***2. Semester:   
7 Controlling a steppermotor***

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**Controlling a steppermotor**

**Project planning:**

**Contents:**

1. **Materiallist**
2. **Softwares**
3. **Timeplanning**
4. **Theory**
   1. **Run a Stepmotor**
   2. **Circuit plans**
   3. **Program**
5. **Building the case**
6. **Look**
7. **Problemsolving**
8. **Sources**

1. **Materiallist:**

|  |  |  |
| --- | --- | --- |
| Equipment: | Type: | x |
| Arduino Uno |  | 1 |
| Stepping Motor | SM-17HS4023 | 1 |
| Driver | LM-298\_H\_Bridge | 1 |
| Power-supply | MW MB10EU  12V | 1A | 12W max. | 1 |
| USB cable | Typ B | 1 |
| Jumper cable | Typ: Male/Male | x |
| Jumper cable | Typ: Female/Male | x |
| Button | Typ: Push-Button | 5 |
| OLED-Display | ADA938 OLED 128x64 | 1 |
|  |  | 1 |

1. **Software:**

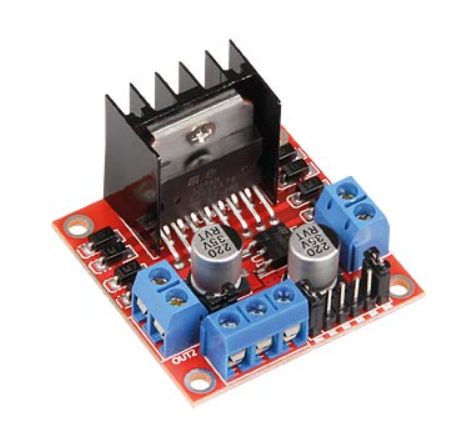
|  |  |
| --- | --- |
| Arduino | V: 1.8.13 |
| Eagle | V: 9.6.2 |
|  |  |

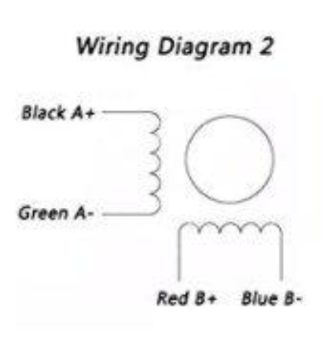
1. **Timeplanning:**

|  |  |
| --- | --- |
| 28.02.2022 | Preparation of materiallist |
| 07.03.2022 | Discussion over the material |
| 14.03.2022 | Clarify usage of the materials |
| 21.03.2022 | Plan the circuit & writing program |
| 28.03.2022 | Plan the circuit & writing program |
| 25.04.2022 | Testing the circuit |
| 02.05.2022 | Writing report |
| 16.05.2022 | Insert the circuit in the construction |
| 30.05.2022 | Preparation of the report |
| 13.06.2022 | Discuss the report |
| 20.06.2022 | Discussion over the project & report |
| 27.06.2022 | Presentation |

1. **Theory:**

**IV.a Run a stepmotor:**

First of all we need to know how we can control the steppermotor. We use there a L289N H-Bridge.

Every coil of the motor has two connection pins. In this case A+ & A- and B+ & B-.

So we want to control those coils with our Arduino outputs. If we can control the coils, we can control the movement.

A steppermotor has got the function to move precisely

in single steps. We can divide a single 360° circular movement in 200 steps. Every step has its own logic, that we programmed in Arduino.

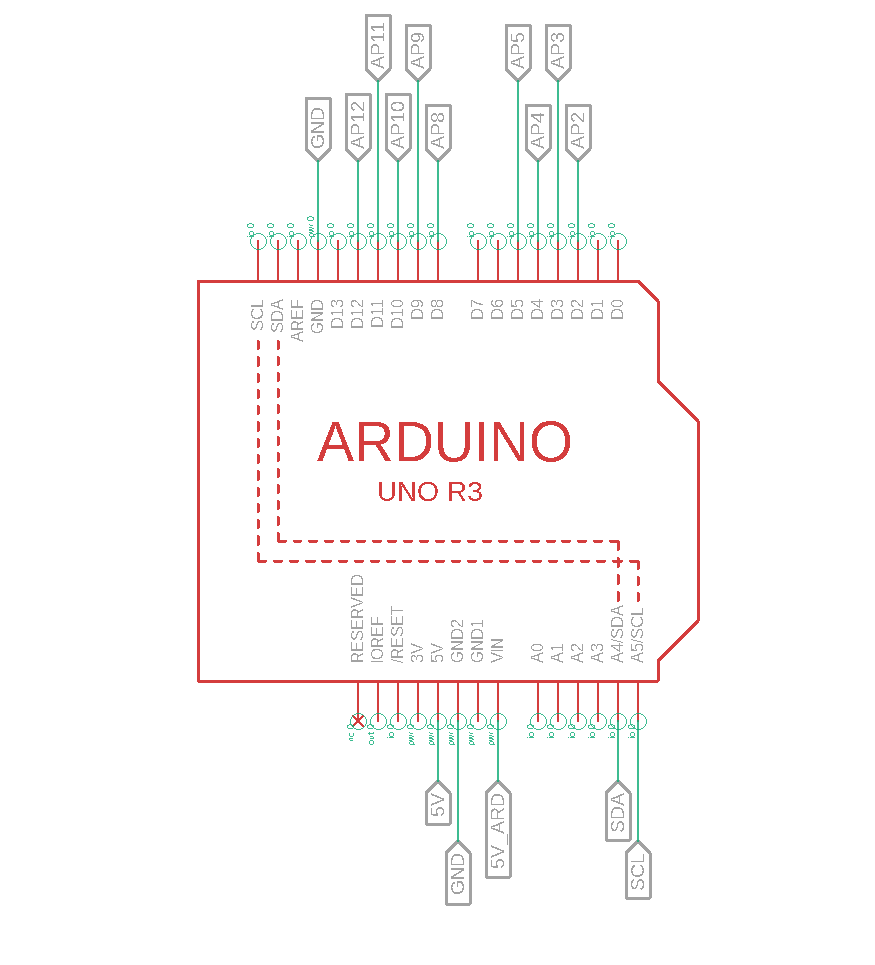
Ein Bild, das Tisch enthält.

Automatisch generierte Beschreibung

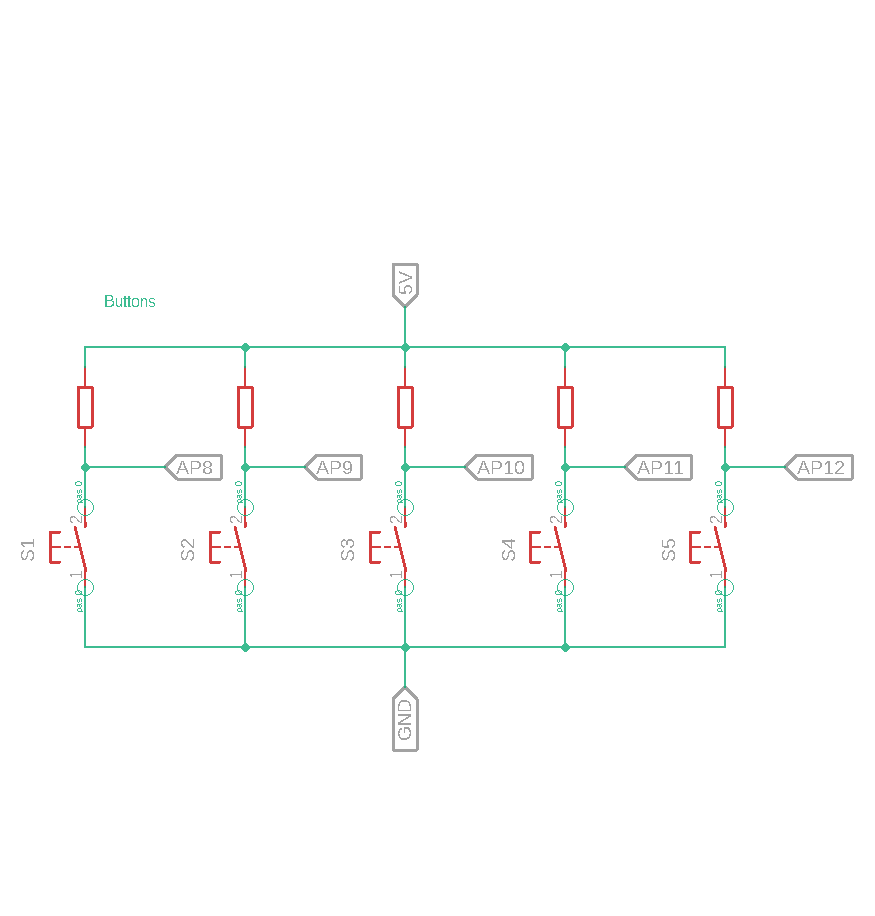
We have here the order of the signals we must use to turn right. We see on the left side the order of the motorpins and how to do 4 steps, with the digital signal “High” and “Low”. To do 8 steps we just repeat the order. We are able to do many steps, in a certain speed and direction with our program.

**IV.b Circuit plans:**

**Arduino Uno connecting plan:**

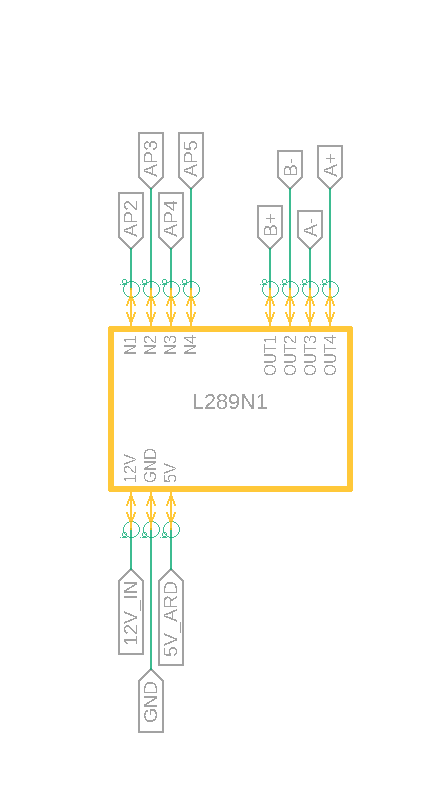
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|  |  |
| --- | --- |
| Powersupply: | 5V\_ARD |
| Supply for components: | 5V (intern Arduino) |
| Ground | GND |
| AP# | Arduino Pin Nr. |

**Buttons Connecting plan:**

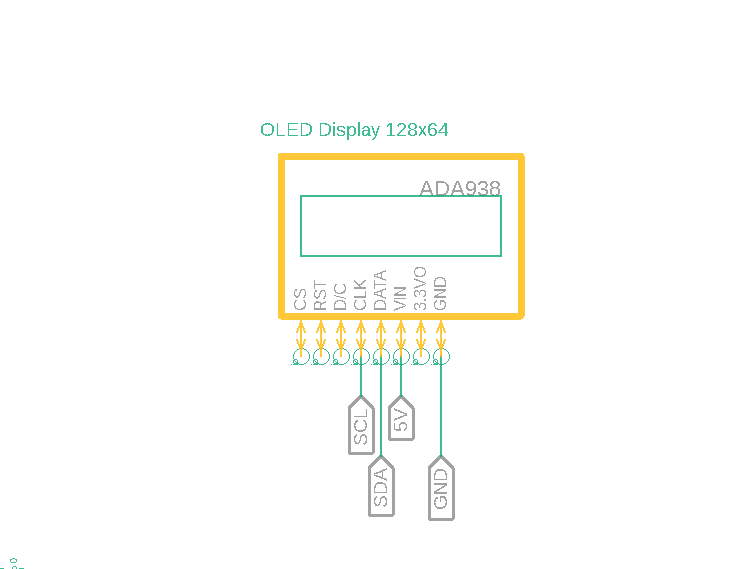
**Resistances:** 5x 10k Ohm

|  |  |
| --- | --- |
| Supply | 5V (intern Arduino) |
| Ground | GND |
| AP# | Arduino Pin Nr. |

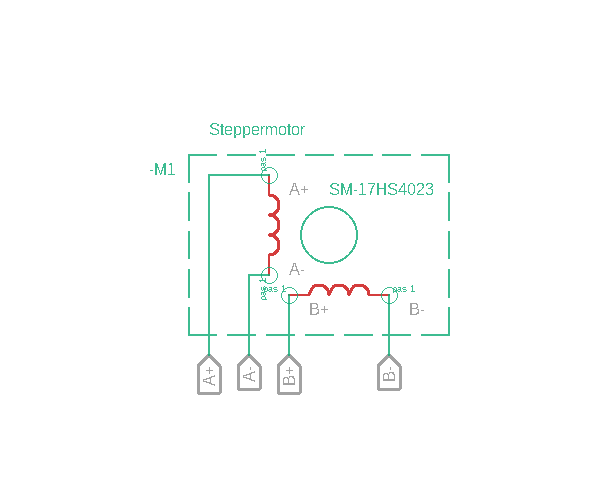
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**L289N1 connecting plan:**

|  |  |
| --- | --- |
| Supply | 12V |
| Supply | 5V  (intern Driver) |
| Ground | GND |
| AP# | Arduino Pin Nr. |
| Motor Pin | A+ |
| Motor Pin | A- |
| Motor Pin | B+ |
| Motor Pin | B- |

**Oled Display:**

|  |  |
| --- | --- |
| Supply | 5V  (intern Arduino) |
| Ground | GND |
| Data | SDA |
| CLK | SCL |

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**Steppermotor**

**connecting plan:**

|  |  |
| --- | --- |
| Motorpins: | A+ |
|  | A- |
|  | B+ |
|  | B- |

**Wiring:**

We used a the Arduino Uno here for getting control of the circuit. The buttons with pull-up resistances are our inputs. We used the SDA & SCL outputs for the OLED-Display and 4 digital outputs for controlling the L298N which manages the steppermotor.

1. **Theory**

**IV.c Program:**

1. **Building the case**

We built an own case for our circuit.

We have 5 buttons, one OLED-Display, a steppermotor, a driver   
and the Arduino Uno to put in a case.

We made a model in Fusion 3D to print a 3D model of our case. It‘s divided in 2 parts: one top element, and the bottom plate. So we can easily open it again.

We had there a pair of complications, but in the end we have a great case.

Pictures:

1. **Look**
2. **Problemsolving**
3. **Sources**

<https://forum.digikey.com/t/how-to-drive-a-stepper-motor/13412>

<http://www.piclist.com/techref/piclist/jal/drivingbipolarsteppermotors.htm>

<https://www.instructables.com/Controlling-Bipolar-Stepper-Motors-with-Arduino-wi/>

<http://www.datasheetcafe.com/17hs4023-datasheet-stepper-motor/>

<https://www.sparkfun.com/datasheets/Robotics/L298_H_Bridge.pdf>

<https://www.manualslib.com/manual/1208079/Arduino-Uno.html>

<https://github.com/Ayman628/Seconde_semester>