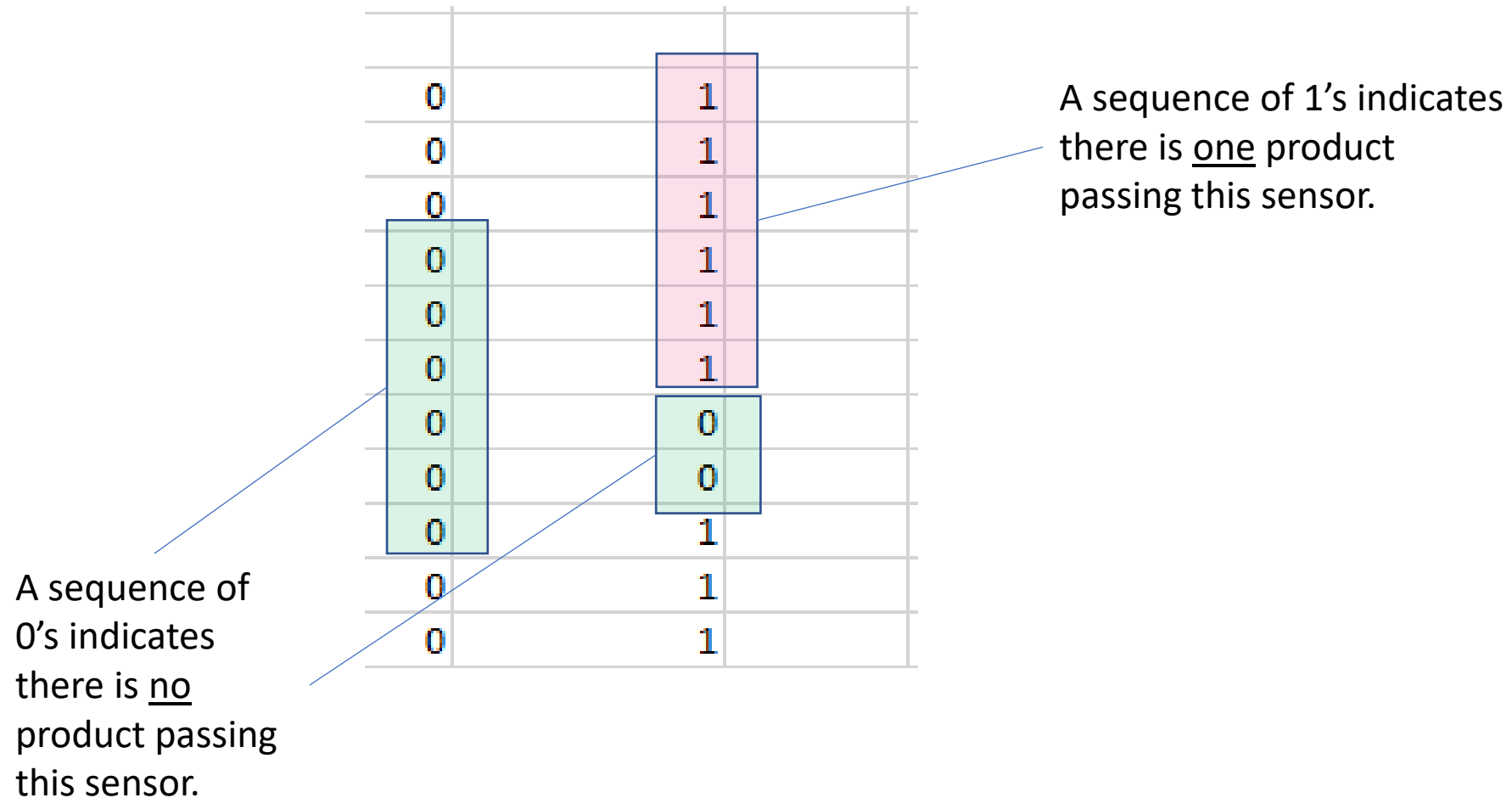


SCHEMATIC OF DUAL PRODUCTION LINE

# Explanation of ICONS in Schematic

- The Long grey rectangles are the production line conveyors on which the Steel products are transported.
- Machines have variables measured in RPM (rotations per minute), these can range from 0 – 1000's of RPM.
- Detectors indicate 1, when there is steel passing by the detector and 0 when there is no steel passing by the detector
- Diverters indicate 1, when they are not diverting steel and 0 when they are diverting steel.
- $\psi_1$  diverts steel from production line **1 to 2**
- $\psi_2$  diverts steel from production line **2 to 1**
- Products are long and move quickly across the production line, meaning that one product can be detected by consecutive detectors simultaneously.

# How to Read the Binary Signals



# Questions

1. How many products passed production line 1 from 02:00 to 14:00?
2. How many products passed both production lines over the entire time frame in the data set.
3. Product Diversion
  - a) How many products have been diverted in total? [Consider the fact that multiple products can be diverted when a single diverter is open.]
  - b) Tracing these diverted products through the product line, state the times they passed through Machine A and B and the RPMs they experienced.
4. Rows 11512 to rows 11545 on detector  $\delta 2$  indicates a product.
  - a) At what time range is this product at detector  $\beta 2$
  - b) At what time range is this product at detector  $\alpha 2$