

## Pulley-Driven Toy Chaser: A Remote-Controlled Play Experience for Pets

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updated 17. 4. 2025 | published 17. 4. 2025

### Summary

This is a toy-chasing pet toy using Arduino and motor pulleys to keep pets active and entertained.

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### Description

I created this project to provide my kitten with a fun, stimulating, and interactive way to play, especially during times when I'm busy or away. Cats are natural hunters, and they thrive on movement and unpredictability. Traditional toys often lose their appeal quickly, so I wanted to design something that mimics the chase instinct by moving a toy along a controlled path using a motor and pulley system. Unlike static toys or simple automated ones, this system allows the toy to travel between multiple points — such as A, B, and C — keeping the cat engaged and curious. It's fully mechanical and customizable, which means

the movement can be adapted to different speeds, directions, or patterns.

### **Functions**

move a toy or ribbon along a pulley-guided path using a remote control  
the speed and direction of the toy's movement remotely easily adjust or  
reposition the toy and pulleys for different layout

### **Hardware and Software Used**

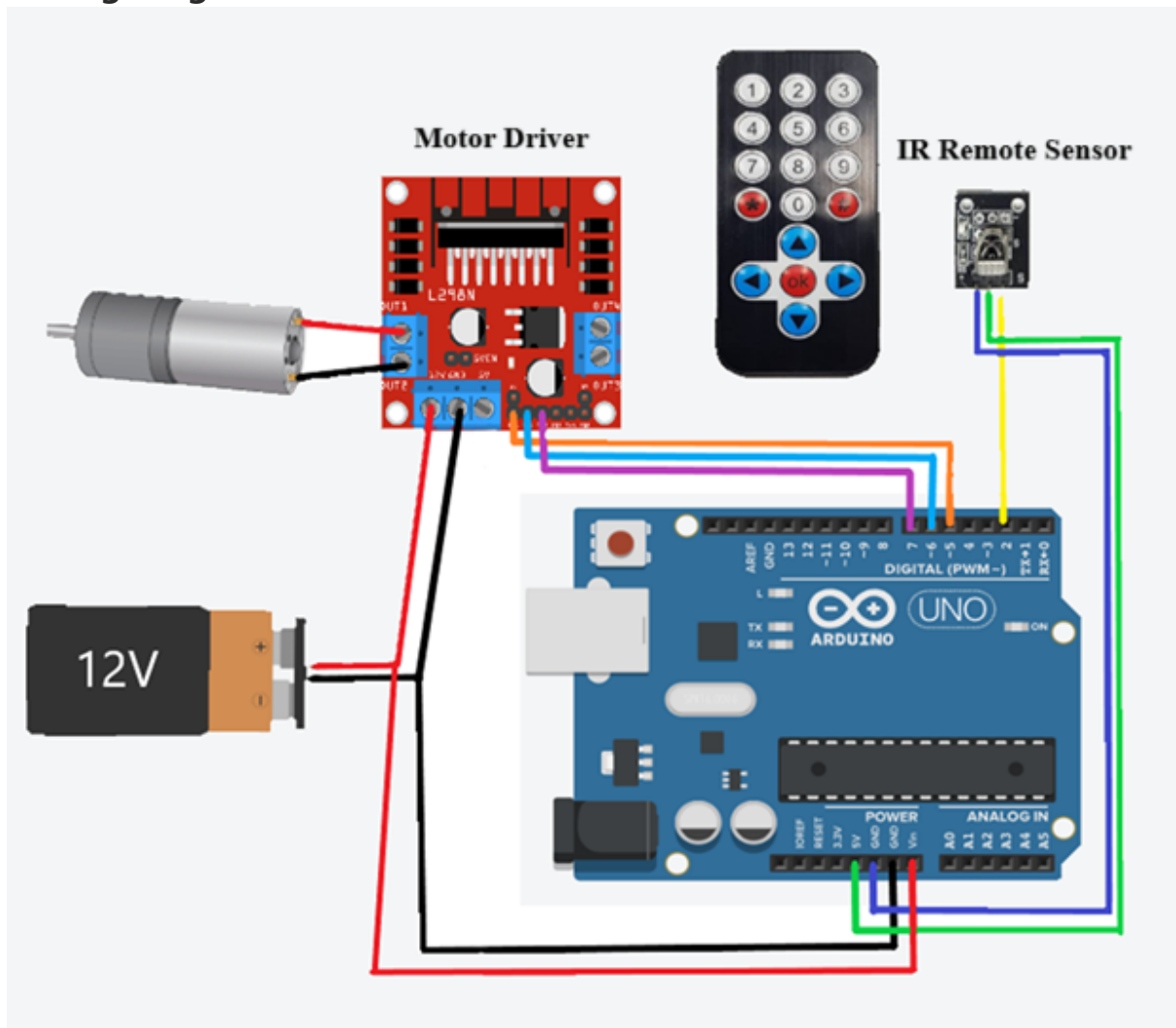
#### **Hardware:**

Arduino  
L298n motor driver  
25mm Geared Motor High Torque (exact motor size and specs in pdf file)  
Infrared IR Wireless Remote Control Module  
Power Supply (8x1.5v battery) or (12v adapter)  
Jumper wires  
2 x 608 Bearings  
3 x rubber band  
Crochet yarn  
Ribbon or small toy

#### **Software**

Arduino IDE to write and upload the code to the microcontroller  
Fusion 360 for Design

## Wiring diagram



- 1- Connect battery positive to 12v in motor driver and negative to the Gnd of motor driver. You can also use a power supply with 12v.
- 2-Connect Arduino vin with battery positive and Arduino Gnd with battery negative.
- 3- Connect the motor to the out1 and out2
- 4-Connect the negative in the IR sensor with Arduino Gnd, the positive with 5v in Arduino, and the S with pin 2 in Arduino.
- 5- Connect the first pin in the motor driver with pin 5, the second with pin 6, and the third with pin 7.

## Code

The Arduino Code is in the attached files. You can adjust values like motor speed. The motor begins with a speed of 0 and increases by 10 until 255. You need to download "IRremote" from Arduino ide library manager. After that, run the code included; if you have the same remote as the one I got you will be starting the motor with button number 1 and stopping it with button number 2. Reverse direction with button number 3 and increase the speed with up button and decreasing the speed with down button. If your remote is different, you need to open the serial monitor and check the

values you get for each of your buttons and then replace these values with the values I have in the code. More elaboration is in the pdf file.

### **Printing Instructions**

- You could use any material
- 0.2 Layer Height
- Use as low as 5% infill for all parts except the “base cover” part and “pulley part” as they need to be strong so 15% infill for them.
- Activate support in “motor base” and “base cover” parts only

### **Assembly Instructions**

1. Print each file one time except for “base”, “base cover”, “Protective cover”, and “pulley” parts 2 times.
2. Upload the code to Arduino using Arduino IDE.
3. Connect the Arduino and other components as shown in the wiring diagram. Place all the electronics in the “motor base” part and cover them with “motor base cover” part. Make sure that the IR sensor is on the top so that it receives the signal from the remote.
4. The “base” part is hollow; this is intended so that you fill it with any heavy material you have like bolts and screws or Gibson with water. This is to make the base stable.
5. After filling the “base” part, cover it with “base cover” part and connect them with super glue for better stability. Place the bearing on top of them and then place the “pulley part” on top of the bearing. You can use super glue also for better stability.
6. Place the “protective cover” part on top of the pulley, but make sure it is not stopping the motion range of the yarn. Also use super glue so that it doesn’t move. It is not shown in the photos because I designed it recently.
7. Place the motor on the “motor base”. Pass the motor wires from the gap I made down. Then place the “motor pulley” part on top of the motor. Another protective part called “motor protective cover” part for the “motor pulley” is included. It will be placed on top of “motor base cover” part and make sure to use super glue so it doesn’t fall out.
8. Finally use rubber band around each of the 3 wheels for good grip with the yarn. Spin the yarn around the pulleys and attach a toy or a ribbon to it.

### **Demo and Usage Instructions**

Usage is simple using the IR remote controller. Start the motor by pressing number 1 and up button for speeding up and down button for slowing. Number 2 stops the motor and number 3 reverses the direction. If the initial height of the pulleys doesn’t satisfy you, you can raise them by putting books under them. More details are in the pdf.

# Model files



**motor-base-cover.stl**

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**base-cover.stl**

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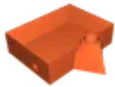
**base.stl**

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**motor-protective-cover.stl**

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**motor-base.stl**

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**pulley.stl**

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**protective-cover.stl**

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**motor-pulley.stl**

## Other files



### Arduino code

2 files



**toy\_chaser\_arduino\_code.ino**



**how-to-customise-arduino-code-as-you-like.pdf**

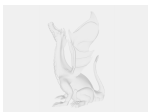


### Assembly guide and components

2 files



**assembly-guide-with-photos.pdf**



**components-used-with-photos.pdf**

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