VTI1E2 – APLIKASI MIKROKONTROLER dan ANTARMUKA©

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Denny Darlis S.Si., M.T. - 13770026

Program Studi D3 Teknologi Telekomunikasi

Fakultas Ilmu Terapan - Universitas Telkom

Telkom University

Diploma of Telecommunication Engineering

VTI2D3
Aplikasi Mikrokontroler dan Antarmuka

Materi ke-6: Antarmuka Dasar Mikrokontroler

Denny Darlis, S.Si., M.T.

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Ikhtisar

Ulasan

- **Computing** is any activity that uses computers to manage, process, and communicate information. It includes development of both hardware and software. Computing is a critical, integral component of modern industrial technology.
- A computer is a machine that manipulates data according to a set of instructions called a computer program. The program has an executable form that the computer can use directly to execute the instructions. The same program in its human-readable source code form, enables a programmer to study and develop a sequence of steps known as an algorithm. Because the instructions can be carried out in different types of computers, a single set of source instructions converts to machine instructions[6] according to the CPU type.

Ulasan

- The execution process carries out the instructions in a computer program. Instructions express the computations performed by the computer. They trigger sequences of simple actions on the executing machine. Those actions produce effects according to the semantics of the instructions.
- In computing, an **interface** is a shared boundary across which two or more separate components of a computer system exchange information. The exchange can be between software, computer hardware, peripheral devices, humans, and combinations of these. Some computer hardware devices, such as a touchscreen, can both send and receive data through the interface, while others such as a mouse or microphone may only provide an interface to send data to a given system.

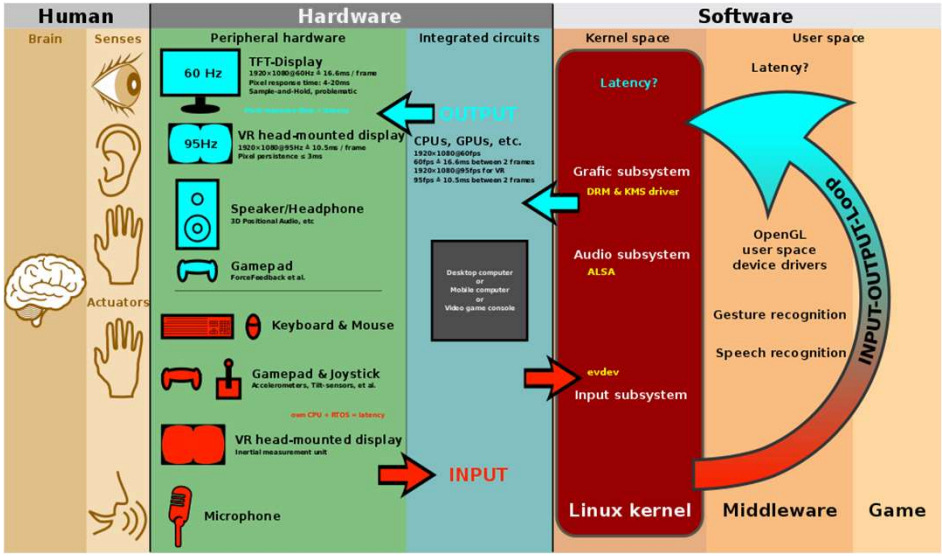
Ulasan

- In computing and especially in computer hardware, a **controller** is a chip, an expansion card, or a stand-alone device that **interfaces** with a more **peripheral** device. This may be a link between two parts of a computer (for example a memory controller that manages access to memory for the computer) or a controller on an external device that manages the operation of (and connection with) that device.
- The term is sometimes used in the opposite sense to refer to a device by which the user controls the operation of the computer, as in game controller.
- In desktop computers the controller may be a plug-in board, a single integrated circuit on the motherboard, or an external device.
- In mainframes the controller is usually either a separate device attached to a channel or integrated into the peripheral.

Ulasan

- A **peripheral** or **peripheral device** is "an ancillary device used to put information into and get information out of the computer".[1]
- Three categories of peripheral devices exist based on their relationship with the computer:
  - an **input device** sends data or instructions to the computer, such as a mouse, keyboard, graphics tablet, image scanner, barcode reader, game controller, light pen, light gun, microphone, digital camera, webcam, dance pad, and read-only memory);
  - an **output device** provides output from the computer, such as a computer monitor, projector, printer, headphones and computer speaker); and
  - an **input/output device** performs both input and output functions, such as a computer data storage device (including a disk drive, USB flash drive, memory card and tape drive).
- Many modern electronic devices, such as internet capable digital watches, smartphones, and tablet computers, have interfaces that allow them to be used as computer peripheral devices.

- A **user interface** is a point of interaction between a computer and humans; it includes any number of modalities of interaction (such as graphics, sound, position, movement, etc.) where data is transferred between the user and the computer system.
- A human–machine interface usually involves peripheral hardware for the INPUT and for the OUTPUT. Often, there is an additional component implemented in software, like e.g. a graphical user interface.
- The **graphical user interface** (GUI) is a form of user interface that allows users to interact with electronic devices through graphical icons and visual indicators such as secondary notation, instead of text-based user interfaces, typed command labels or text navigation. GUIs were introduced in reaction to the perceived steep learning curve of command-line interfaces (CLIs),[2][3][4] which require commands to be typed on a computer keyboard.

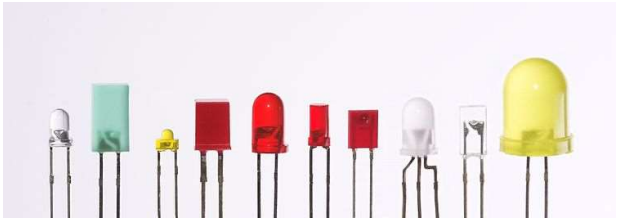


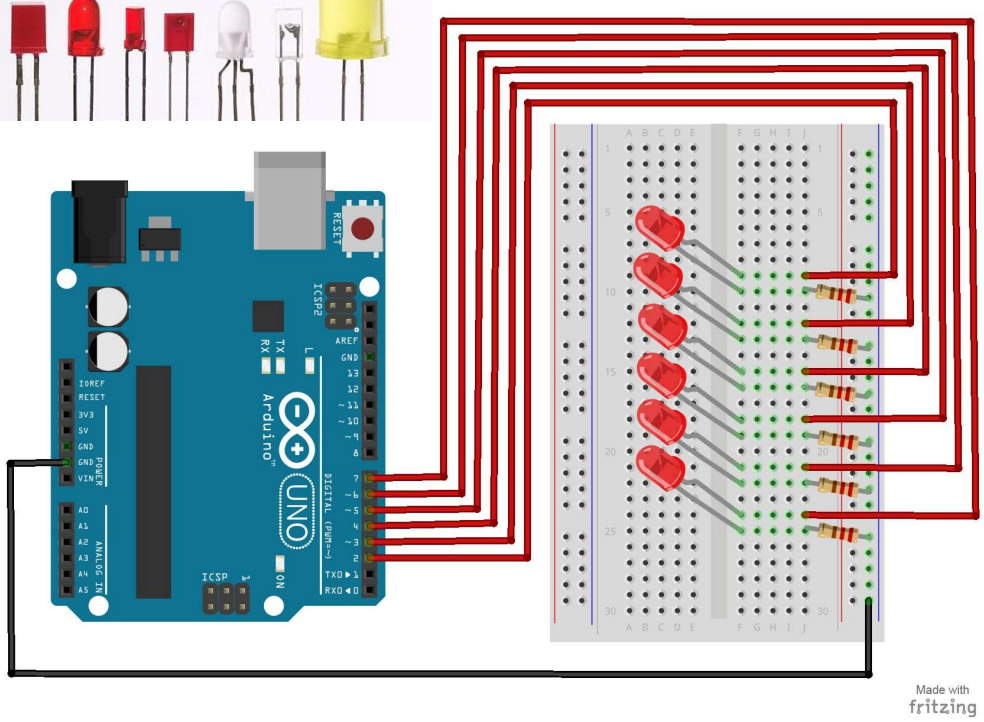
Microcontroller Interfacing - Basics

- Microcontrollers have become a very useful in embedded design as they can easily communicate with other devices, such as sensors, switches, LCD Displays, keypads, motors and even other microcontrollers
- To interface a device to a microcontroller simply means to **Connect** a device to a microcontroller.
- Many interface methods have been developed over years to solve the complex problem of balancing circuit design criteria such as **cost, size, weight, power consumption, reliability and availability**.

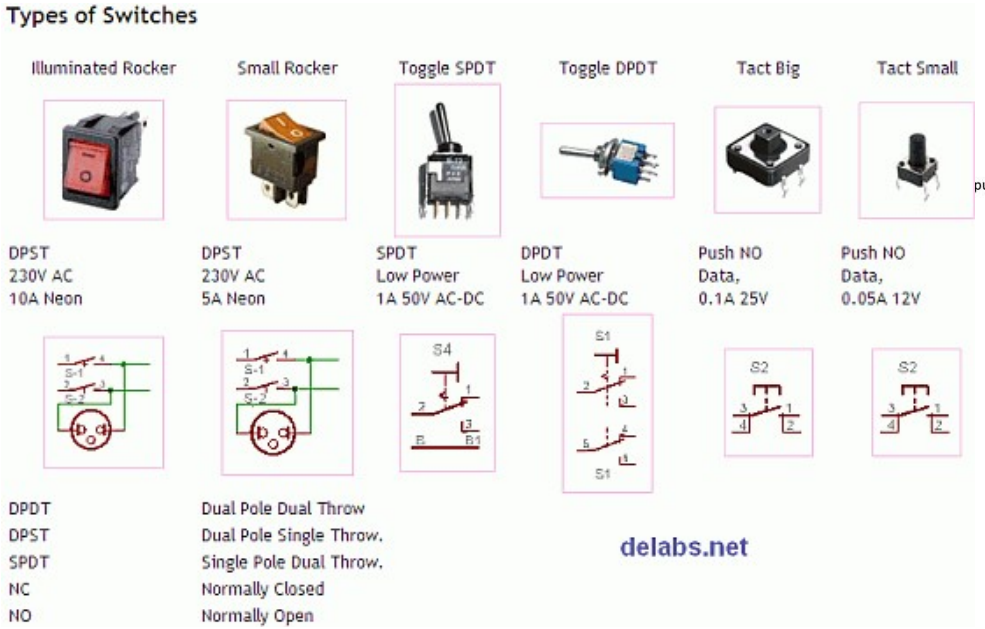
Interfacing to LED

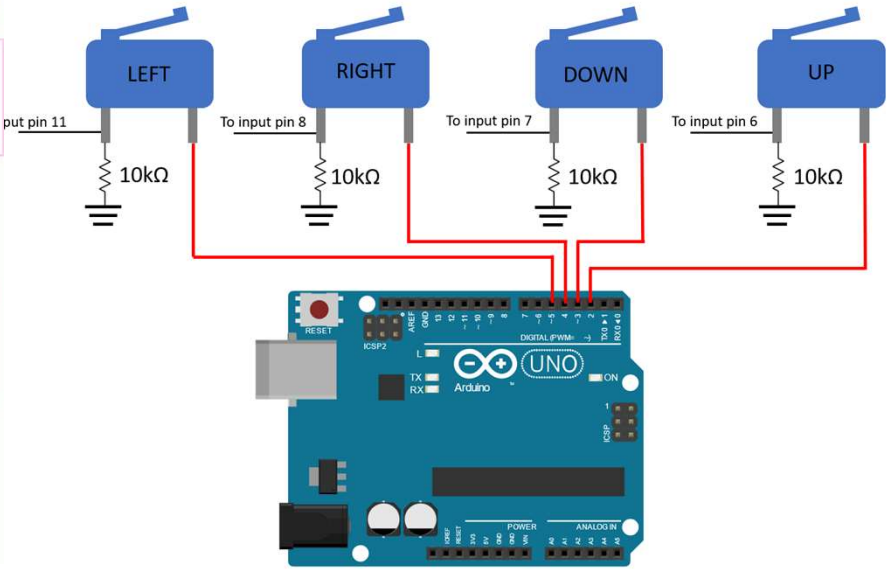
Power Supply Voltage	LED Color	LED Vf	LEDs in series	Desired Current	Resistor (calculated)	Resistor (rounded)
3 V	Red, Yellow, or Yellow-Green	1.8	1	25 mA	48 Ω	51 Ω
4.5 V	Red, Yellow, or Yellow-Green	1.8	2	25 mA	36 Ω	39 Ω
4.5 V	Blue, Green, White, or UV	3.3	1	25 mA	48 Ω	51 Ω
5 V	Blue, Green, White, or UV	3.3	1	25 mA	68 Ω	68 Ω
5 V	Red, Yellow, or Yellow-Green	1.8	1	25 mA	128 Ω	150 Ω
5 V	Red, Yellow, or Yellow-Green	1.8	2	25 mA	56 Ω	56 Ω
9 V	Red, Yellow, or Yellow-Green	1.8	4	25 mA	72 Ω	75 Ω
9 V	Blue, Green, White, or UV	3.3	2	25 mA	96 Ω	100 Ω



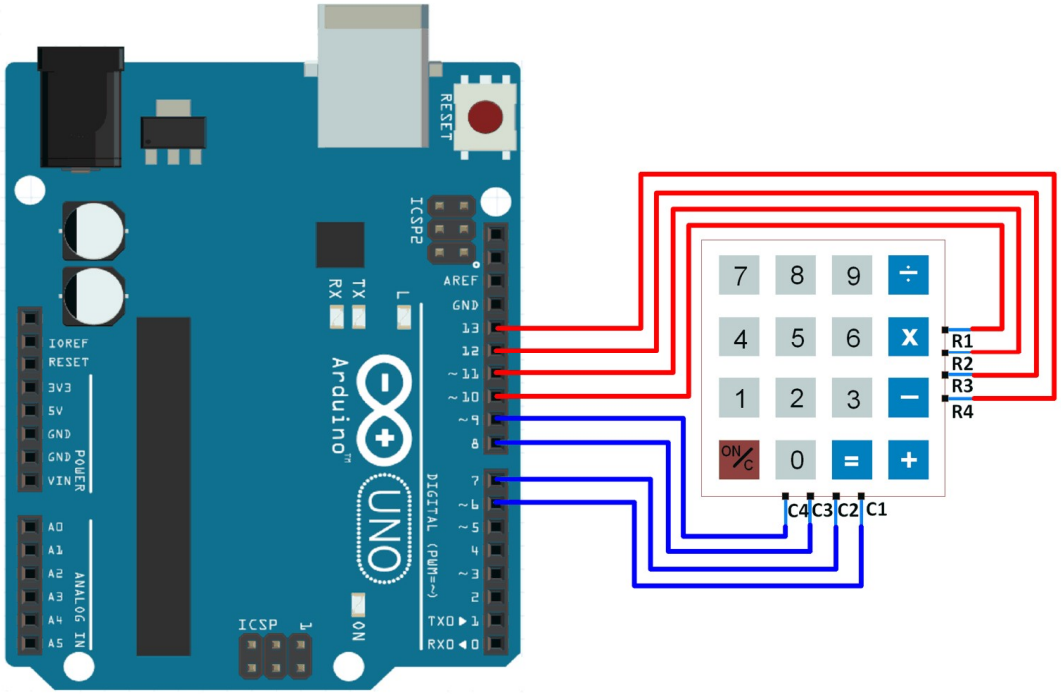


Interfacing to a Switch

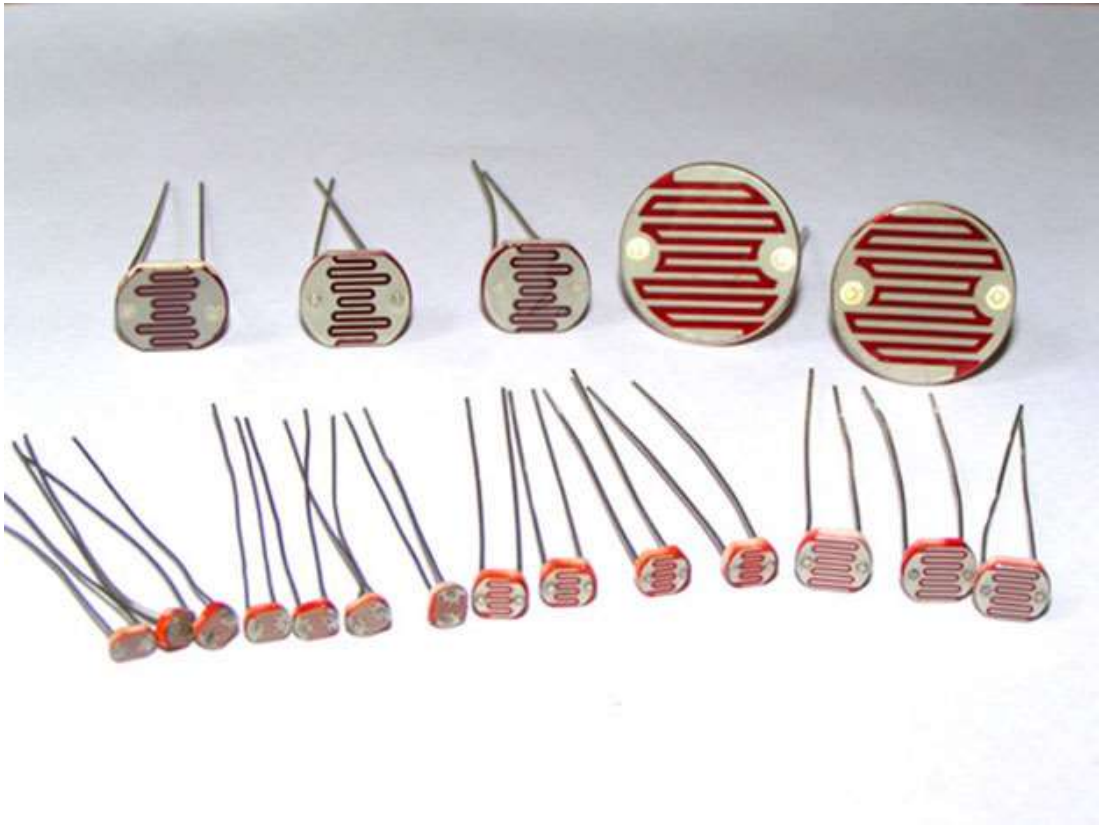


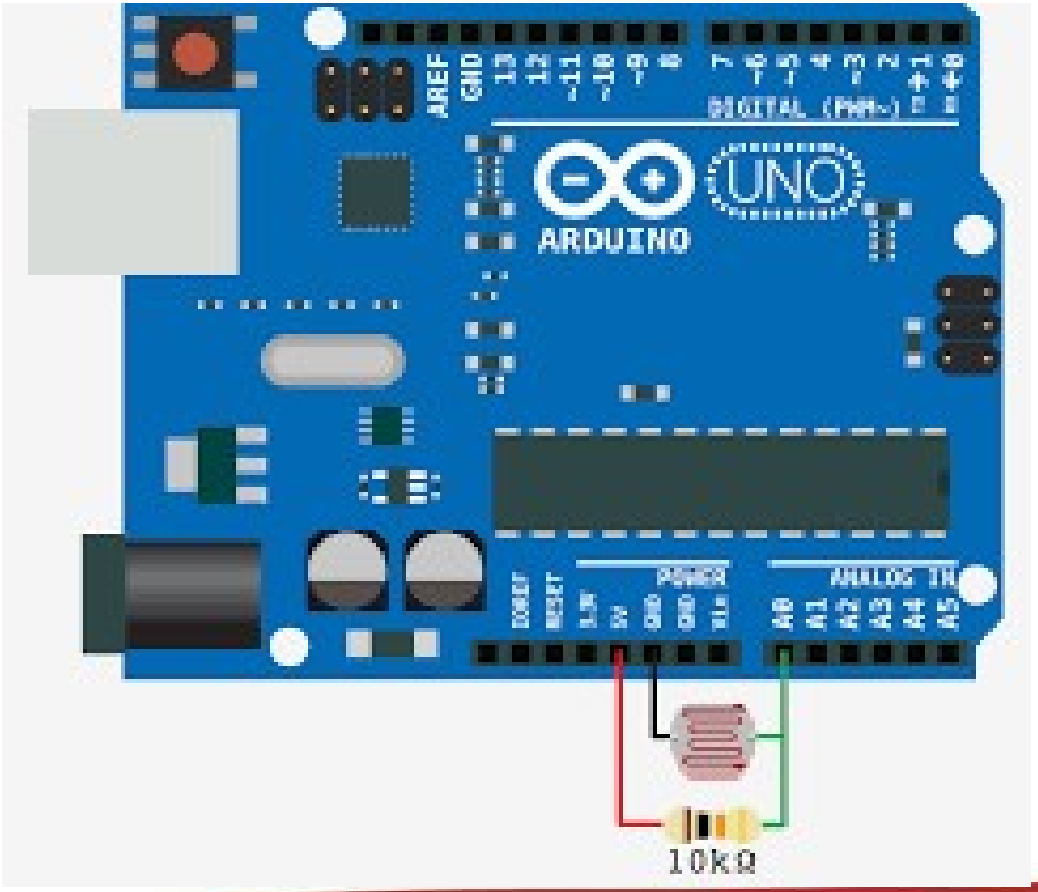


Interfacing to a Keypad

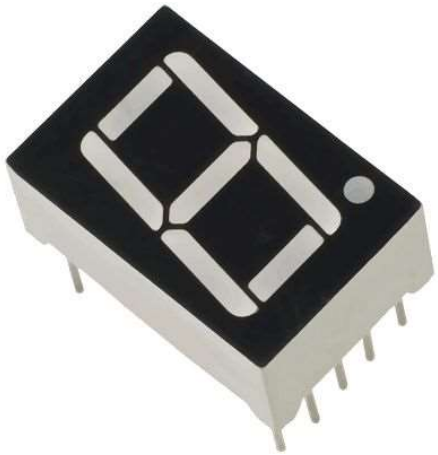


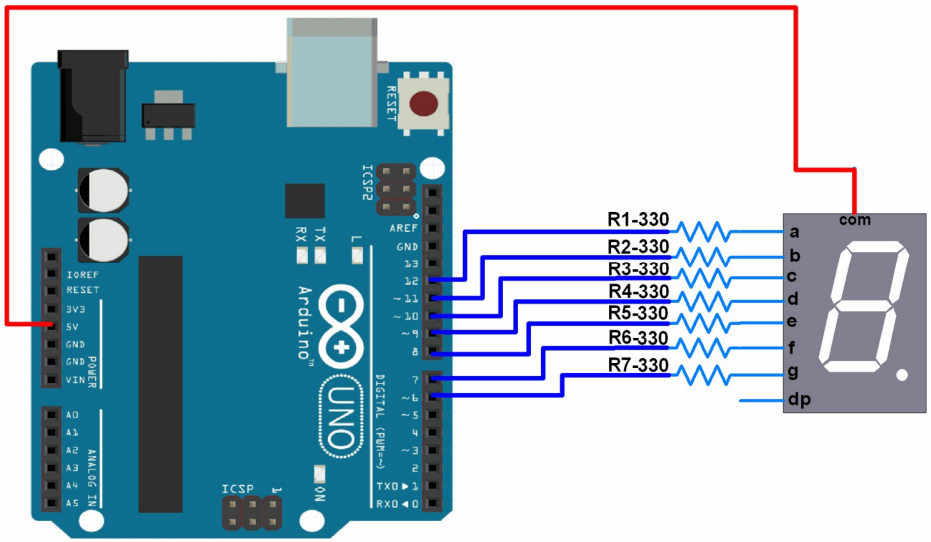
Interfacing to an Light Dependent Resistor

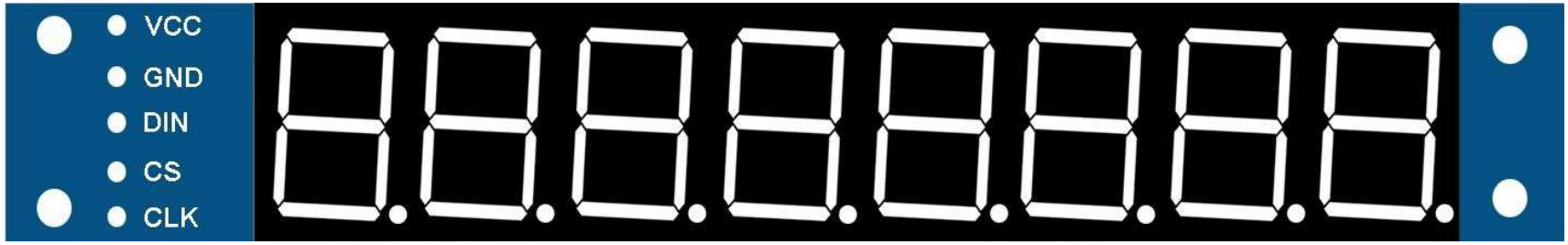




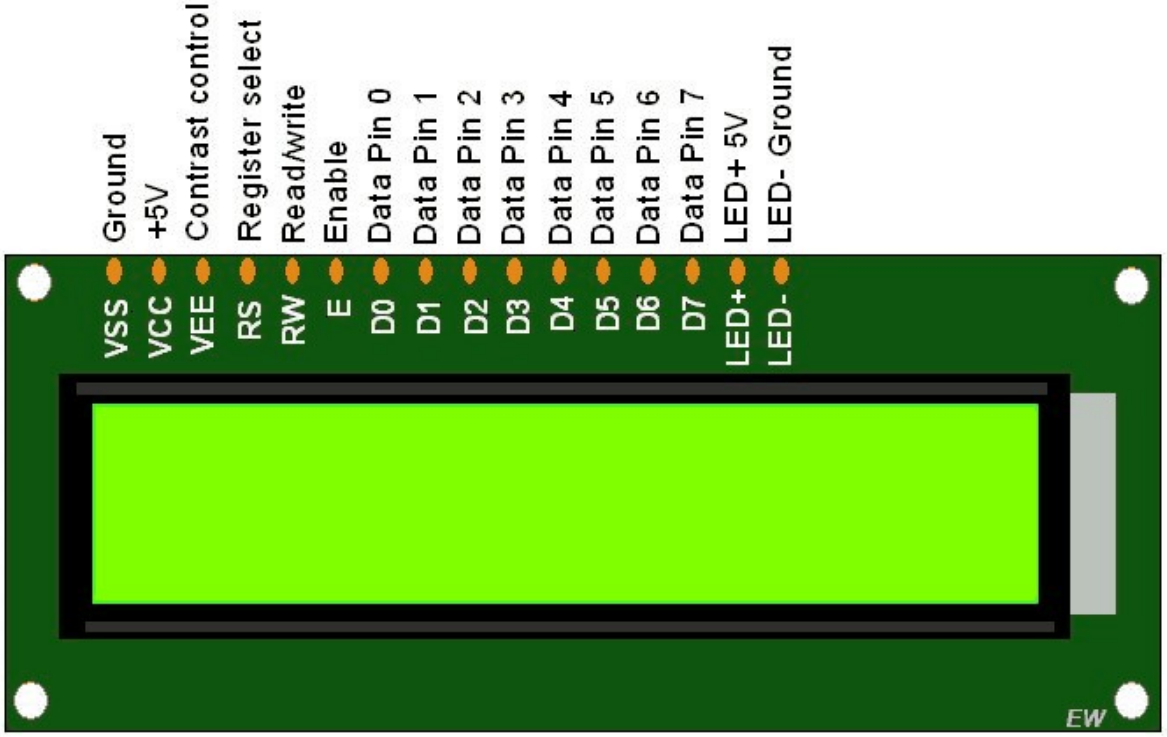
Interfacing to a 7-Segment Display

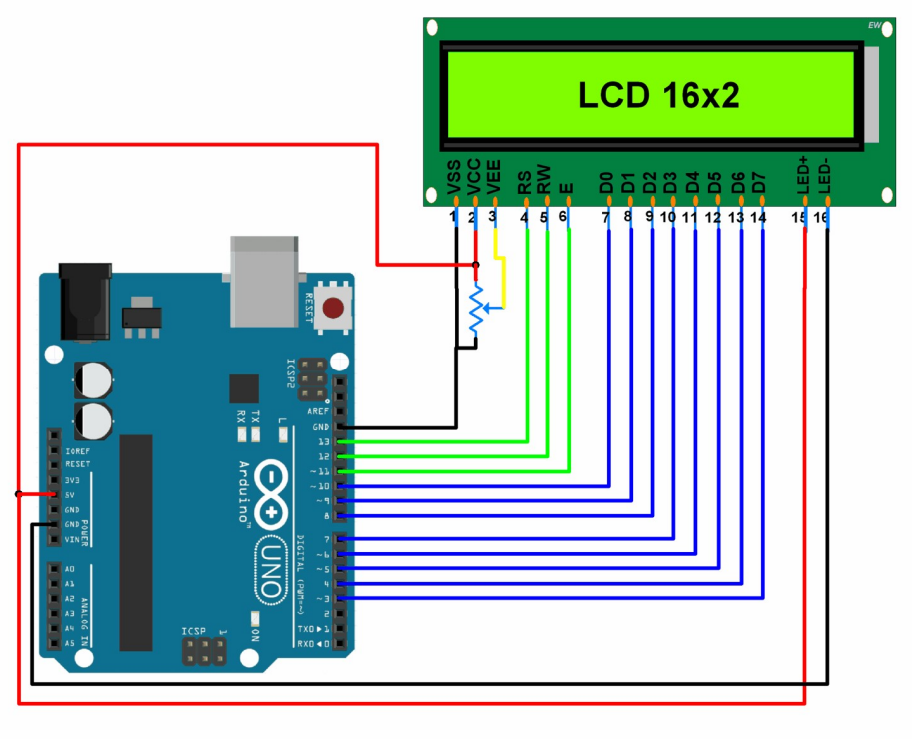




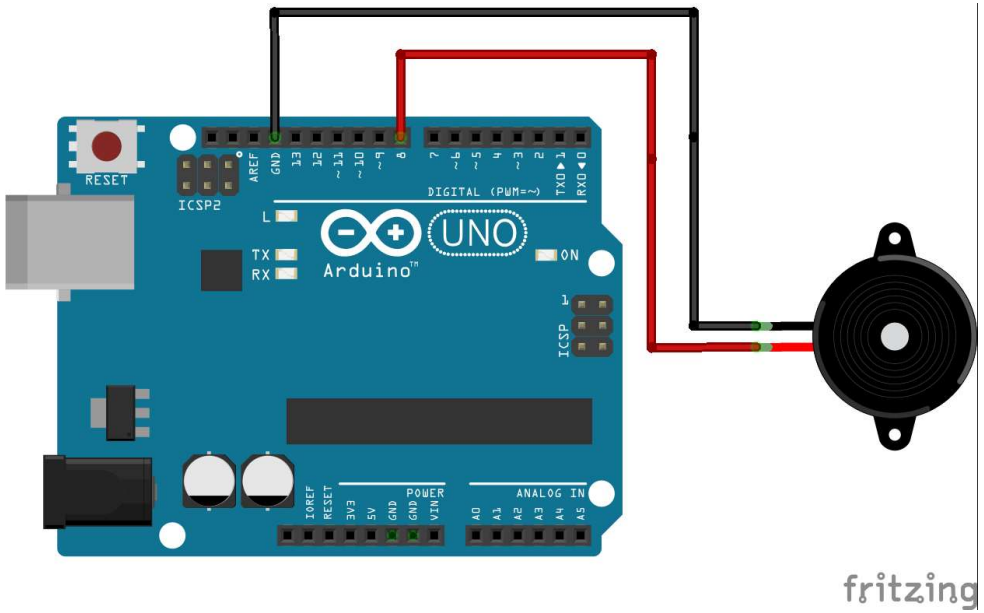


Interfacing to an LCD Display

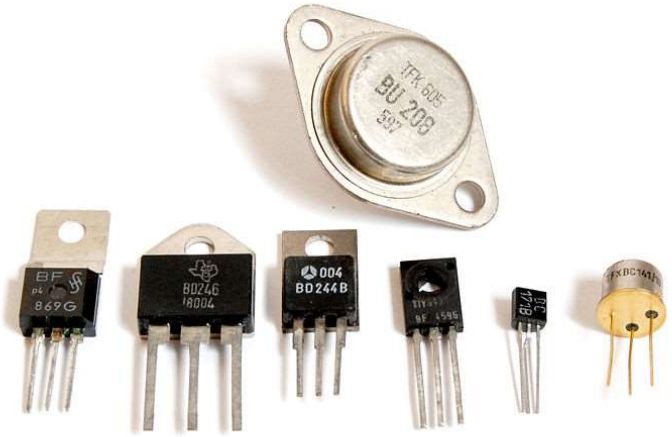


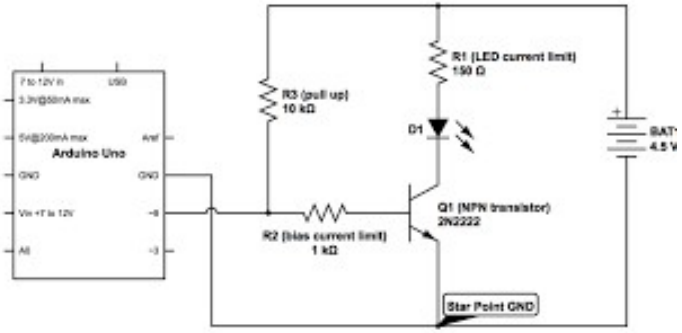


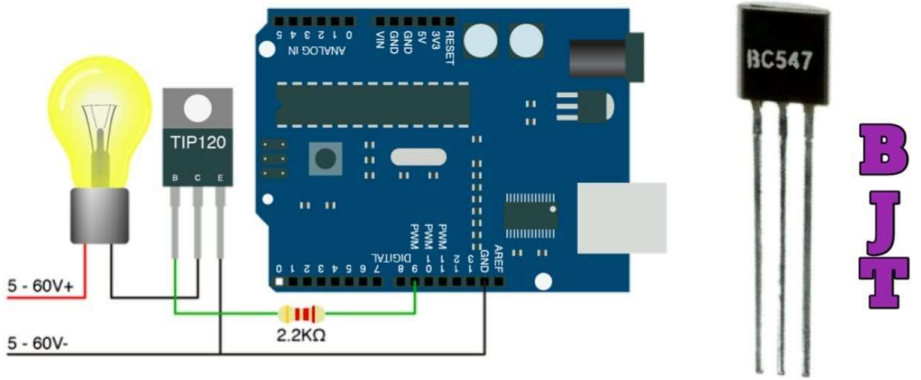
Interfacing to a Piezo Sounder



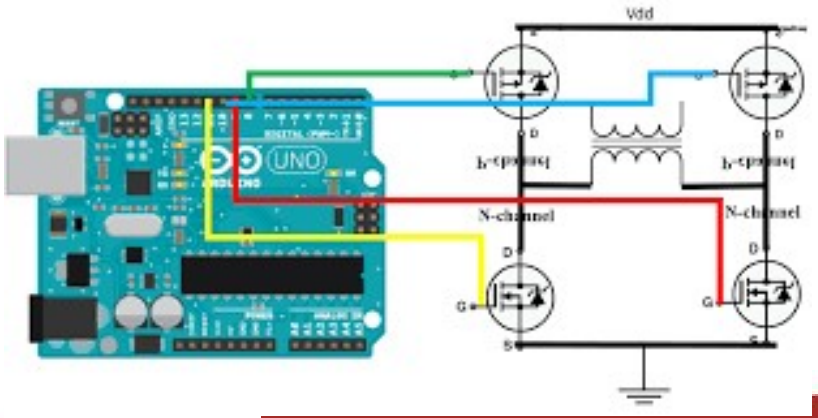
Interfacing to a Transistor







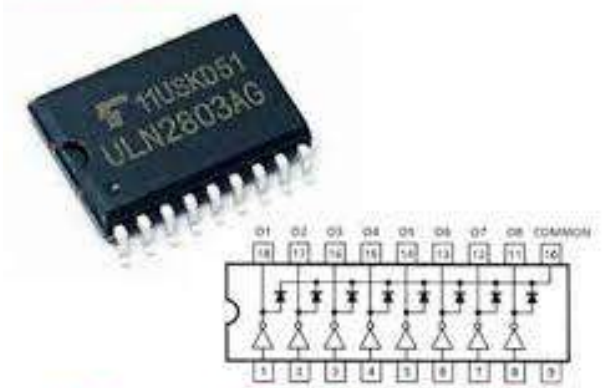
Transistor - Amplifier/Switch with ARDUINO



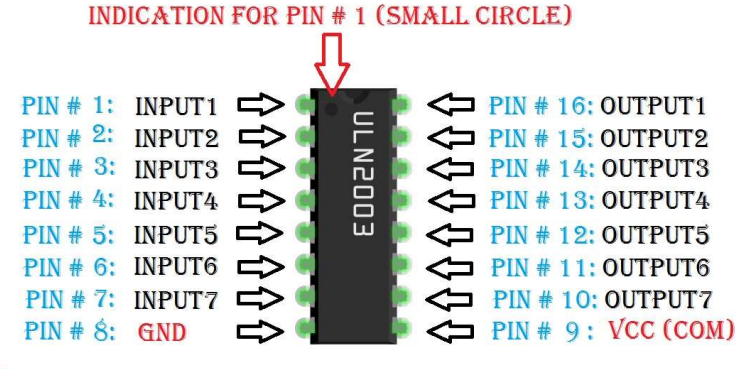
Interfacing to a Darlington Driver IC

Telkom University

ULN2803



8 Channel Darlington Driver

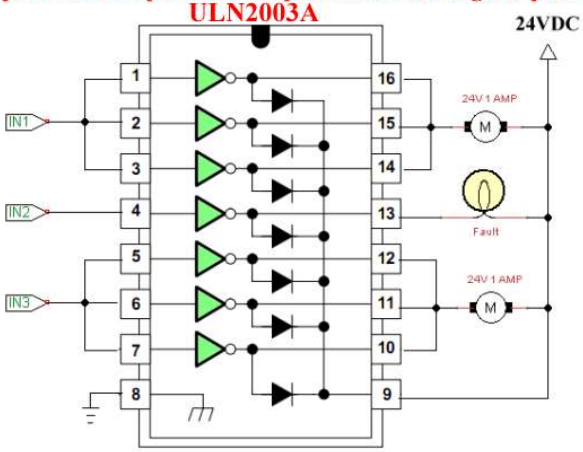


ULN2003 PINOUT

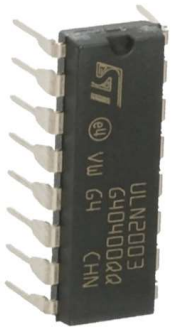
www.TheEngineeringProjects.com

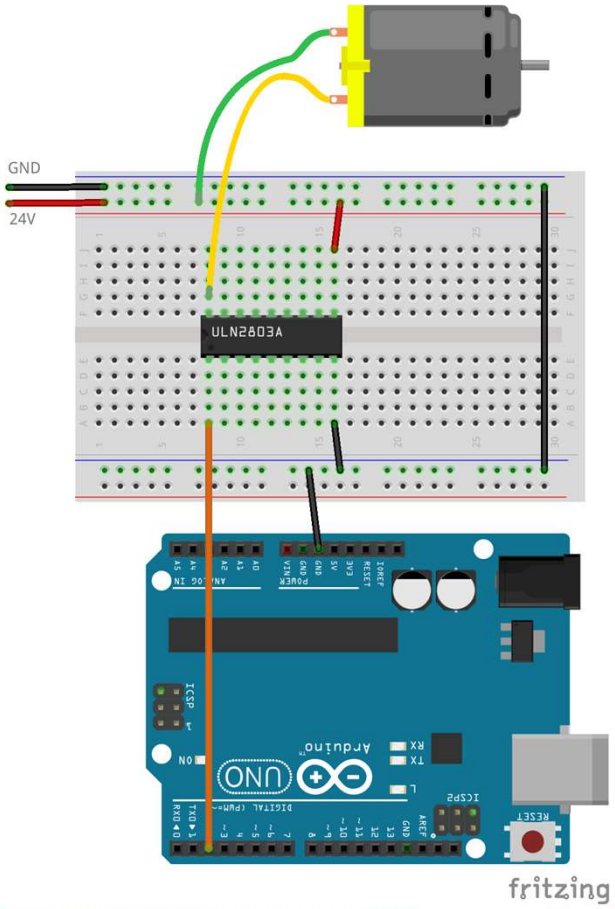
Inputs and outputs can be paralleled for higher power.

ULN2003A

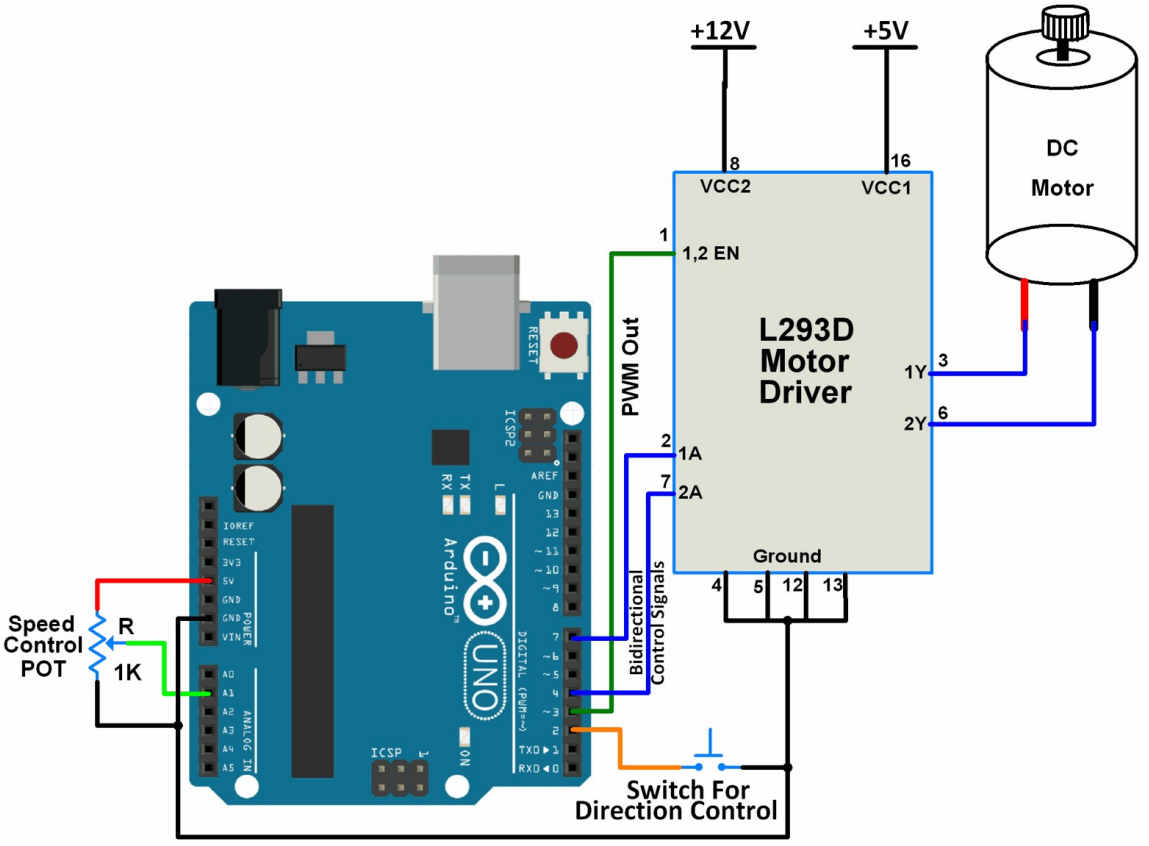


www.bristolwatch.com

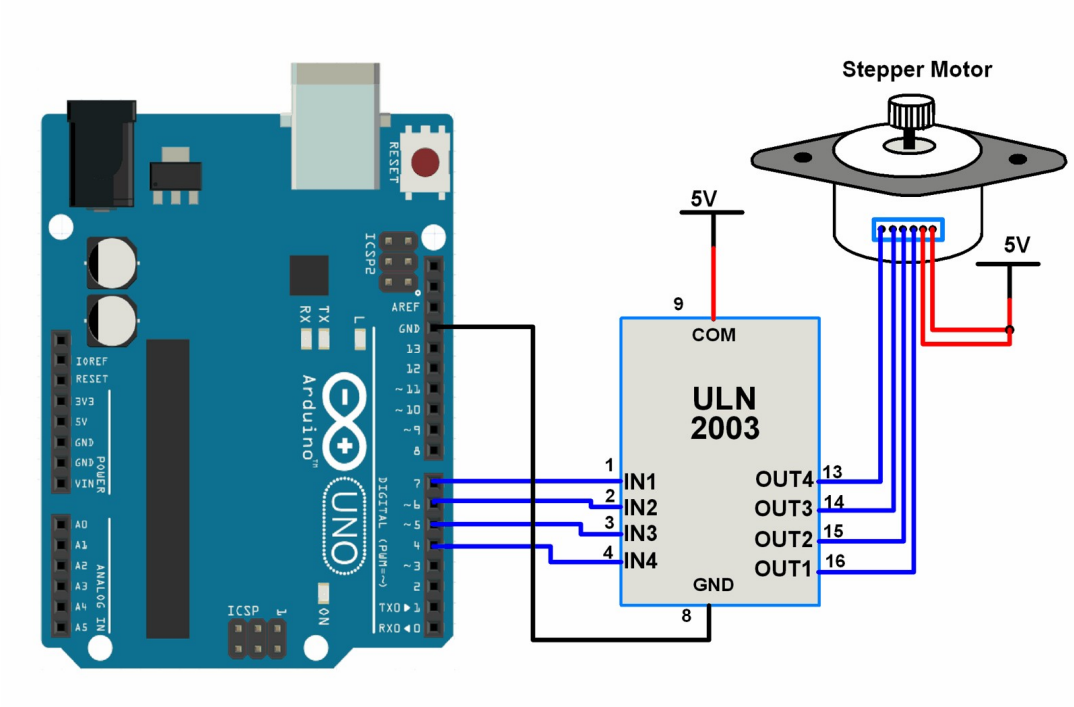




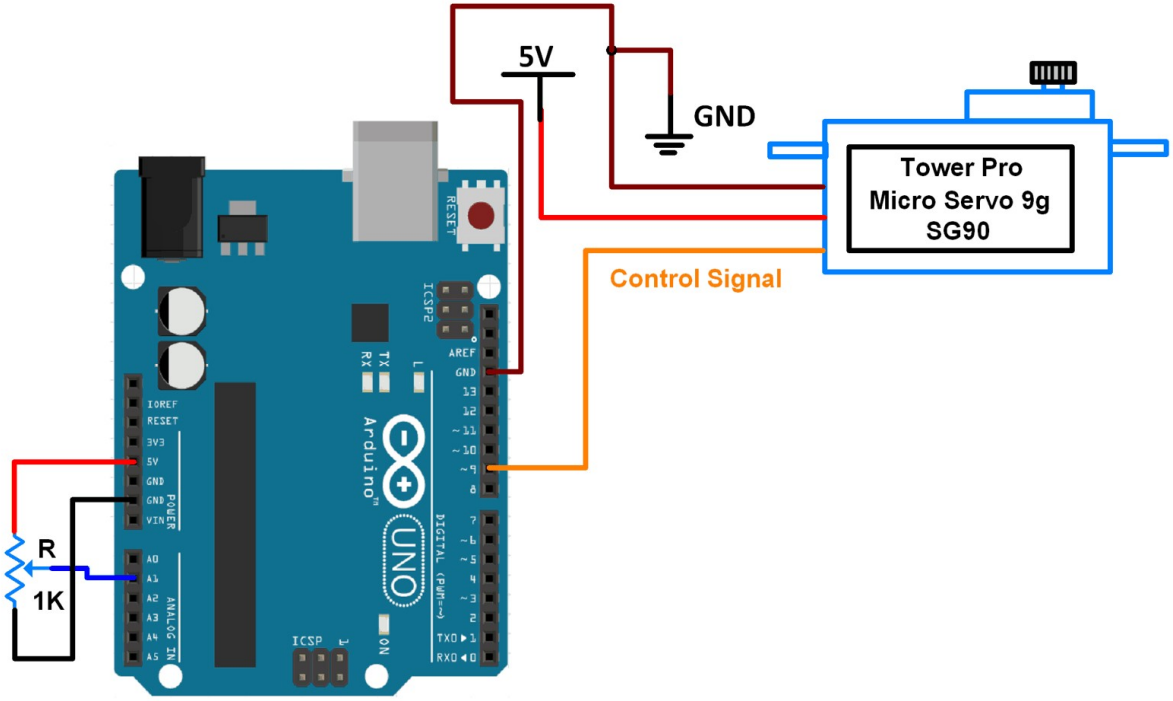
Interfacing to a DC Motor



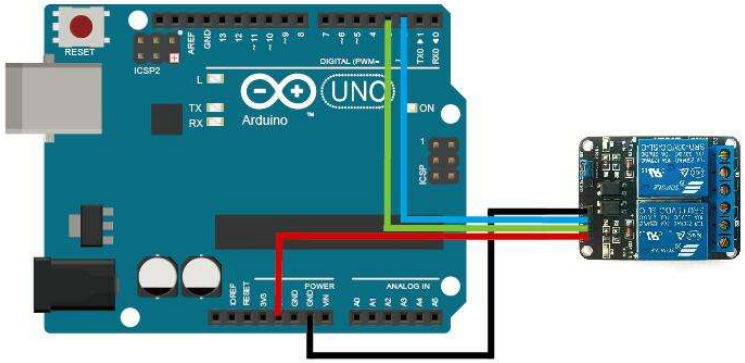
Interfacing to a Stepper Motor



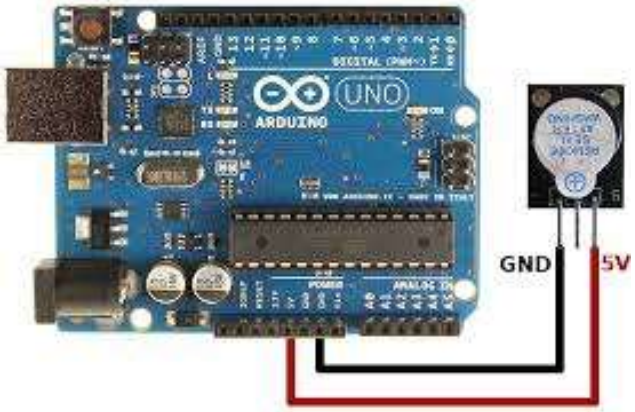
Interfacing to a Servo Motor



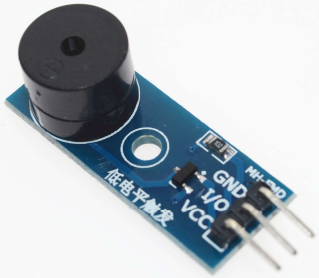
Interfacing to a Relay

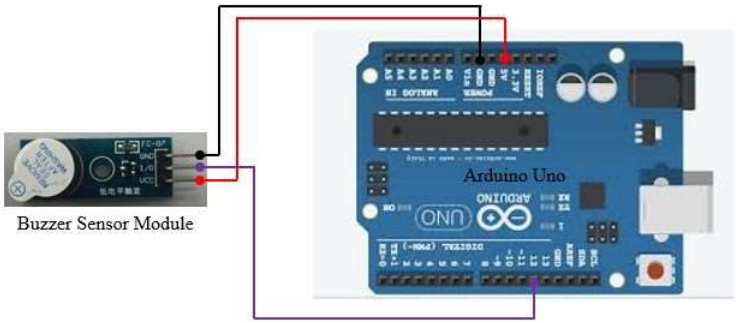


Interfacing to a Buzzer



Passive buzzer low level modules





- GND ----- Arduino GND
- I/O ----- Arduino Pin 12
- VCC ----- Arduino 5V

Referensi

1. https://www.studentcompanion.co.za/microcontroller-interfacing-basics/
2. https://www.studentcompanion.co.za/microcontroller-interfacing-advanced/
3. https://www.studentcompanion.co.za/microcontroll
4. https://www.electronicwings.com/sensors-modules/sensors-moduleser-interfacing-sensors/
5. http://acoptex.com/wp/project-105c/

Ada pertanyaan?

Semoga Bermanfaat dan Terima Kasih atas Perhatiannya