Home Exercise Guide - Arduino Uno R3 + Sidekick Basic Kit V2

Objective. Gain hands-on experience in basic electronics, rapid prototyping, and embedded programming while working entirely from home. By the end you will be able to:

- identify and wire common electronic components
- write and debug simple Arduino sketches that use digital, analog, PWM and servo interfaces
- design and document small electronic systems (schematic + block diagram)
- create and present a mini-project that extends the supplied tutorial tasks

1. Getting Started

a. **Install the Arduino IDE** and connect the Uno R3. Verify that `File → Examples → 01.Basics → Blink` uploads and blinks the on-board LED.
b. **Open the Sidekick online tutorial** (https://wiki.seeedstudio.com/Sidekick_Basic_Kit_for_Arduino_V2/ or the local mirror)
c. **Prepare your workspace** – Breadboard on a non-conductive surface, parts in the labelled tray, USB cable within comfortable reach.

Safety check – Never power the board if you feel components getting hot; immediately disconnect USB and re-check wiring.

Figure 1: Sidekick Basic Kit for Arduino V2 https://wiki.seeedstudio.com/Sidekick_Basic_Kit_for_Arduino_V2/

For the Lab report:

1. Sidekick Tutorial Documentation

a. **Block Diagrams** – Provide a *high-level* code flowchart or state-diagram for **three** tutorial tasks (e.g. *push-button control*, *analog potentiometer input*, *mini-servo sweep*).
b. **Electronic Schematics** – Neat, labelled schematics for the same three tasks. Use any CAD tool: KiCad, EasyEDA, Fusion360, Altium etc.
c. **Discussion** – ½ page reflecting on difficulties and debugging strategies.

2. Mini Project

Design and build a small application using the Sidekick components plus any optional parts from the lab junk-box.

Deliverables

- Full electronic schematic
- Block diagram of the firmware logic
- 3-D design (STL or drawing) for an enclosure and/or mechanical adapters
- 200-300 word application description (purpose, key features, future improvements)

Demo – Be prepared to present the working project to the instructor during the last lab sessions (3–5 min + Q&A).

Mini Project Inspiration:

- **Arduino game-pad** – build a handheld controller for the Alvik robot (joystick + buttons transmitting over serial with python over Wi-Fi implementation or Bluetooth).
- **Light-tracking servo** – closed-loop sun tracker to maximize solar-panel illumination.
- **Sound detector** – clap sensor that triggers a buzzer or LED flash.
- **Ambient mood light** – RGB LED that changes color with room brightness or temperature.
- **Tiny desk fan** – potentiometer controls motor speed; optional temperature feedback.

You are encouraged to propose *any* idea that can be realised safely with the available parts.

Good luck, and remember: **systematic wiring checks + incremental code testing** will save you hours of frustration!