21075 GROUP 43

Binary Number Converter

Introduction

Our robot takes a decimal number as input, converts it to binary, and pushes black and white discs to "print out" the result in a clear cylinder: white disks represent 0s, black disks represent 1s.

Software

Take input; convert it to binary

↓

Take a disk from the main conveyor belt

↓

Point to the rightmost "unprinted" bit of the binary number

↓

Does the current bit correspond to the color of the disk?

YES NO

↓

Rotate the arm to push it off; regard this bit as "printed"

↓

Once 4 disks have been pushed off into the tube, spin the victory flag*

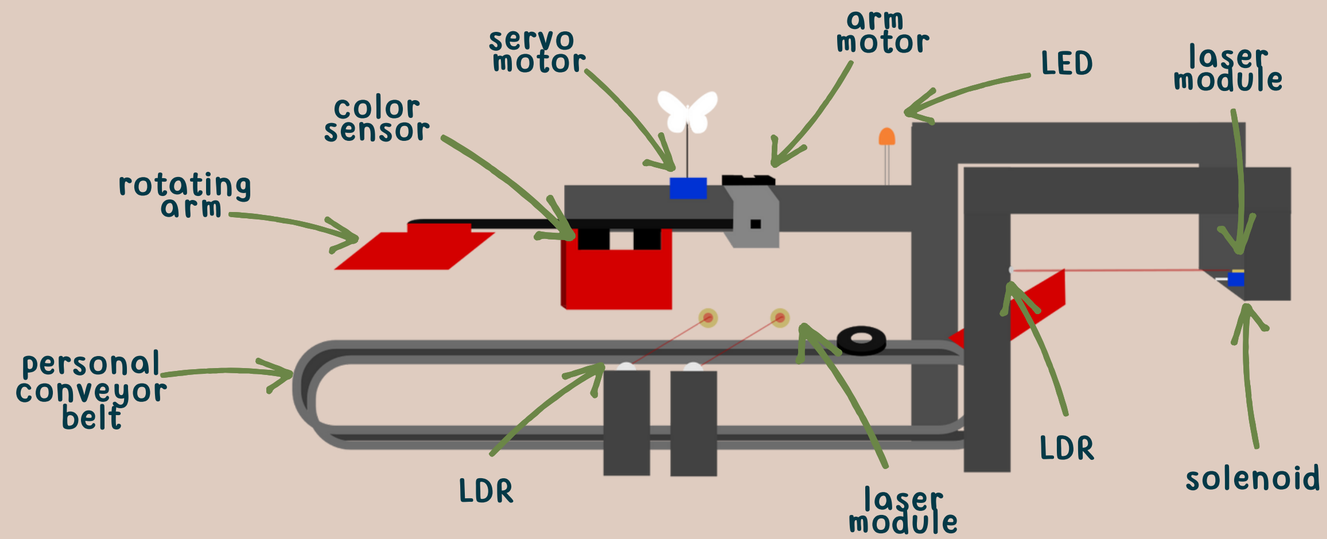
Ask the user to go again

YES NO

↓

Say Goodbye!

Hardware:



Breakdown

LDR & lasers - detect motion
Solenoid - make a straight-line pushing motion to take a disk from the main conveyor belt onto the **personal conveyor belt**
Color Sensor - determine if the object is black, white or neither
Rotating arm (& arm motor) - push off a disk from the **personal conveyor belt** into a plastic tube
Servo motor - wave the victory flag*

Error Detection

The LED will signify an error whenever the robot receives incorrect user input, detects a randomly colored disk or has an arbitrary long object (or just two disks too close to each other) on its conveyor belt

*Why a butterfly?

The window in our meeting room is broken in a shape suspiciously resembling a butterfly. We took it as a sign.