



K.N.S. GOVT. POLYTECHNIC SAMASTIPUR

DEPARTMENT OF ELECTRONICS

(Electronic Simulation Software Practice)



EXPERIMENT - 1.2

AIM :- Practice different Interfaces of EDA tools.

APPARATUS REQUIRED: -

Sr. No.	Apparatus / Software Required	Purpose
1	Computer / Laptop	To run EDA software
2	EDA Tool	For circuit design and simulation
3	Internet Connection	For accessing online EDA tools if required
4	Circuit Components Library	To select electronic components
5	Power Supply and Ground Symbols	To complete circuit connections
6	Simulation Interface	To observe circuit output
7	Keyboard and Mouse	For drawing and editing circuits

Examples of EDA tools:

Type of EDA Tool	Examples
Online circuit simulators	Tinkercad, EasyEDA, Falstad
PCB design tools	KiCad, Eagle, Altium Designer
HDL simulation tools	ModelSim, Xilinx Vivado, EDA Playground
SPICE-based tools	LTspice, Multisim, PSpice

Theory:-

Electronic Design Automation (EDA) tools are software applications used by engineers and students to design, simulate, test, and verify electronic circuits and systems. These tools help in reducing manual design errors and improving the efficiency of circuit development.



Different EDA tools provide different user interfaces depending on their purpose. Some tools are used for schematic design, some for simulation, some for PCB layout, and some for writing and testing hardware description languages such as **Verilog** and **VHDL**.

Different Interfaces of EDA Tools:-

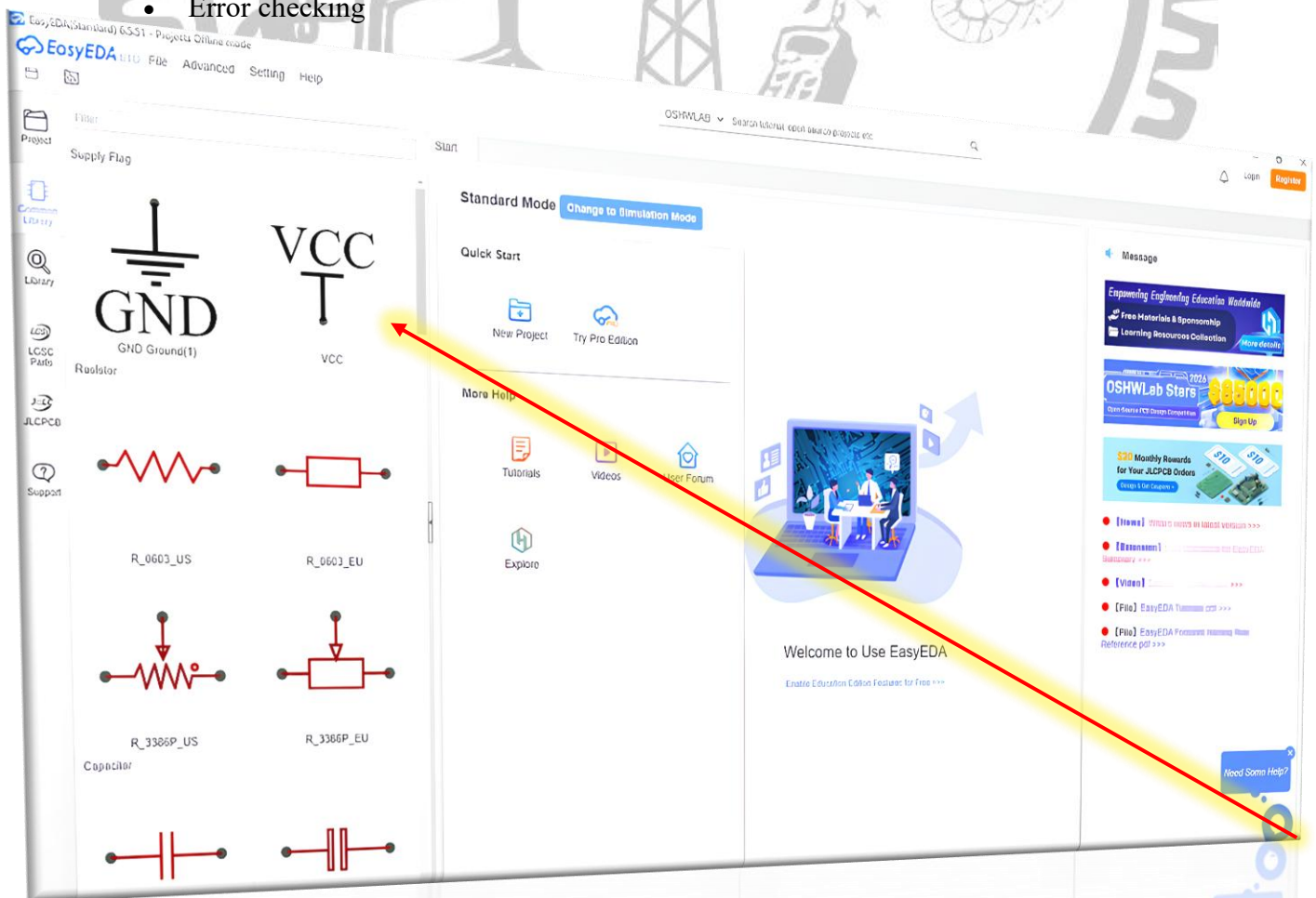
1. Schematic Capture Interface

The **schematic capture interface** is used to draw electronic circuit diagrams. Components such as resistors, capacitors, diodes, transistors, logic gates, ICs, power supply, and ground are selected from the component library and connected using wires.

This interface helps the user to create a visual representation of the circuit before simulation or PCB design.

Main features:

- Component library
- Wire connection tool
- Power and ground terminals
- Component value editing
- Circuit annotation
- Error checking





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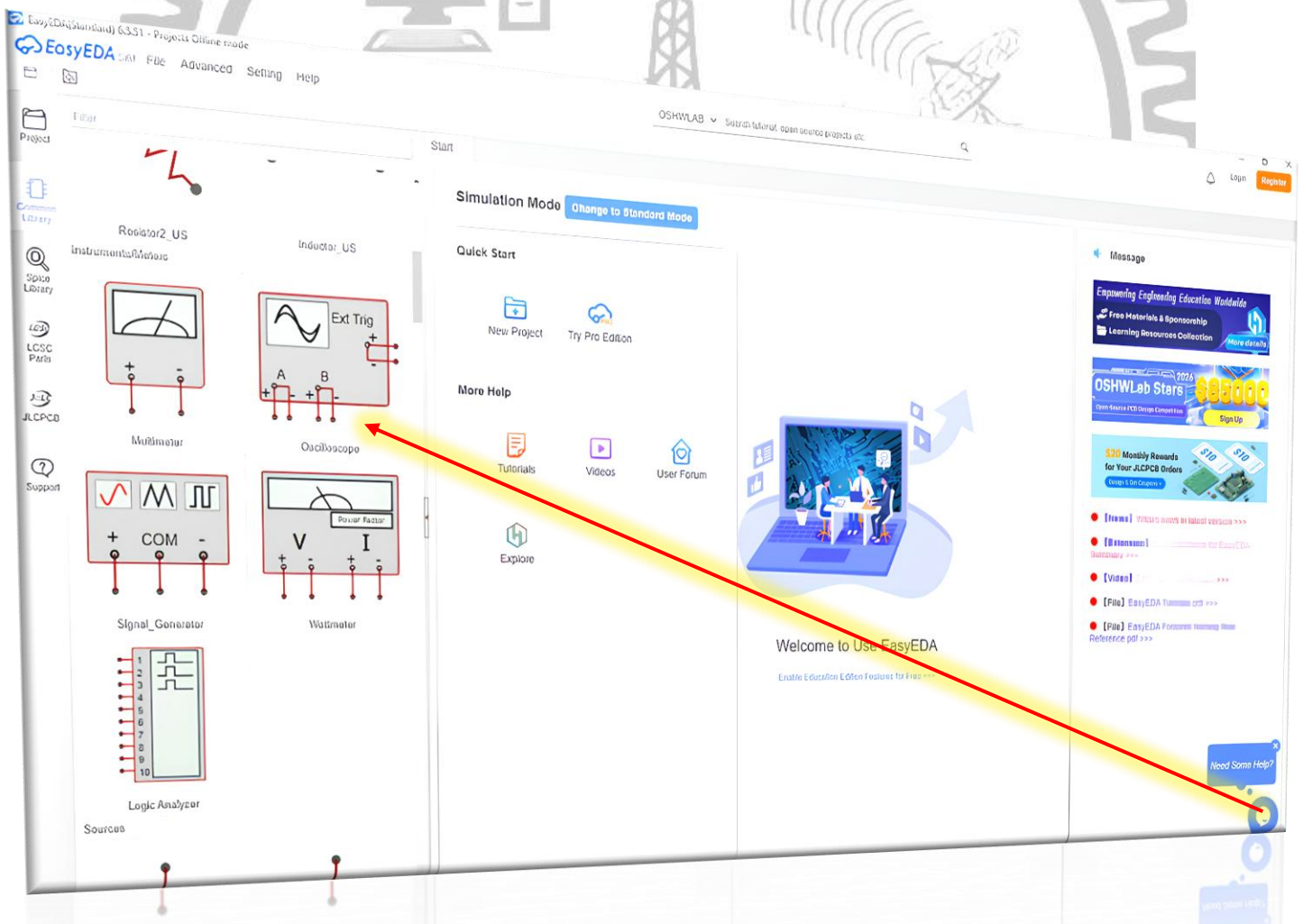
2. Simulation Interface

The **simulation interface** is used to test the working of a circuit virtually. After drawing the circuit, the user can run the simulation and observe the output using virtual instruments such as oscilloscopes, voltmeters, ammeters, waveform viewers, and logic analyzers.

Simulation helps in verifying whether the circuit gives the expected output before implementing it in hardware.

Main features:

- Run and stop simulation options
- Output waveform display
- Voltage and current measurement
- Time-domain analysis
- Frequency-domain analysis
- Error message display





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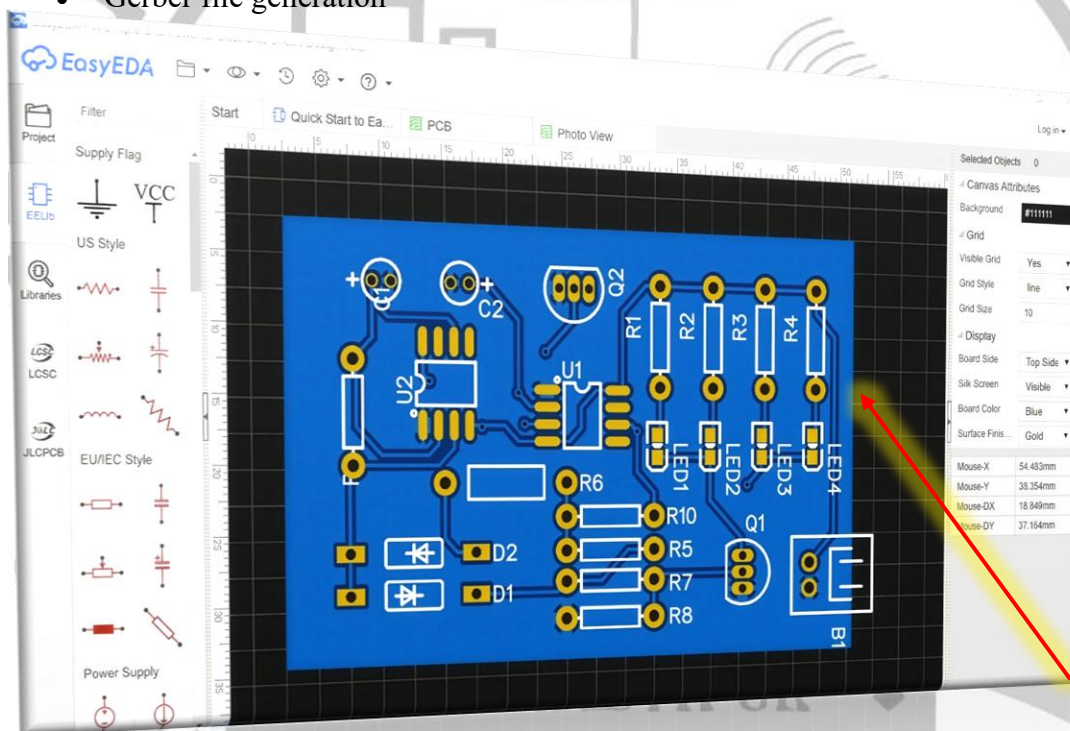
3. PCB Layout Interface

The **PCB layout interface** is used to design the physical printed circuit board. After completing the schematic, the circuit is converted into a PCB layout. Components are placed on the board, and copper tracks are routed to connect them.

This interface is useful for converting a circuit design into a real manufacturable PCB.

Main features:

- Board outline creation
- Component placement
- Track routing
- Layer selection
- Design Rule Check
- Gerber file generation



4. Component Library Interface

The **component library interface** provides access to different electronic components used in circuit design. Users can search, select, and place components into the schematic or PCB design.

A good component library saves time and improves the accuracy of the circuit design.



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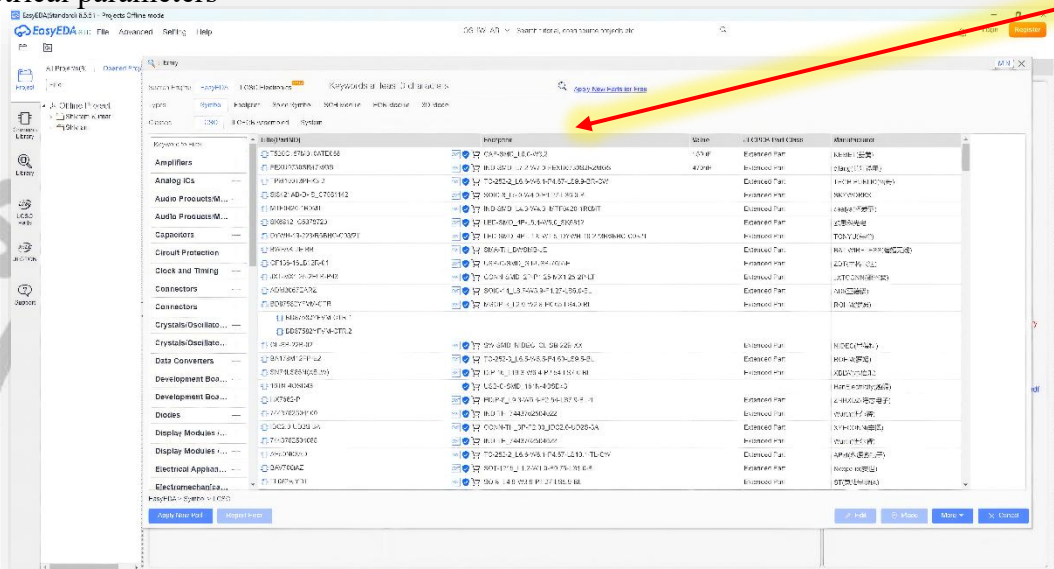
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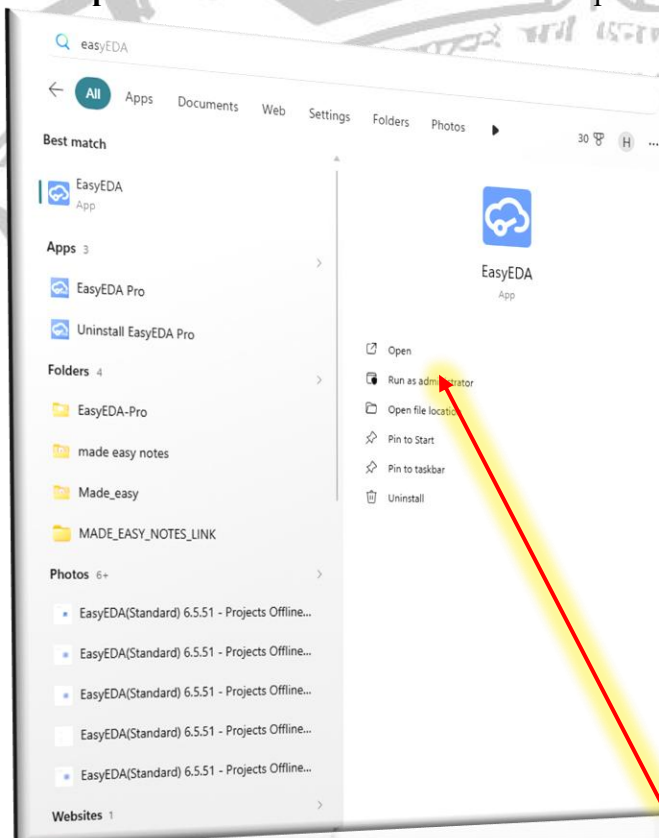
Main features:

- Search option
- Component symbols
- Footprints
- Component models
- Manufacturer details
- Electrical parameters



Procedure:-

1. Open the EDA tool installed on the computer or access an online EDA platform.





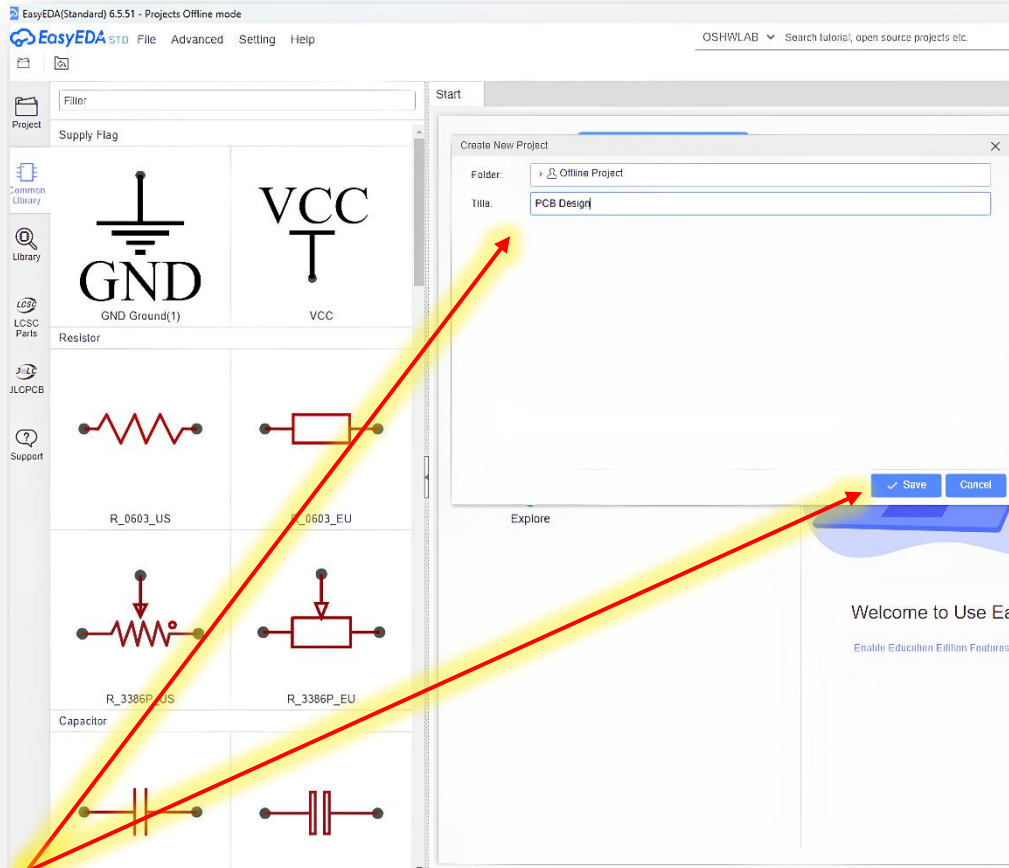
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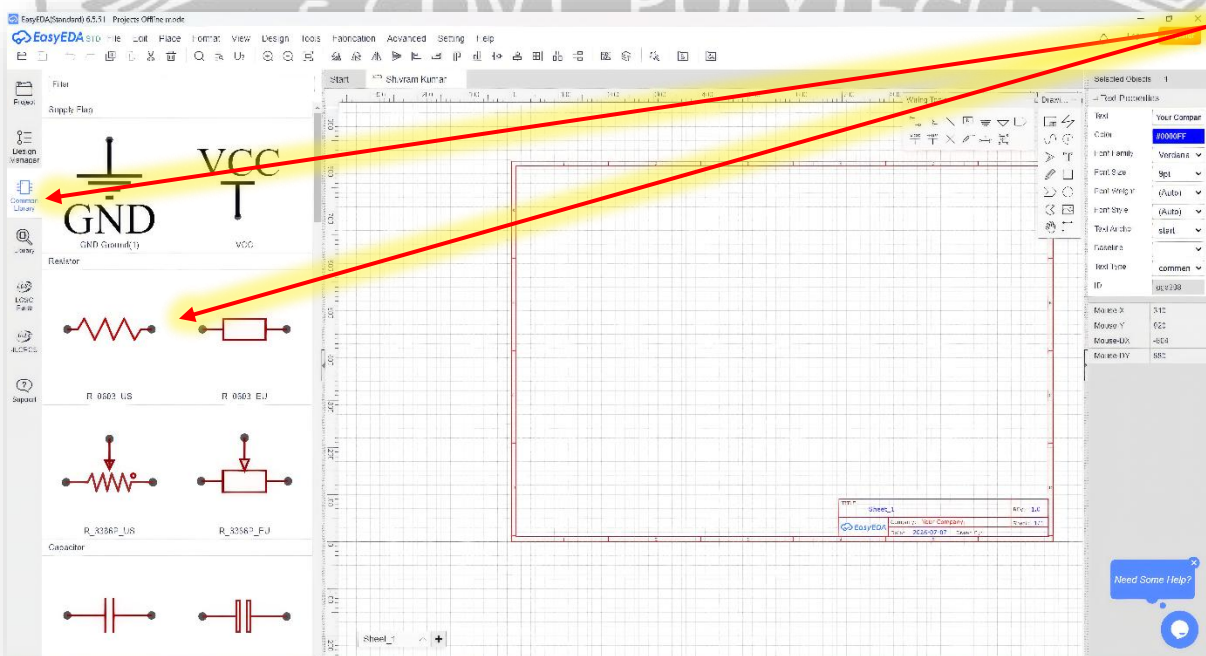


2. Create a new project and give a suitable project name.



3. Open the schematic capture interface from the project workspace.

4. Select electronic components from the component library, such as resistor, LED, capacitor, power supply, ground, logic gates, or ICs.





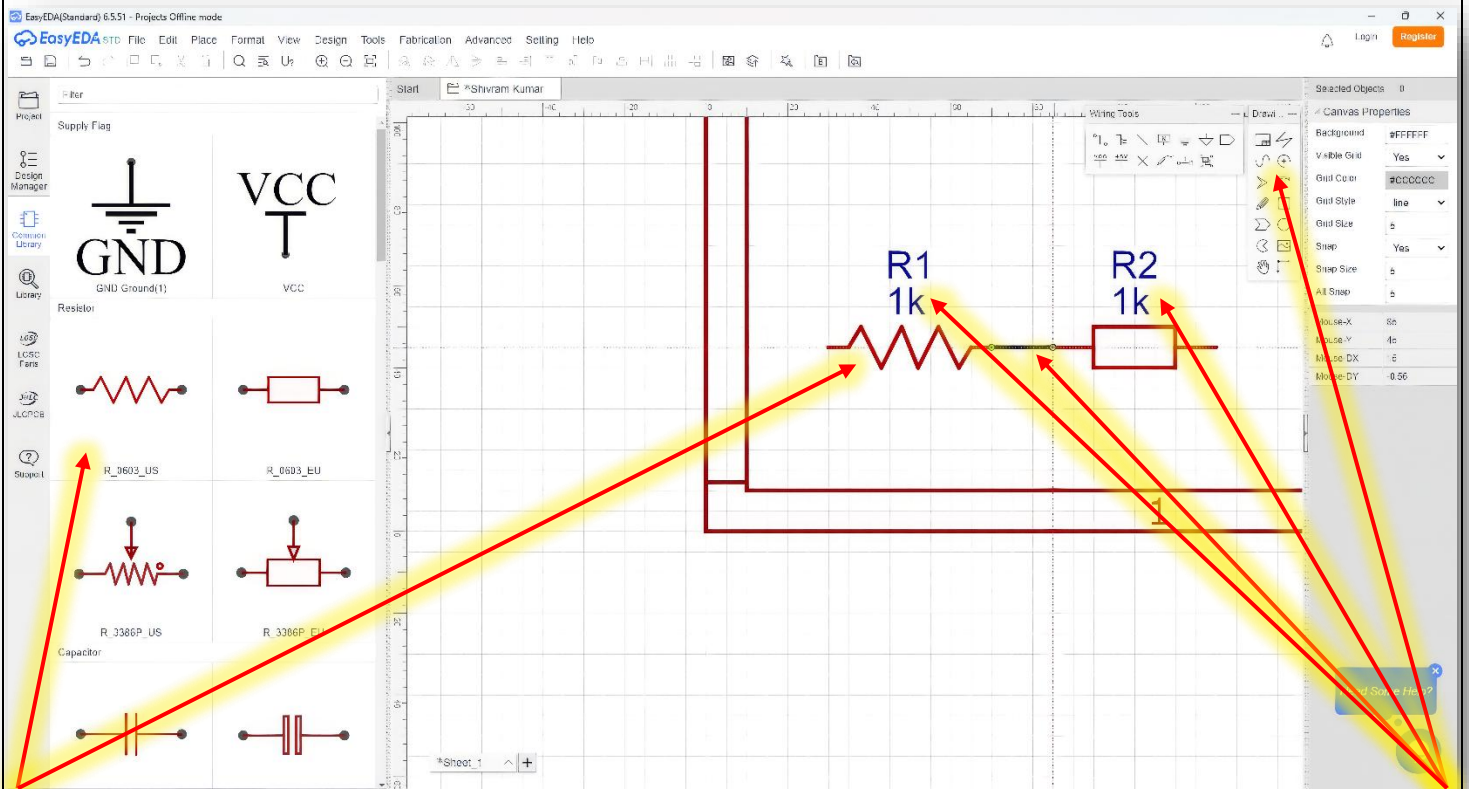
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5. **Place the components** on the schematic workspace according to the required circuit.
6. **Connect the components** using the wiring tool.
7. **Assign proper values** to the components, such as resistance, capacitance, voltage, or IC type.



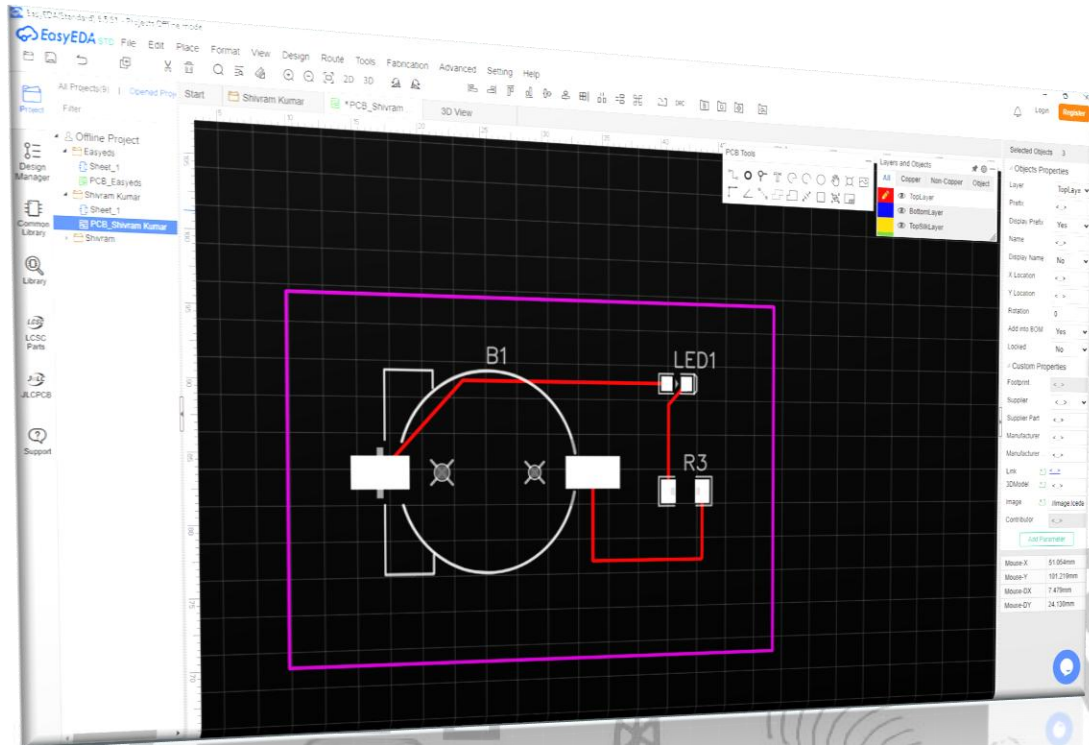
8. **Check the circuit connections** using the electrical rule check option if available.
9. **Open the simulation interface** and set the required simulation parameters.
10. **Run the simulation** and observe the output using meters, waveform viewers, or logic analyzers.
11. **Open the waveform viewer** to study the behavior of input and output signals.
12. **Modify the circuit if required** and run the simulation again to verify the result.
13. **Explore the PCB layout interface** if the tool supports PCB design.



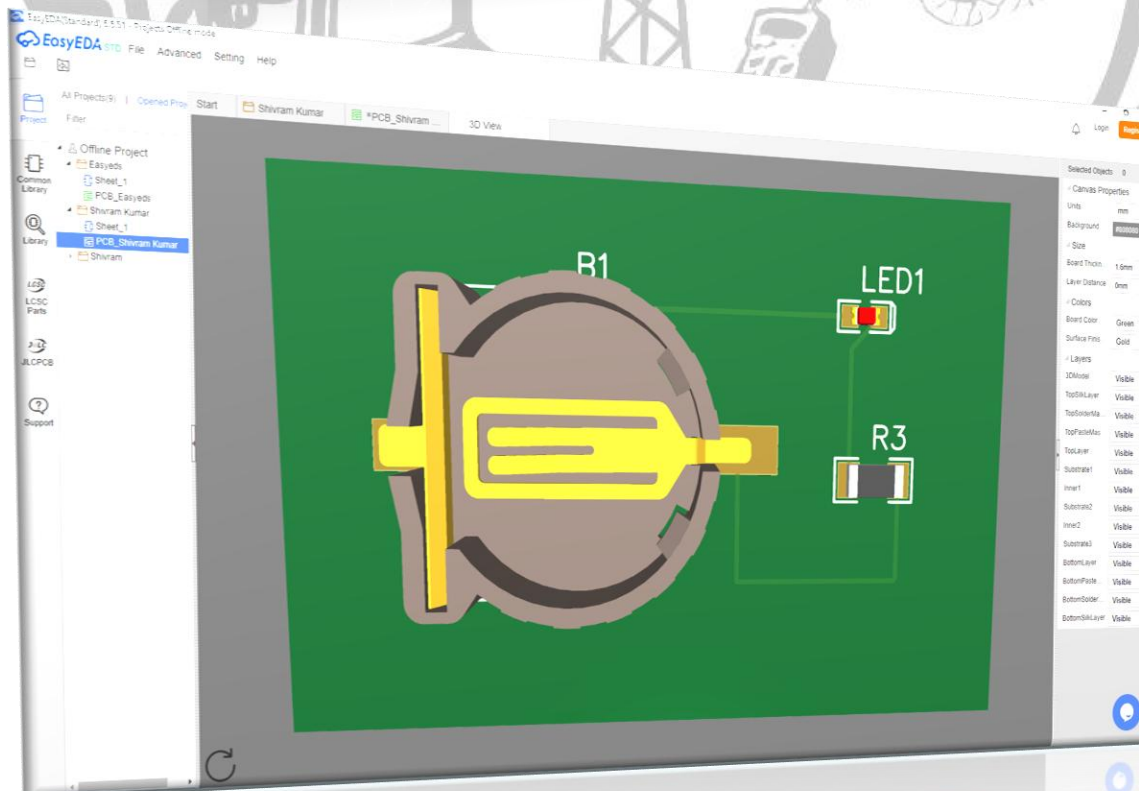
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14. Convert the schematic into PCB layout and place the components on the board.
15. Route the connections between components using copper tracks.
16. Run design rule check to verify the PCB layout.





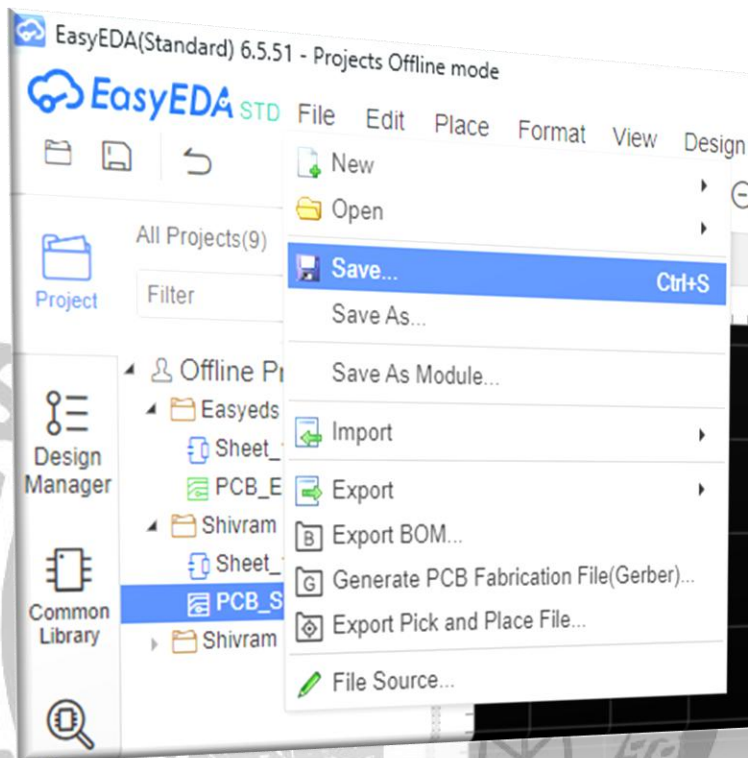
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17. **Save the project** after completing the design and simulation.
18. **Record observations** from different interfaces of the EDA tool.



Result:-

Different interfaces of EDA tools were successfully studied and practiced. The schematic capture interface was used to draw circuits, the component library was used to select components, the simulation interface was used to test circuit operation, and the waveform viewer was used to observe output signals.

The PCB layout interface was also explored for designing printed circuit boards, and the HDL coding interface was practiced using a simple Verilog program. Thus, the basic working and importance of different EDA tool interfaces were understood successfully.

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