

# EE-100 Engineering Laboratory

## **Module1: PCB**

Dr. –Ing. Ahmad Kamal Nasir

**[Office Hours]**

Tuesday (1200-1300)

Thursday (1200-1300)

Room 9-345A (EE Dept. Right Wing)

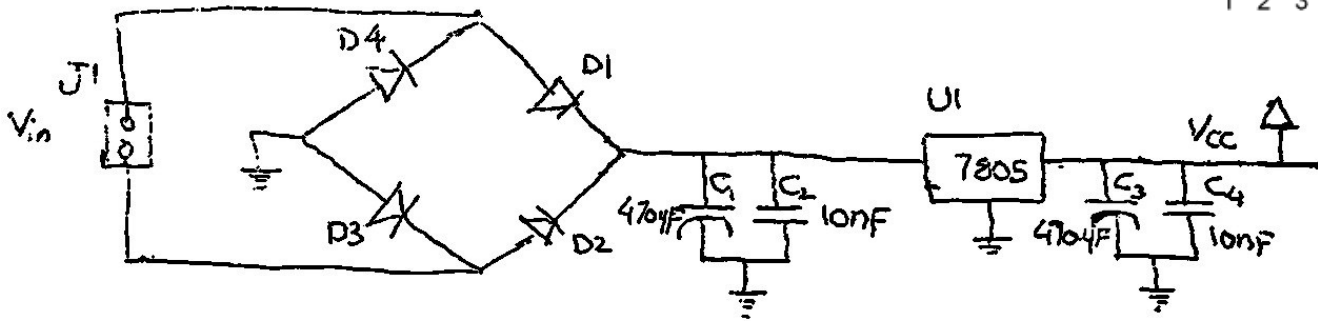
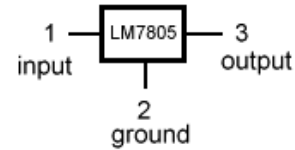
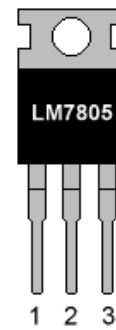
Module 1

**WEEK 3**

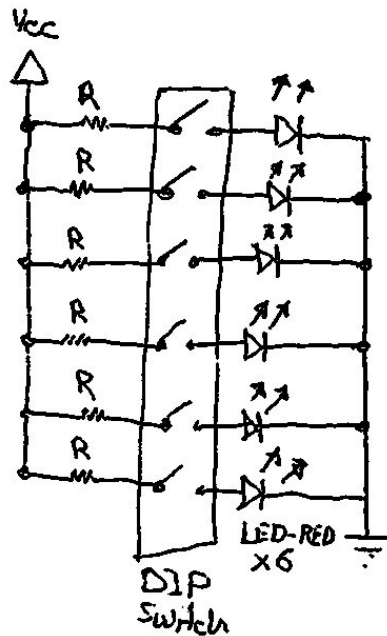
# Today Objectives

- Advanced Features of Proteus
  - Wire Labels
  - Multi-Sheets Design
  - Design Rule Manager for PCB
  - Auto Placement/Routing
- Lab Task
  - Schematic design for the problem solution
  - PCB design for the problem solution

# Warm-Up Demonstration



( Proteus Library Search Keyword )



$V_{in} = 12V$  DC Battery ( CELL )

$R = 330\Omega$  ( MINRES 330R )

$C_1 = C_3 = 470\mu F$  ( ZA470U100V )

$C_2 = C_4 = 10nF$  ( CERAMIC 10N )

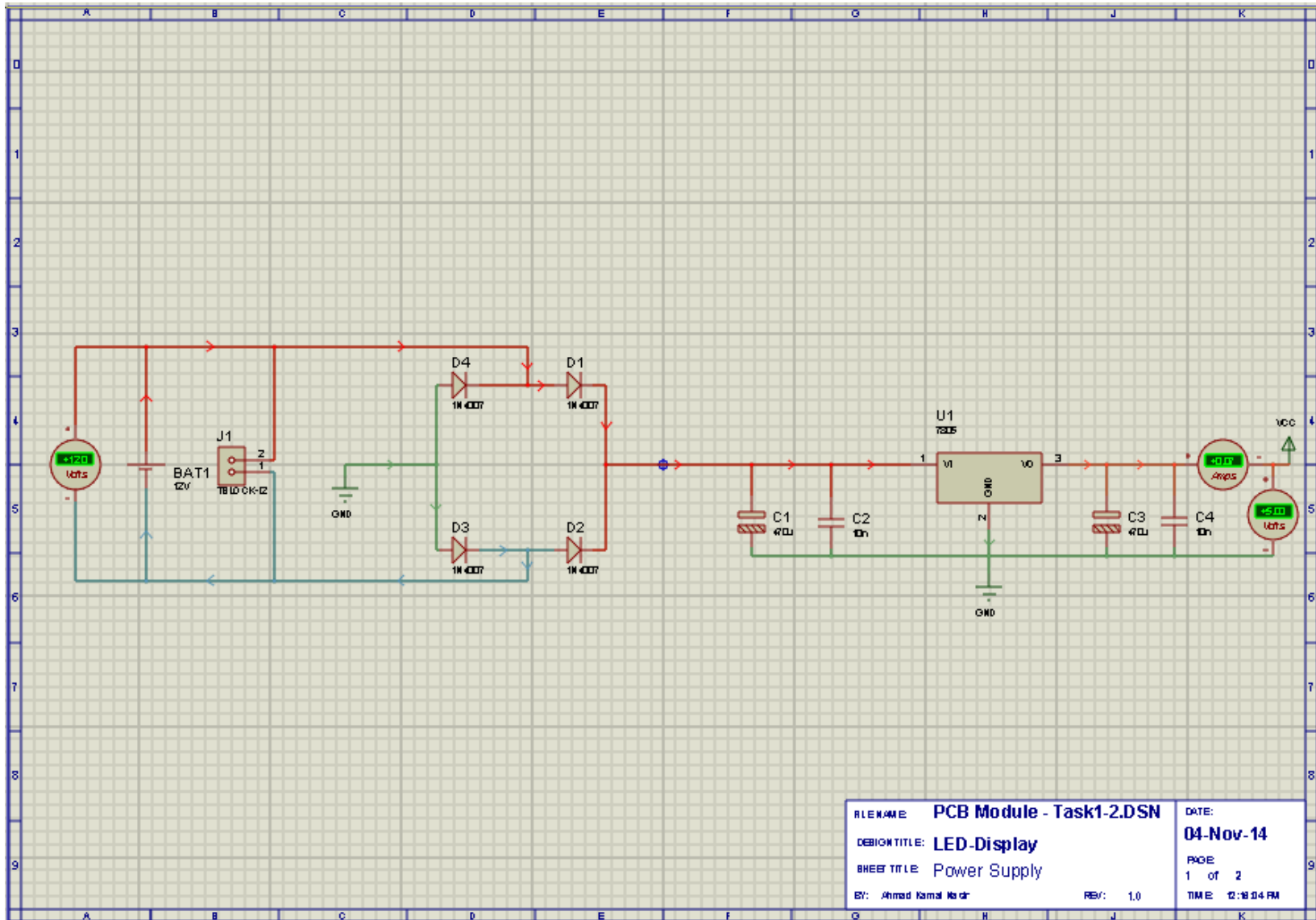
LED ( LED-RED )

$D_1 = D_2 = D_3 = D_4 = 1N4007$

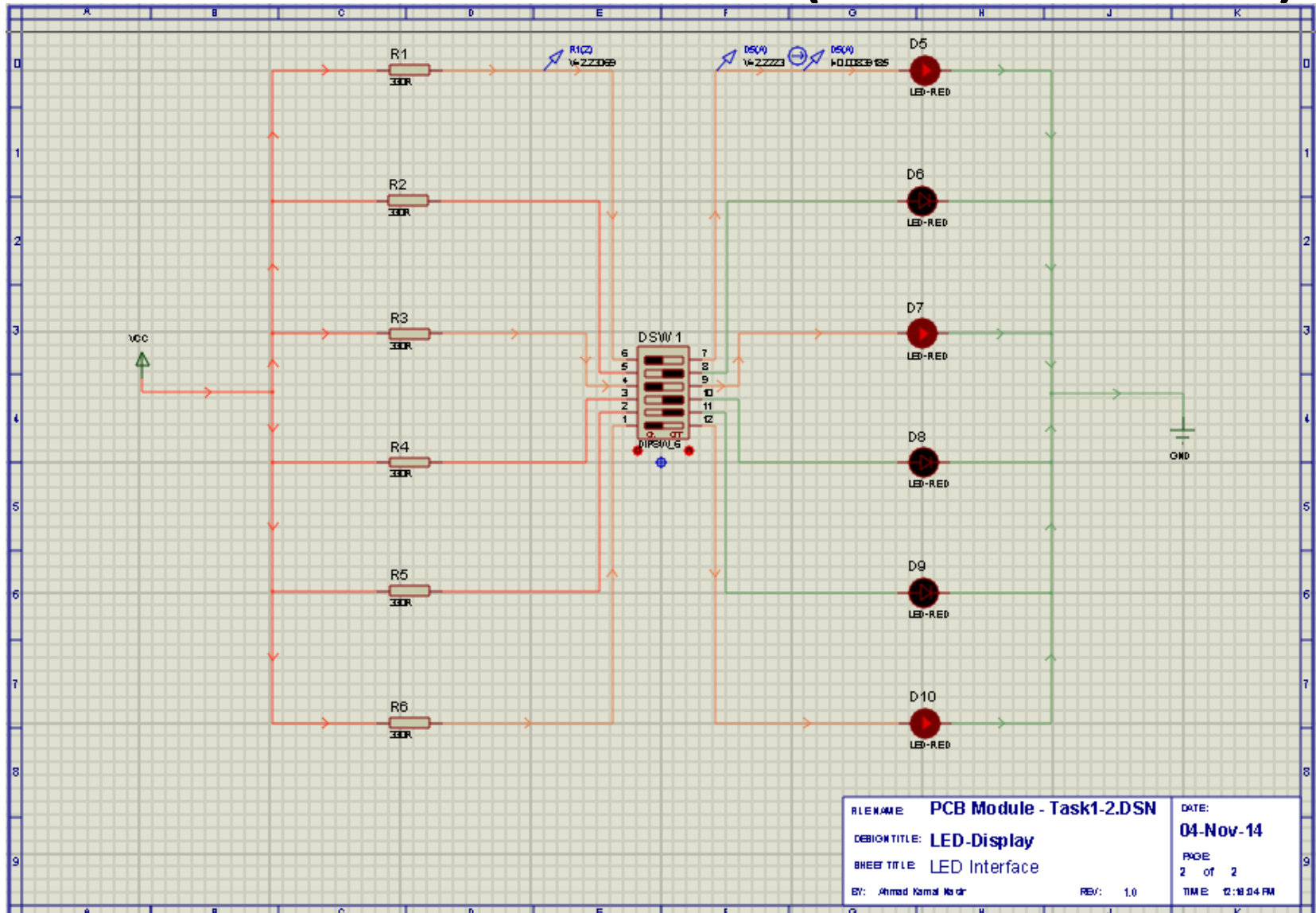
J1 = Terminal Block ( TBLOCK-I2 )

DIP switch = ( DIPSW-6 )

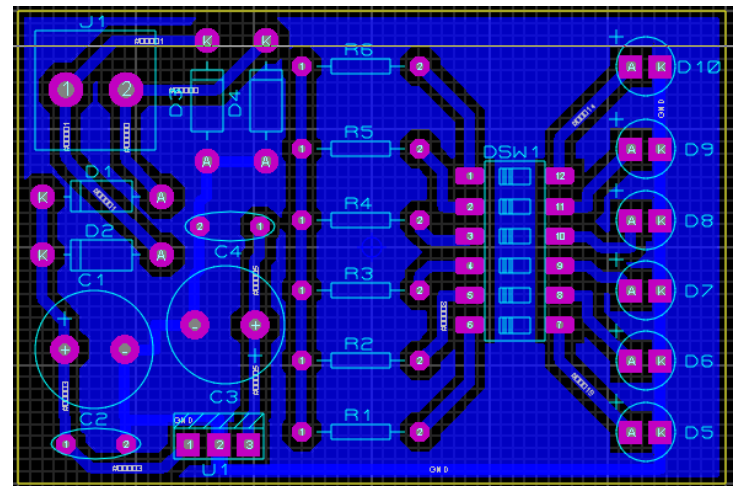
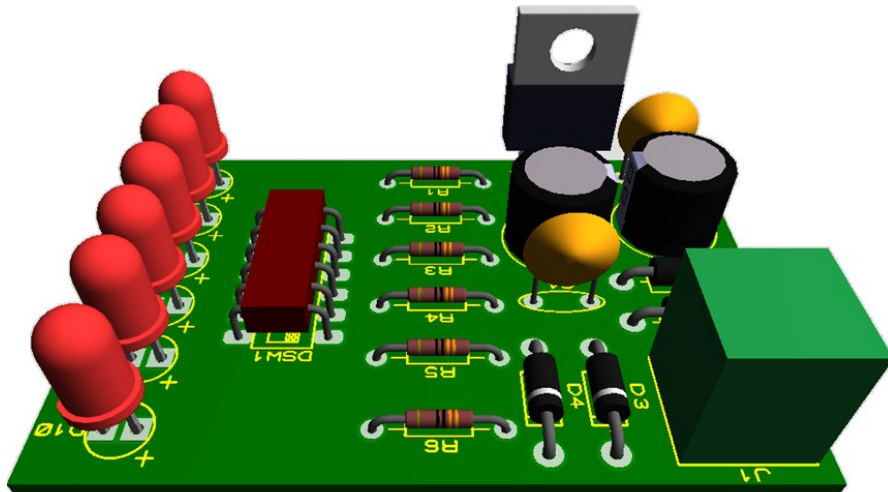
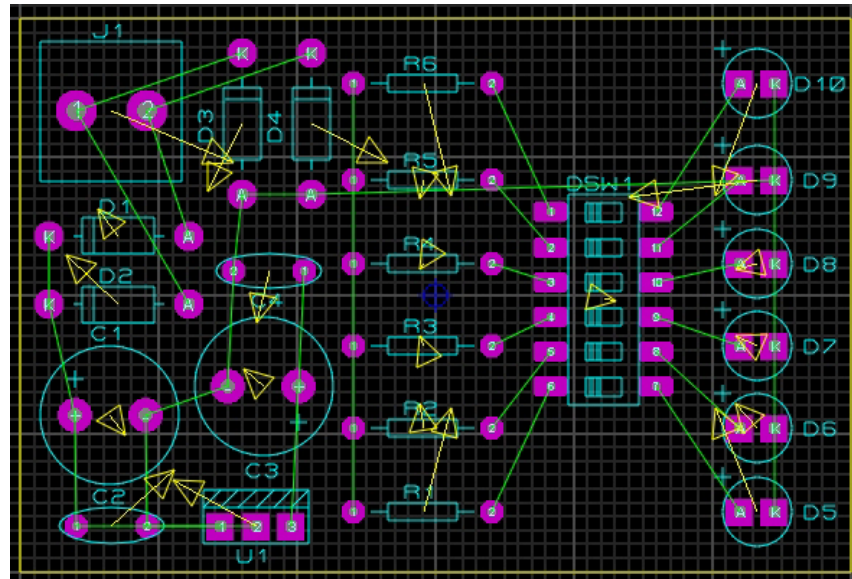
# Resultant Schematic (Sheet 1 of 2)



# Resultant Schematic (Sheet 2 of 2)



# Resultant PCB



# Lab Task 2: Create Schematic Drawing and PCB Layout Drawing

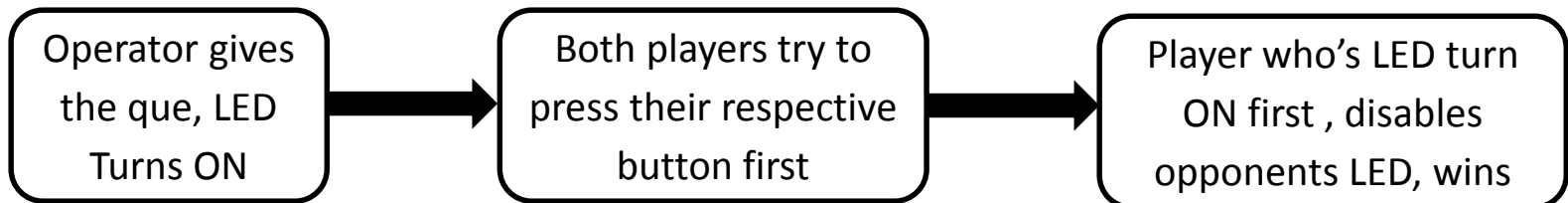


# Problem Statement

- We need to determine the reflex response between two people. Create Schematics and Layout Drawing for the circuit that allows you to visually determine the reflex response between two people.
- This also can be used in quiz events, where two participants hit their button to answer. The participant, who pressed his button first, will get a chance to answer first.

# Problem Description

The reflex between two people can be judged by determining who presses a button before the other person on a que. The designed circuit needs to have two visual output signals. A third person that is the operator will give the que of when to press the signal. Each person when given the que by the operator will try their level best to press their button before the other person. The person who switches ON the LED first, wins.



# Circuit Specifications

- Can operate from a **6V DC battery** source.
  - All circuit elements must use only the connected source
- Uses **LED ,2.2V @ 10mA**, for visual output
  - Calculate appropriate resistor to be used
- The relays used, must operate with the battery.
  - The relay requires **6V** to be operated and it has a **SPDT** switch
- Judge must simultaneously enable the circuit and give the start que.
  - A switch can be used to give a visual que such to turn on a LED
- The switches used for players are **SPST**
- Single layer PCB with track width of **40th** and PCB size not greater then **50mmX50mm**.
- Upload the schematic and layout files on **Dropbox**
  - Files should use the following naming convection
  - **Section\_TaskNo\_RollNo1\_RollNo2** (e.g.: L2\_Task2\_19XXXXXXXXX\_18XXXXXXXXX)

# Possible Solution

