Project 1: Conveyor Sorter System – Rev A

Objective:

The objective of this laboratory project is to create a PLC program to simulate a conveyor sorting system for a product being manufactured. Choose all required I/O devices as needed to meet the requirements below.

Tasks to be accomplished:

Design a conveyor sorting system with the following requirements:

1) A feeder subsystem is located at the left on the conveyor layout and the conveyor flows from left to right. There are 3 possible lines that the products can go down. Line A for size A, Line B for size B, and finally Line C for size C.
2) Depending on the size of the product, each of the products will flow down the conveyor to the appropriate sorting point and line.
3) Line A has a collection point capacity of 8 products, Line B is unlimited in capacity, and Line C has a collection point capacity of 6 products.
4) Indicate at the collection points for Line A and Line C, if there is room for more products or if the collection point is full.
5) Use some type of input device to actuate an imaginary solenoid to switch between lines and indicate any activation by the appropriate indicator light. *In the report, be sure to discuss how the system would know what product was coming from the feeder subsystem.*
6) Be sure to fill the feeder to its capacity of 12 products and indicate if the sorter has room for any additional products. Filling the feeder can only take place when the conveyor system is NOT running. Turn on the appropriate DC motor (Yellow light from the tower) for movement of product from the sorter subsystem into the conveyor.
7) If any of the lines reaches their capacity, indicate such at the collection point and also the light pole. Turn on the appropriate light that is located in the light pole when either collection point is full or the feeder is empty, and when the lines reach 12 for Line A, and 6 for Line C. When the system is running normally, illuminate the appropriate light. Be sure to be able to "reset" the light pole as needed.
8) Do not allow the feeder subsystem to be overfilled.
9) Have the capability to reset Line A & C after they have reached capacity.
10) Refill the feeder as many times as it takes to collect 36 of Product A, 24 of Product B, and 18 of Product C. (The TA will push three random PB's that will represent the three different sizes. It will be very random.)
11) Be sure that the system will Fail Safe and can be stopped as needed, quickly, from two different locations.
12) What happens if a line is full and another box for it is fed through the feeder??

Project Deliverables:

1) Submit a well-documented PLC program (report PDF).
2) Written report to include:
    a. Sketches showing the system and the location of the devices used.
    b. Block diagram of the flow and operation of the system.
    c. Description of I/O devices used (Why and How)
    d. From Requirement 5, discuss what you would use for the system to understand which product came out of the feeder subsystem. State ALL assumptions.
    e. Challenges faced and how they were resolved.

     f.   Project summary and what was learned.

Timeline

- **Thursday – October 21, 2021**   Online electronic pdf report document to the **Proj 1 Report** drop box and the project program file, .acd file, to **Proj 1 Program** drop box. <u>Make sure your last name is in the submitted file names.</u>
- **Hard copies of your project are NOT required.**

Grading Structure

    60% Program functionality per requirements.
    40% Project Proposal Report
  100% Total