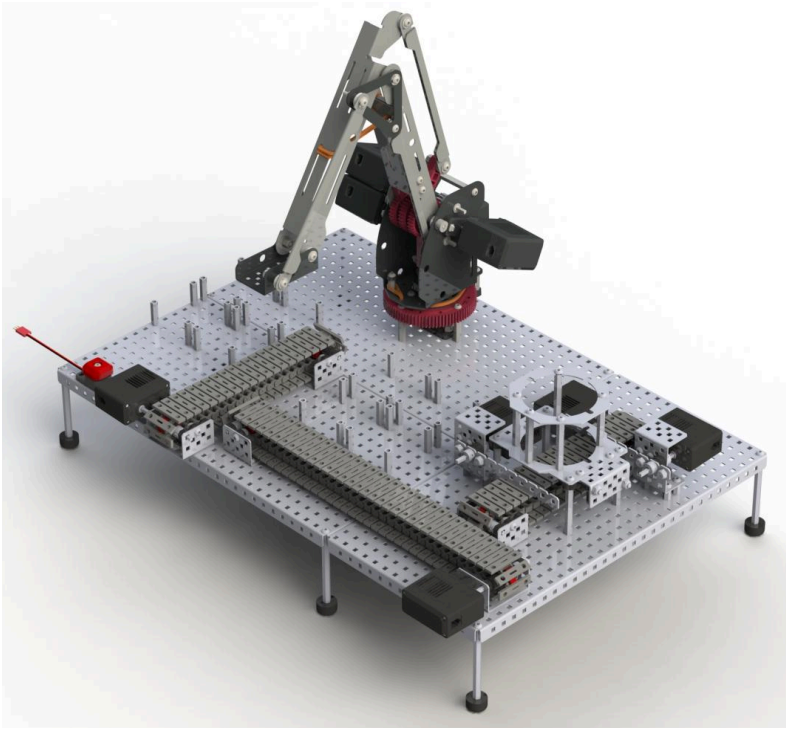
VEX V5 Workcell Extension



Reject Entry

Use two gates with one disk feeder.

Background

In all the V5 Workcell STEM Labs and Workcell Extensions, the conveyor below the disk feeder only turns one direction. However, in this Workcell Extension, you will build two gates to place on both sides of the disk feeder. Depending on the color of the disk, the conveyor will turn a certain direction. With this, the Workcell will reject red disks and only place green and blue disks into their loading zones.

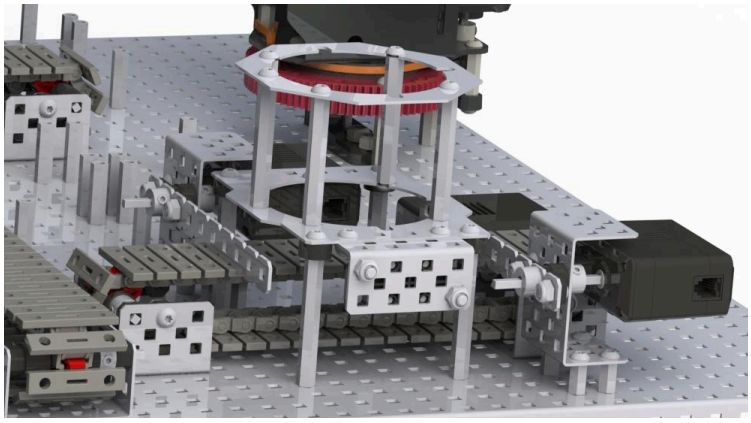
This Workcell Extension will challenge you to coordinate two gates with one disk feeder as well as changing the direction of the conveyor. Ensure that you have completed all 12 V5 Workcell STEM Labs before beginning this Workcell Extension. Follow the construction steps below before you begin the Challenges.

Constructing your Workcell

1. Begin with the build from Lab 2 add one more base plate to match the image above.
    - To build the conveyors, follow steps 10-13 and 16-19 from Lab 9.
    - The arm should be able to pick up disks from the conveyor closest to it.
    - Note in the image above that the placement of the Bumper Switch differs from Lab 2. Relocation of the Bumper Switch will allow space for the additional conveyors.

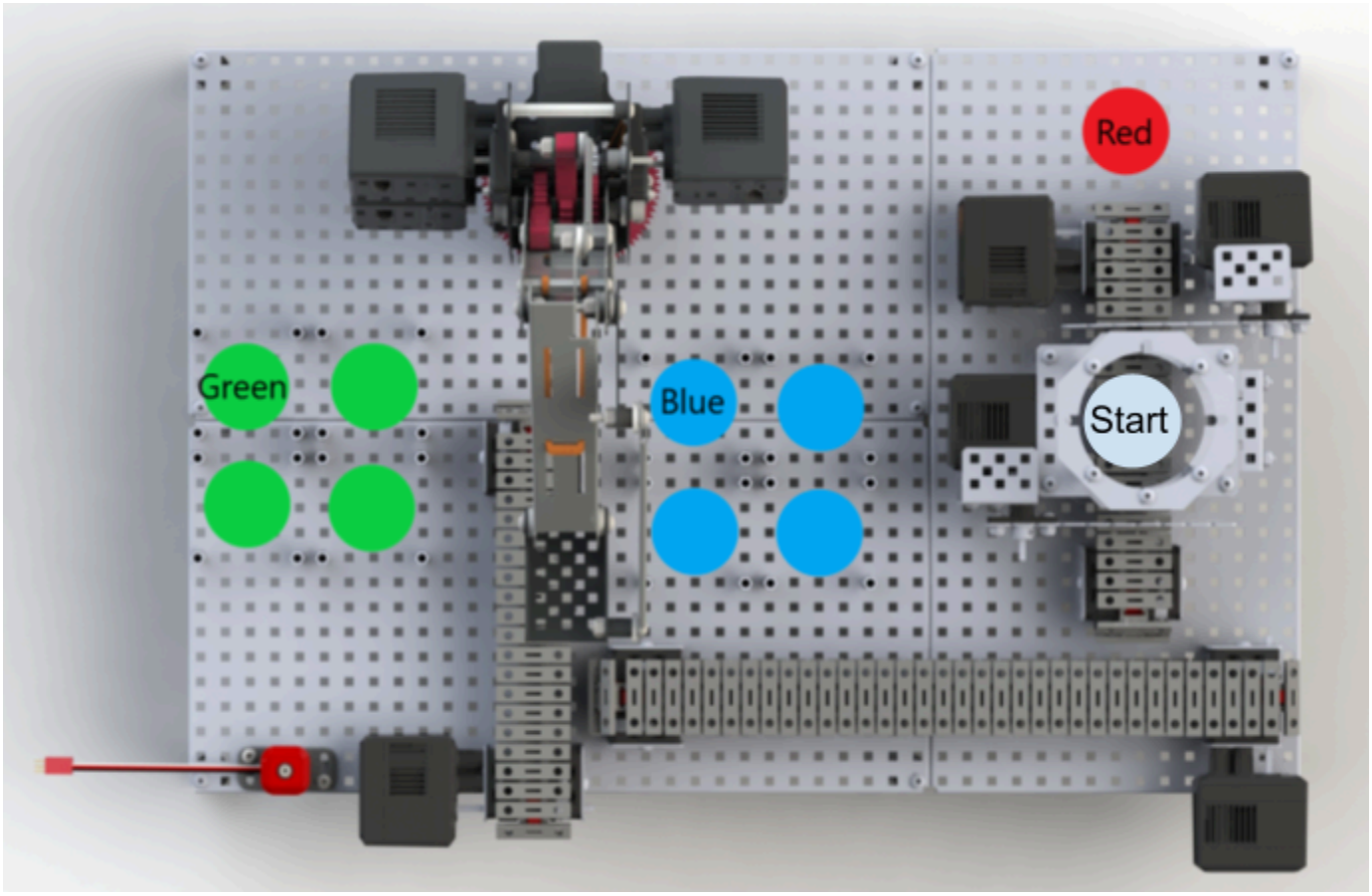
2. Designate your loading zones and use 1” standoffs to mark them.
    - There should only be two loading zones (green and blue).

3. To build the disk feeder, follow the steps in Lab 11 and place it as shown in the example image to the right.
    - Note that the disk feeder should be placed in the middle of the conveyor. Disks should travel both ways on the conveyor.



4. Build two gates. Not sure where to start? Review the Workcell Extension Enable Entry.
    - The placement of the gates should look like in the image to the right.
    - Note that the gates should prevent disks from passing through them until they open.
5. After you have finished constructing your Workcell, complete the challenges below for this Workcell Extension.
    - The disks should be placed in the disk feeder before running the program.
    - All disks should pass from one conveyor to the others without falling off or using a diverter.

Challenges



- **Level 1:** Move a blue disk through the conveyors to its respective loading zone.
    - The blue disk should start from inside the disk feeder.
- **Level 2:** Move 3 blue disks and a red disk through the conveyors to their respective loading zones.
    - The conveyor should turn in reverse to ‘reject’ the red disk once it is detected.
    - The order of the disks placed into the disk feeder should be random.
    - Pick up the red disks from the Workcell manually after they fall off the conveyor.
- **Level 3:** Move 12 disks (4 green, 4 blue, 4 red) through the conveyors to their respective loading zones, or to be rejected.
    - The order of the disks placed into the disk feeder should be random.
    - Pick up the red disks from the Workcell manually after they fall off the conveyor.
    - Place the disks in the disk feeder as it empties.

Competition

- **Time Challenge:** Fill up the disk feeder with a random selection of colored disks. The team that sorts the most amount of disks in one minute wins.
    - Any disks that fall off of a conveyor unintentionally, or are not placed in the loading zone correctly, are not considered sorted.
    - If teams tie, time how much it takes for them to sort 6 disks: two of each color, randomly placed in the disk feeder. The shortest time wins.

Pro Tips

- **The conveyors should not interfere with each other, make sure they are far enough apart.**
- **Use a Line Tracker to stop the conveyor so the arm can pick up the disk.**
- **As soon as the disks pass through the gate, the gate should close before another disk can pass through.**
- **Lengths of the conveyors may differ. Depending on the placement of the conveyors, the loading zones may be different.**