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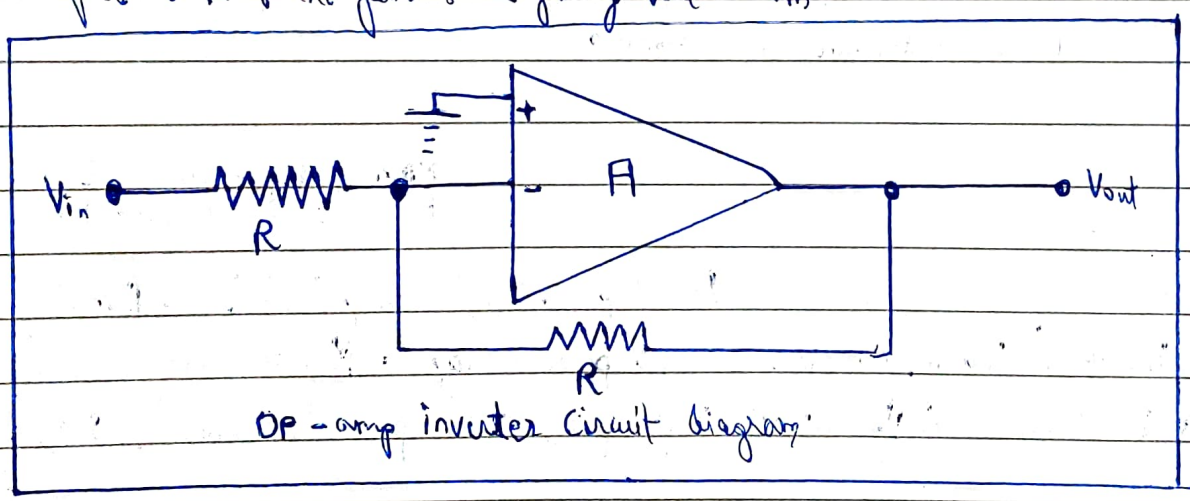
Experiment - 6

Aim :- To study about simulation softwares & simulating small networks in it.

Apparatus :- Simulation softwares ques, proteus

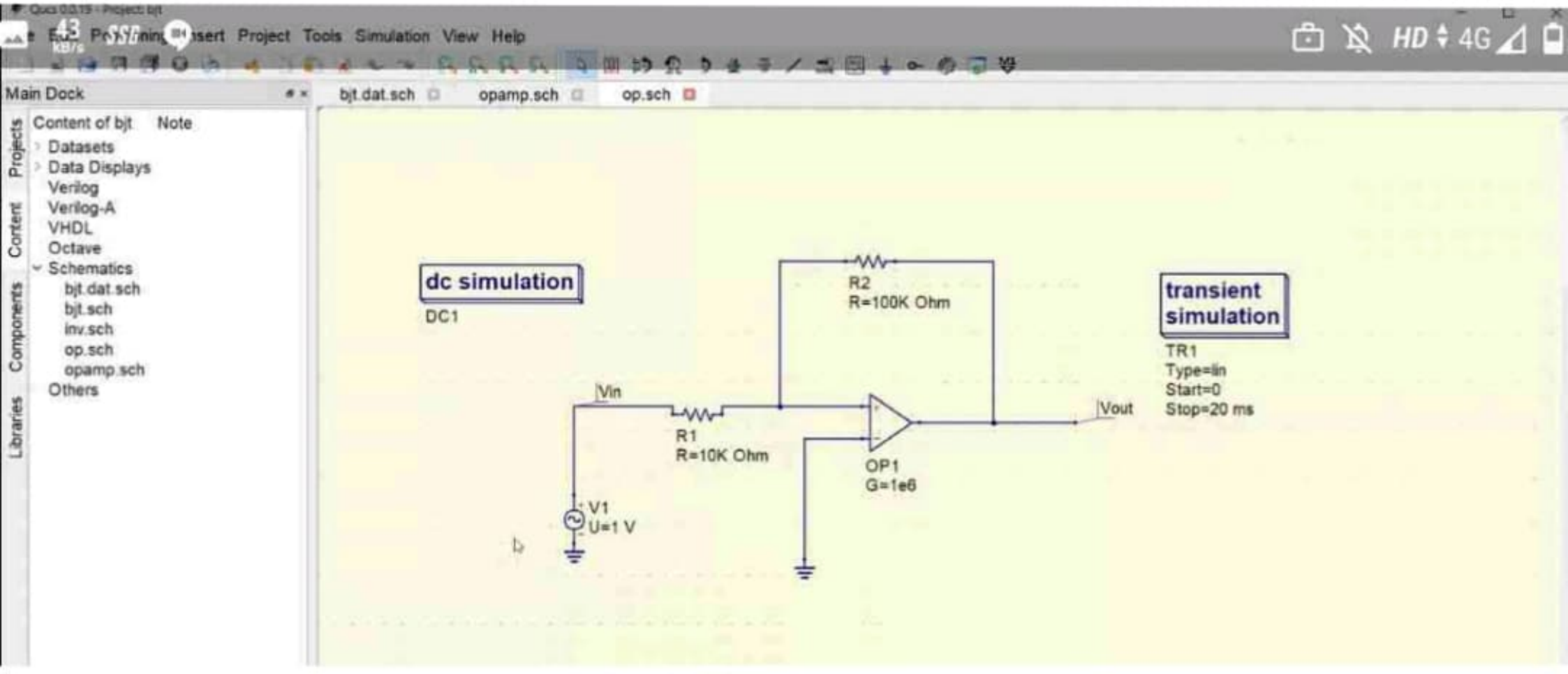
Theory :- ① **Ques :-** Quite universal circuit simulator is a free-software application released under GPL. It offers the ability to set up a circuit with a graphical user interface & simulate the large-signal, small signal & noise behaviour of the circuit.

a.) **OP-amp as an inverter :** op-amp are used to amplify signals from DC to type of megahertz & can be so in a variety of different op-amp configurations. The op-amp inverter also called an inverting buffer is the opposite to that of the previous voltage follower. The inverter does not amplify if both resistances are equal but does invert the input signal. The input impedance is equal to R if the gain is -1 giving $V_{out} = -V_{in}$



OP-amp inverter Circuit diagram

op-amp is the backbone of analog electronics. An op-amp is a DC-coupled electronic component which amplify voltage from a different input using resistor feedback.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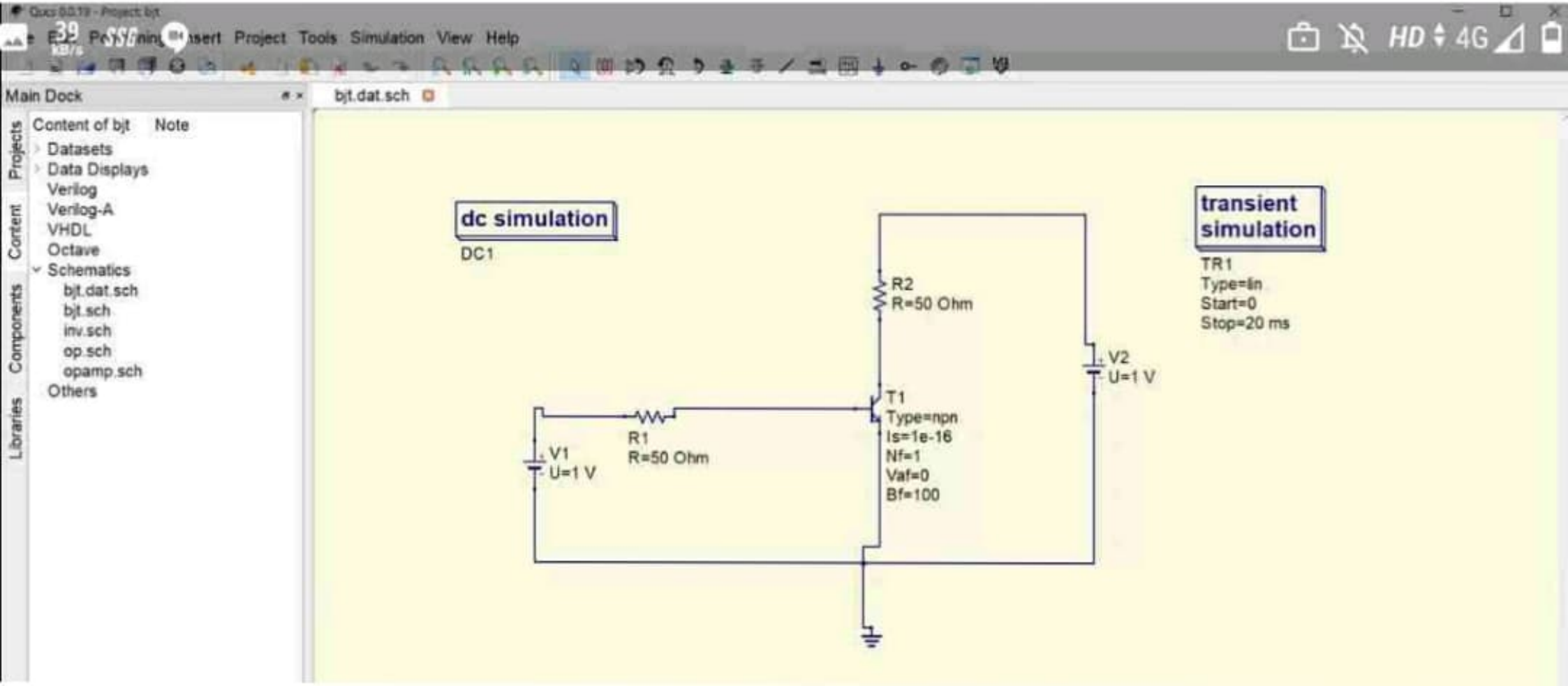
b.) BJT as an Amplifier :- For a transistor to act as an amplifier, it should be properly biased A BJT acts as an amplifier by raising the strength of a weak signal. The DC bias voltage applied to the emitter base Junction, makes it remain in forward biased condition. This forward bias is maintained regardless of the polarity of the signal. The low resistance in input circuit, lets any small change in input signal to result in an appreciable change in the output. The emitter current caused by the input signal contributes the collector current which when flows through the load resistor, results in a large voltage drop across it. Thus a small input voltage results in a large output voltage, which shows that the BJT works as an amplifier.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Projects
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Components
Libraries
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DC1
transient simulation
TR1
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Stop=20 ms
R2
R=50 Ohm
V2
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T1
Type=npn
Is=1e-16
Nf=1
Vaf=0
Bf=100
R1
R=50 Ohm
V1
U=1 V

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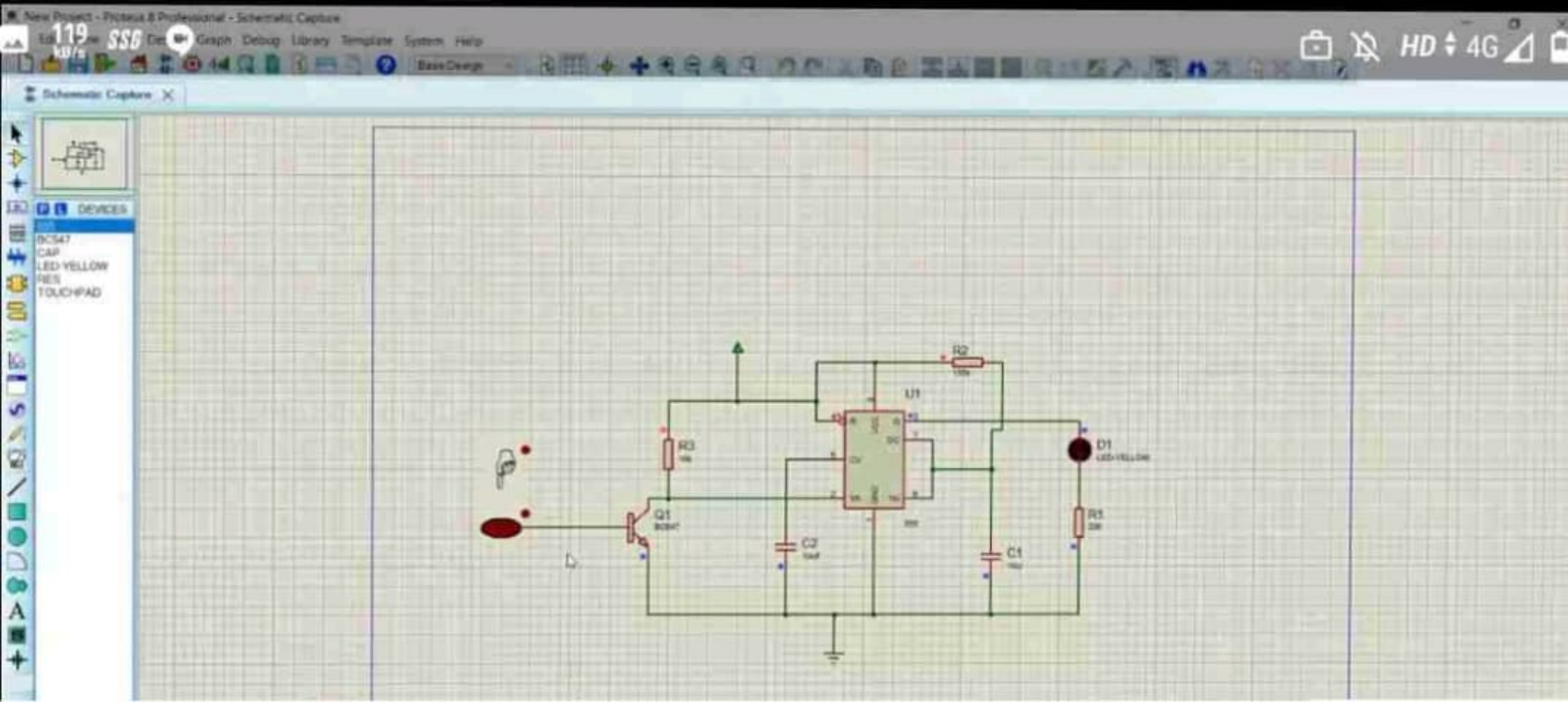
② Protius :- The protius is a proprietary software tool suite used primarily for electronic design automation. The software is mainly used to create schematics & electronic prints for manufacturing printed circuit boards. It is same as Qucs but has better functions than it.

a-) Touch sensor using ic 555 :- The simple touch switch is developed by using 555 timer ic operated as a MONOSTABLE vibrator. Here the stable stage is low, so the timer outputs low after the trigger is removed. Basically in this circuit we will have a LED which turns on when we touch a pin of timer. This circuit is really useful for making touch operated doorbells, buzzers, toys, etc. This circuit is realized by utilising the high input impedance of the trigger pin of the 555 IC. When the IC is triggered by the induced voltage of the human body the output goes high for a time determined by R & C.


New Project - Proteus 8 Professional - Schematic Capture
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Schematic Capture
DEVICES
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CAP
LED-YELLOW
RES
TOUCHPAD
R2
U1
R3
D1
Q1
C2
C1
R1

Conclusion :- Thus, we have studied about different simulation softwares & have simulated one circuits on them.