SAAB – Basic Electronics Training

Scilabus

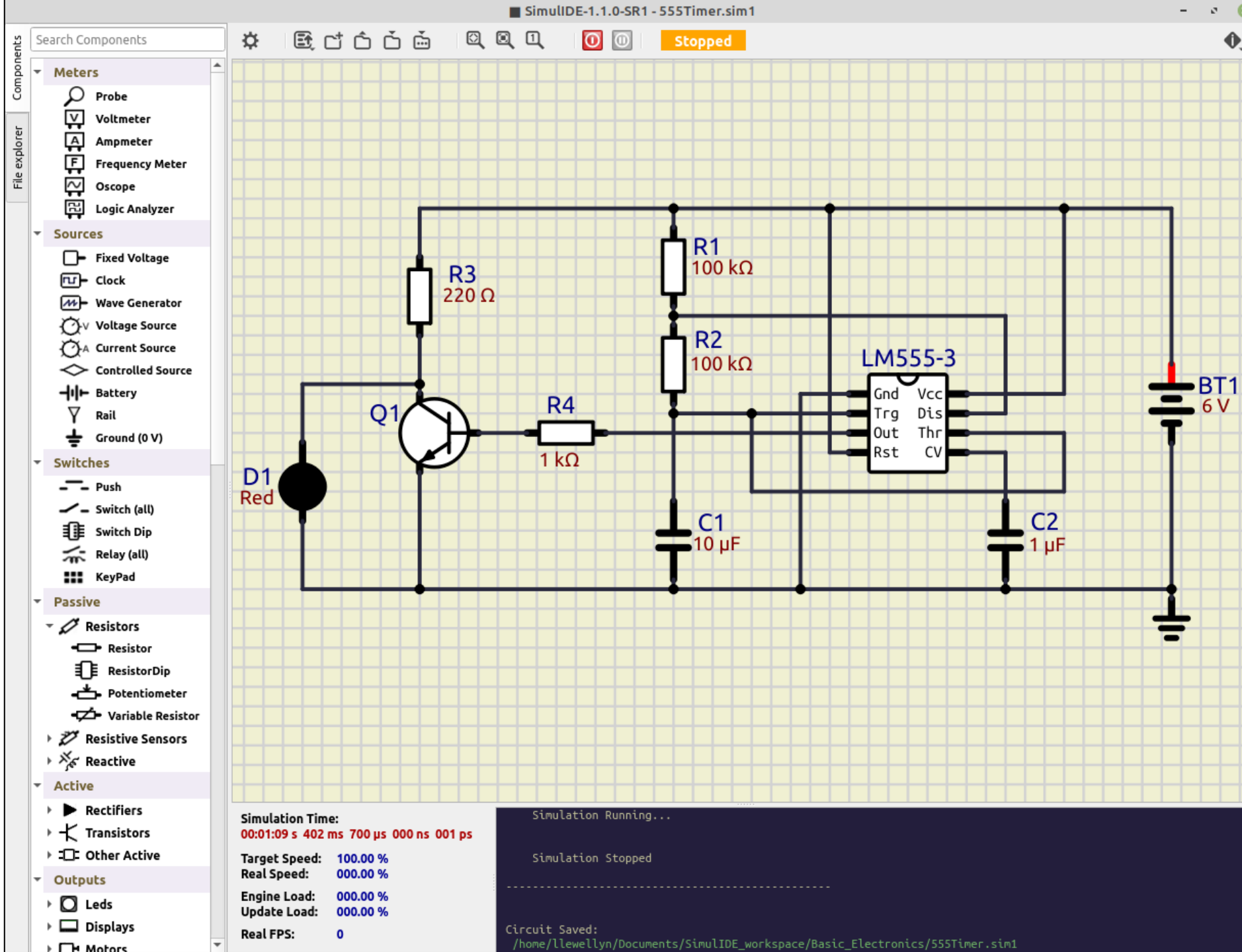
- Analogue Devices & Circuits
- Digital Devices & Circuits
- Embedded Programming
- Schematic Capturing & PCB Design
- Mechanical CAD

Topics

Analogue Devices & Circuits

1. Basic Mathematics (mainly Algebraic Manipulation)
2. Using Unit Prefixes (e.g. giga, mega, kilo, milli, micro, nano, pico, etc.)
3. Electricity, Magnetism and Atomic Structure of Conductors & Semiconductors
4. Potential Difference (V), Current (A), Power (Watts & Decibel), Frequency (Hz)
5. Passive Components and Symbols: Resistance (Ω), Capacitance (F), Inductance (H), Transformer, Diode
6. Passive Component Circuits/Applications – Source, Path, Load
7. Transfer Functions - DC Analysis/AC Analysis
8. Laws and their practical usage & benefits – Ohm, Norton, Thevenin, Kirchoff (KCL/KVL)
9. Introduction to - Active Components/Circuit Application: Transistors
10. Basics on Using Datasheets (e.g. Features, Performance, Min/Max Characteristics, Diagram, Waveforms, Dimensions, Applications)

Analog Circuit Simulation

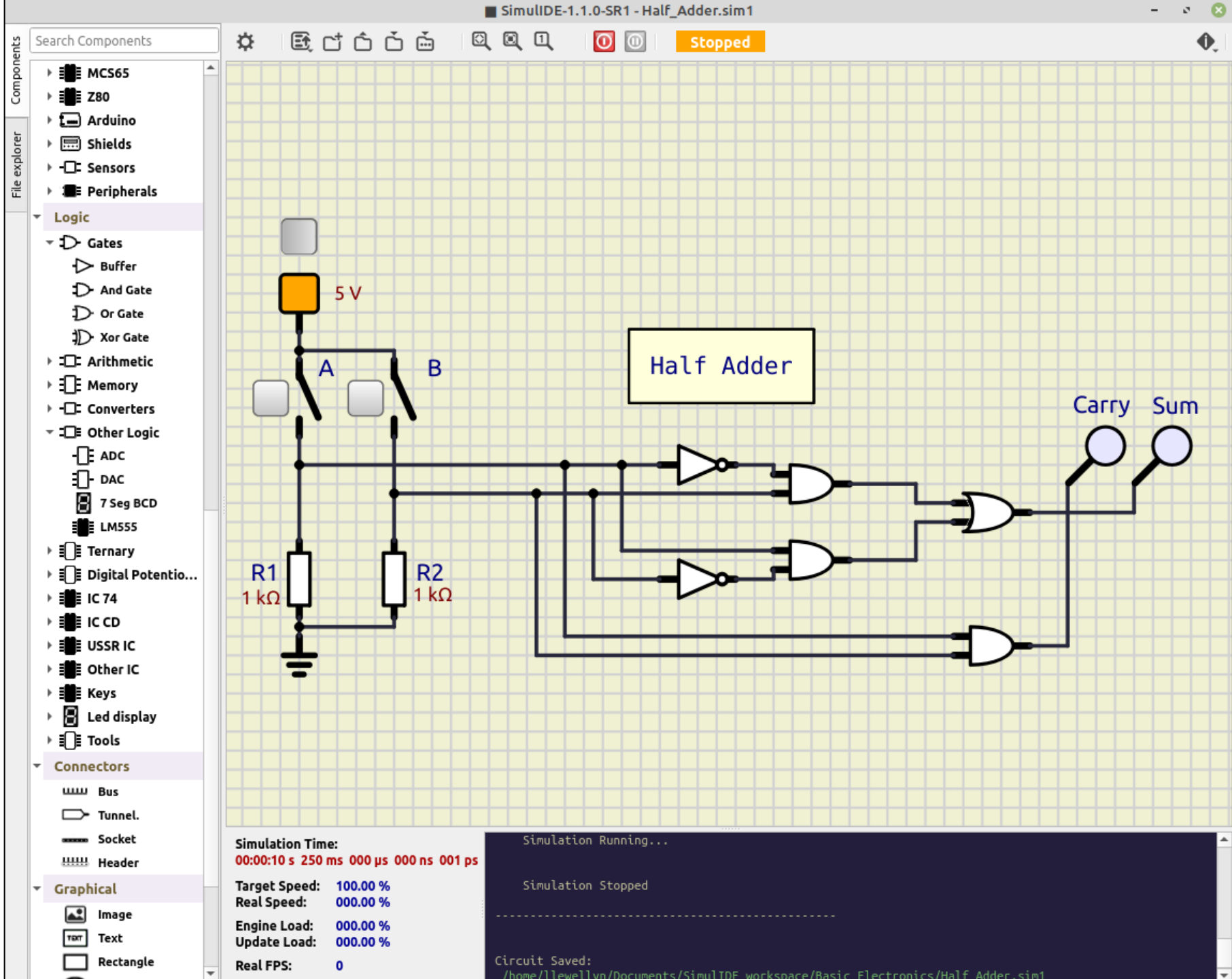


Topics

Digital Devices & Circuits

1. Analogue & Digital Systems
2. Binary Digits & Logic Levels
3. Digital Waveforms
4. Pulse Definitions
5. Periodic Pulse Waveforms
6. Timing Diagrams
7. Serial & Parallel Data
8. Basic Logic Functions (AND, OR, NOT, XOR)
9. Basic System Functions (Latches, Comparator, MUX, DEMUX, Arithmetic, Encoding, Decoding, Counters)
10. Integrated Circuits
11. Test & Measurement Instruments (Oscilloscope, Multimeter, Logic Analyzer)
12. Programmable Logic (PLD, FPGA, Microcontrollers)

Digital Circuit Simulation

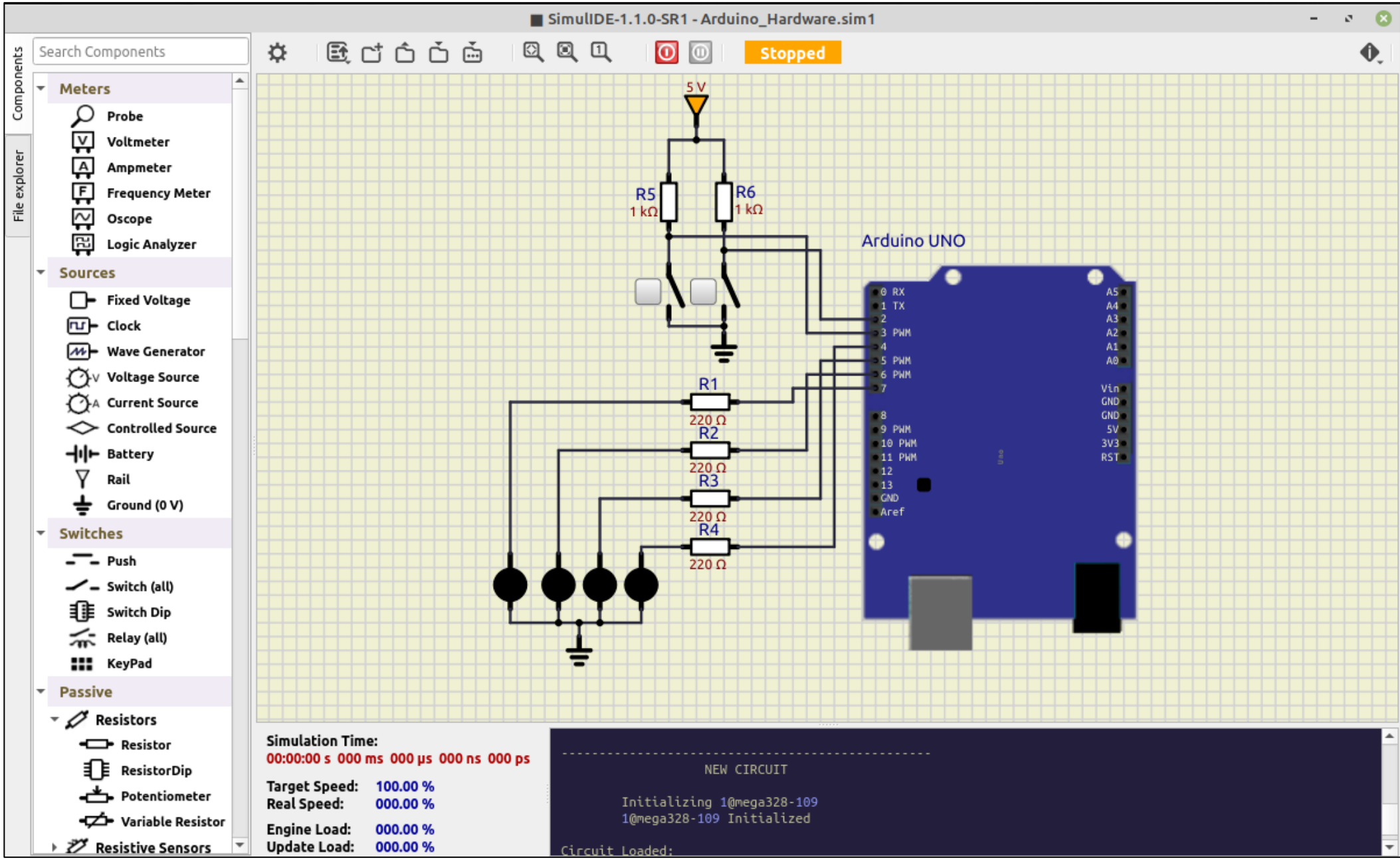


Topics

Embedded Programming

1. Digital I/O
2. Analog Input (ADC)
3. Analog Output (PWM)
4. Sensors (e.g. temperature, light, or motion sensors)
5. Actuators (e.g. buzzers, servo and DC motors)
6. Serial Communication (UART, I2C, SPI)
7. Timers & Counters and Delays
8. Software Structure
9. Integrated Development Environment

Embedded Circuit Simulation

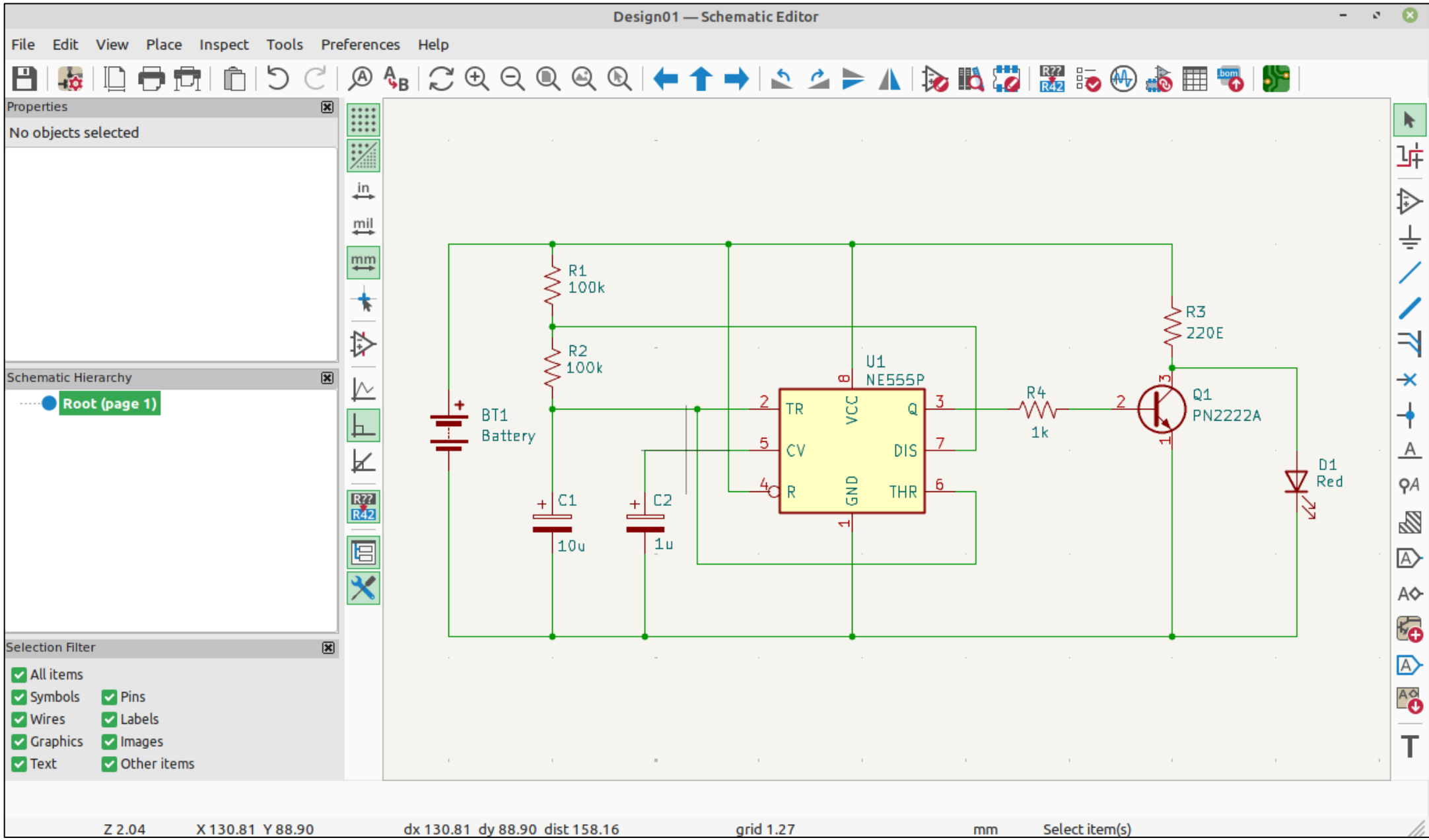


Topics

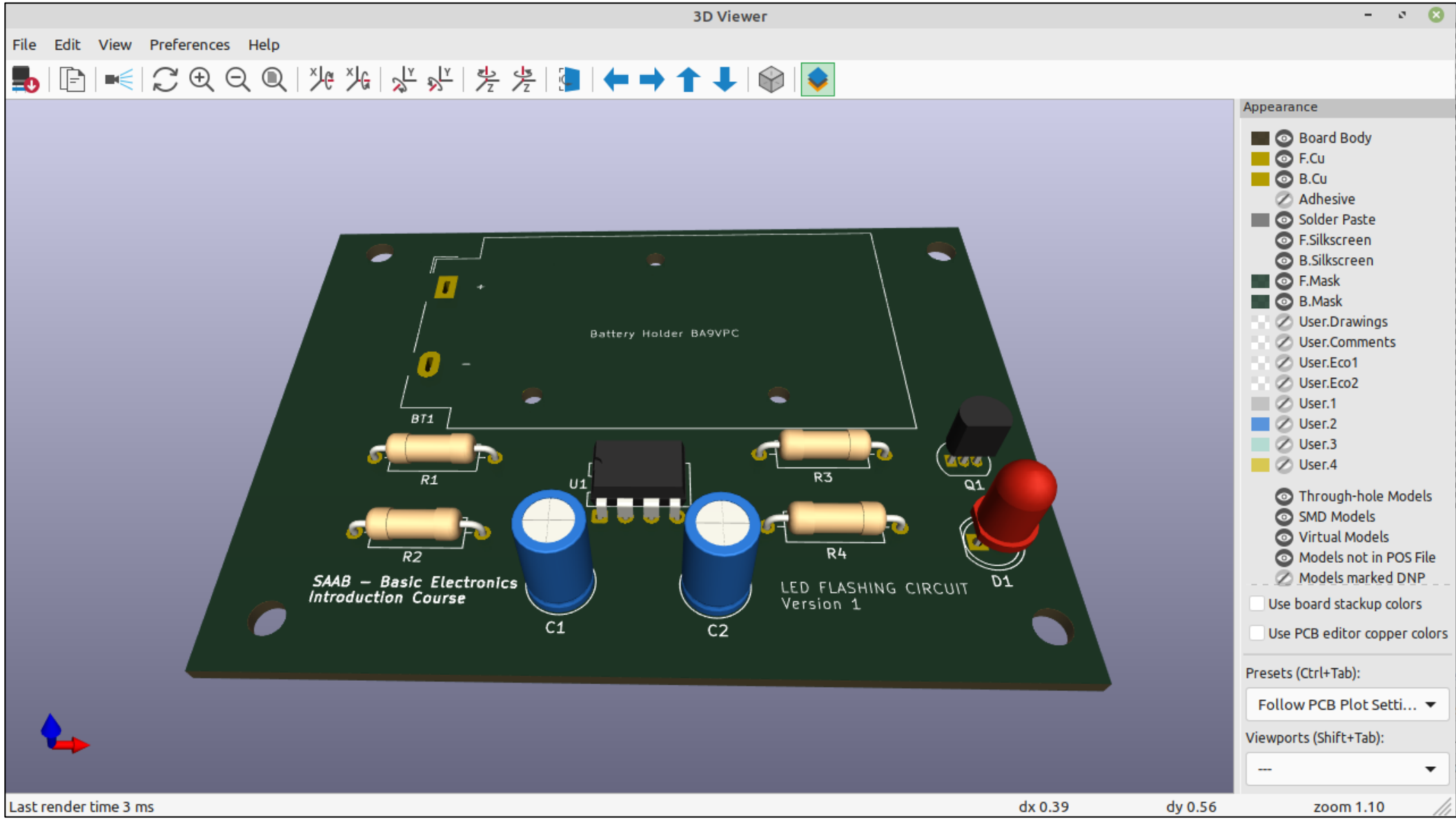
Schematic Capturing & PCB Design

1. Schematic Symbol
2. PCB Footprint
3. Schematic Layout
4. Electrical Rule Check (ERC)
5. PCB Layout
6. Design Rule Check (DRC)
7. PCB Rooting
8. PCB Manufacturing
9. PCB Assembly & Testing

Schematic Capture



PCB Layout
3D Model



Topics
Mechanical CAD

1. Sketcher Workbench Basics
2. Part Design Workbench
3. Turning sketches into 3D parts
4. Fillets, chamfers, and draft angles
5. Editing the model tree
6. Importing STEP files
7. Creating Assemblies
8. Inserting and constraining parts
9. Technical Drawings with Draft & TechDraw Workbenches
10. Adding dimensions, annotations, and title blocks
11. Exporting to PDF or DXF
12. Tolerances and fit basics

Mechanical CAD