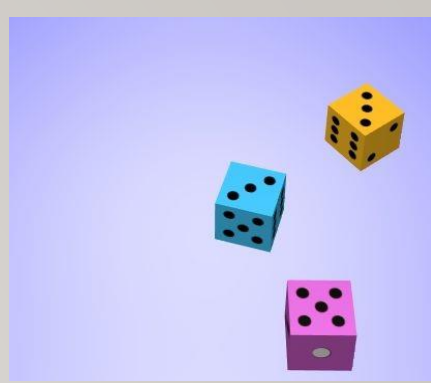


DIGITAL DICE



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GUIDED BY:
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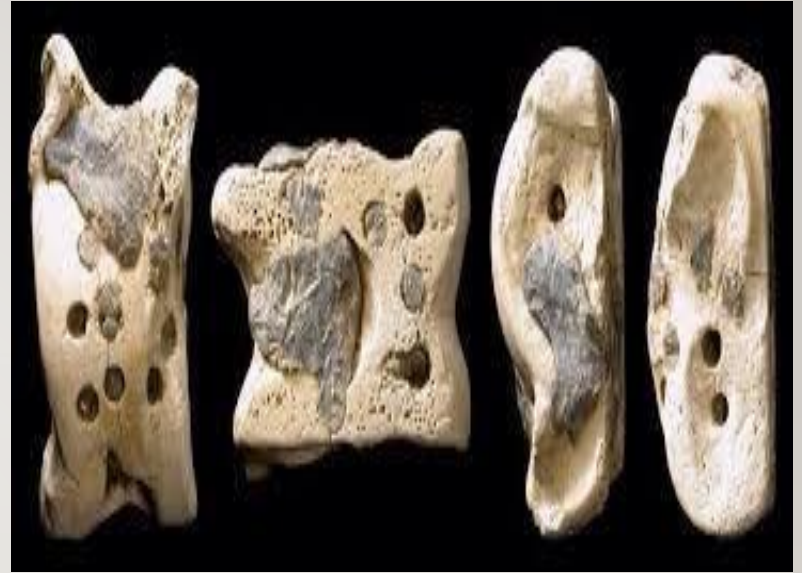
DLD PROJECT

WHAT IS A DICE?

- A dice is a throwable device with multiple resting positions and used for generating random numbers.
- Playing with dice needs us to pick up a dice and make sure that it is unbiased. Usually dice is made up of wood or plastic which may have some deformations.
- So, to solve these problems we have with our conventional dice we made a dice circuit which is totally unbiased and there is no chance of cheating.
- The objective of this project is to create unbiased dice which is far better and reliable than our conventional dice and can be used for many purposes.

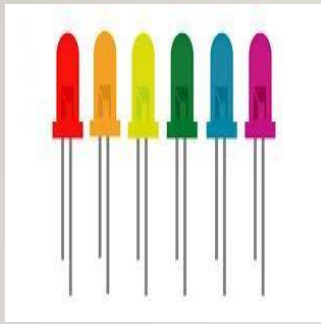
HISTORY OF DICE

- Dice have existed for a very long time.
- The first known six-sided dice were found in Iraq and were made in 2750 B.C. They were made of terracotta, with small holes for the spots.
- Originally dice were used for sorcery and to predict the future, Wise man from the village would roll the dice and, depending on the outcome, would predict what auspicious or inauspicious events were going to happen in the future.
- As time went on, however, dice were used more and more for gambling and playing games. Beside dice, bones of animals were also used.



COMPONENTS OF THE DIGITAL DICE CIRCUIT

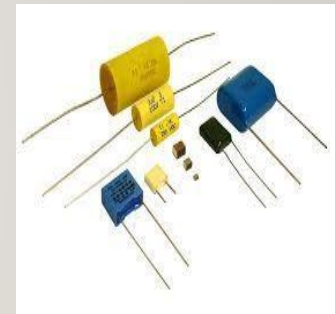
- LEDs X 6



- Resistors – 2.2K Ω , 100K Ω X 2



- Capacitors – 1nF and 0.1 μ F



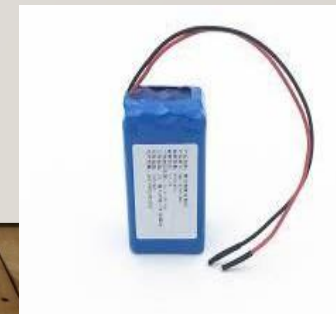
- Push button



- Connecting wires



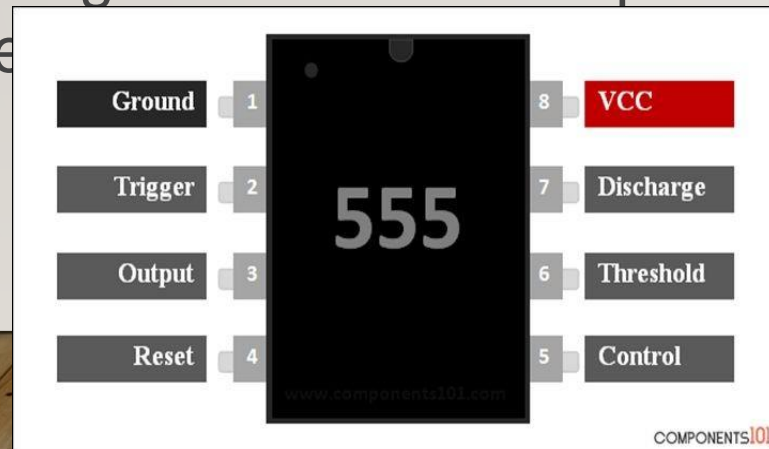
- Battery



WORKING OF ELECTRONIC DICE

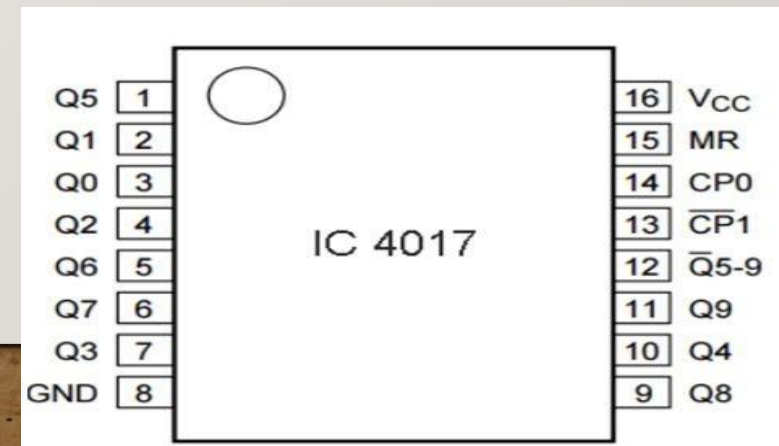
- 555 TIMER IC:

The 555 timer IC is an integrated circuit (chip) used in a variety of timer, delay, pulse generation, and oscillator applications. In this circuit, it is used in astable mode to generate clock pulse for de

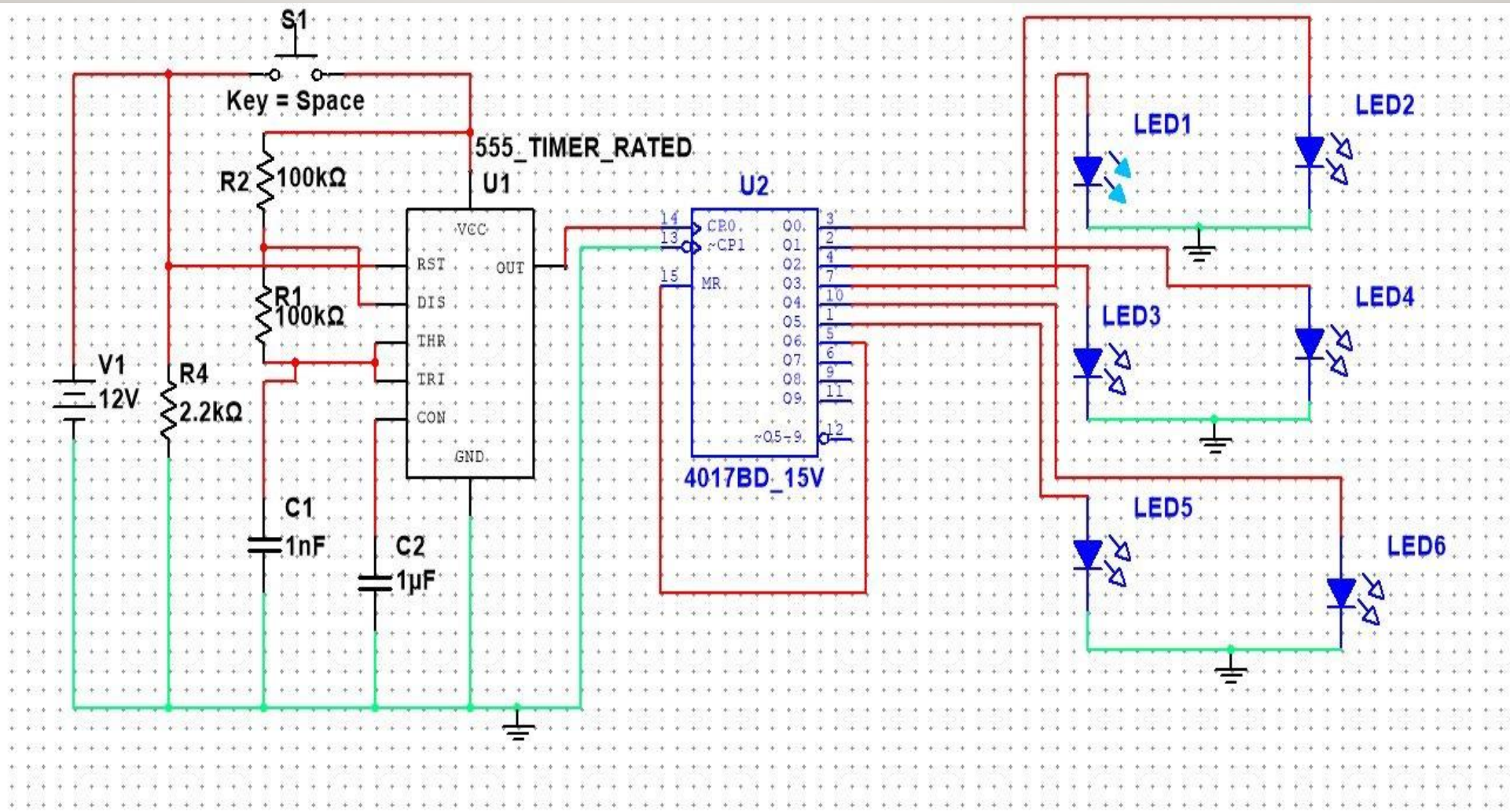


- BD4017 DECADE COUNTER IC:

CD4017 is a 16 pin CMOS decade counter/ Divider. It takes clock signal from the clock input and turns on the 10 output in sequence, each time when it receives clock input pulses.



CIRCUIT DIAGRAM

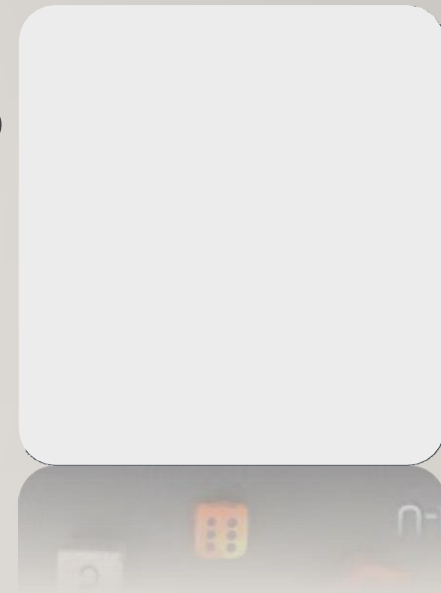


WORKING AND CONSTRUCTION OF DIGITAL DICE



CONSTRUCTION OF ELECTRONIC DICE

- 6 LED's have been used in Digital Dice , each LED represent a number (1-6) of Dice. 6 LEDs have been connected to the output Q0 to Q5, and the seventh output Q6 is connected back to the RESET PIN 15. To apply the clock pulse at PIN 14 of 4017 IC, 555 timer IC in Astable mode has been used. The oscillated output generated at PIN 3 of 555 has been applied to the PIN 14 of 4017, so that output can be advanced with each clock pulse.
- We can control the speed of flashing LEDs by using the potentiometer (RV1), by rotating the potentiometer knob we can change oscillation frequency of 555 timer, hence the rate of clock pulse. The frequency of the 555 can be calculated using this formula:
$$F = \frac{1.44}{((R1 + 2 * RV1) * C1)}$$



CONSTRUCTION OF ELECTRONIC DICE

- In the dice we have kept the oscillation frequency high so that no one can cheat. Flashing speed of LED is directly proportional to oscillation frequency of 555, as High the frequency, as high the speed of flashing. You can increase The frequency can be adjusted by rotating the potentiometer. So in this way you can increase the randomness.



WORKING OF ELECTRONIC DICE

INPUT GIVEN

- When we press the push button The 555 Timer receives the clock pulse and passes to the counter.

GENERATING THE NUMBER

- In counter first 6 outputs are given to LED's. So, the LED starts flashing until the push button is released .

OUTPUT

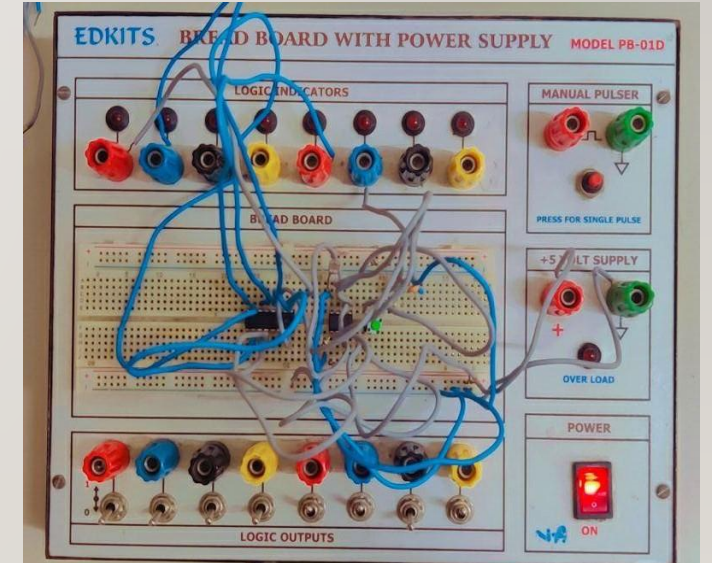
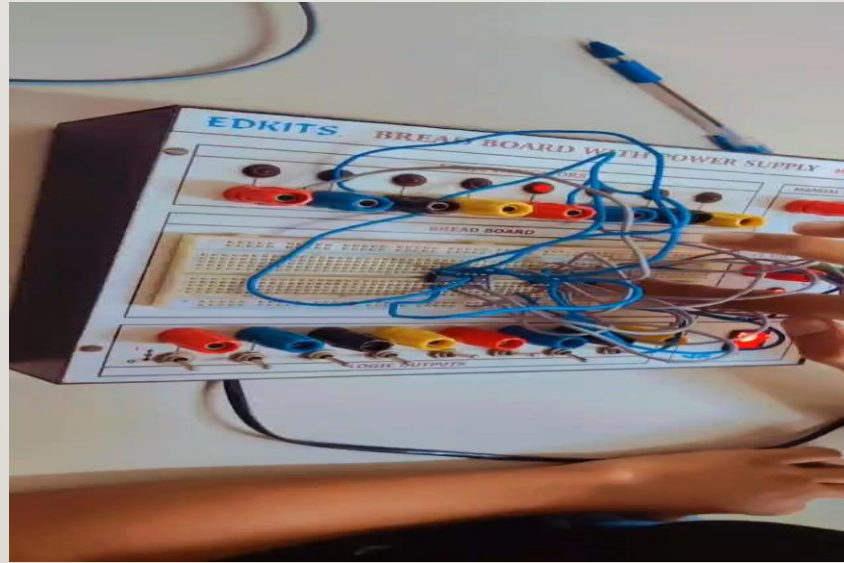
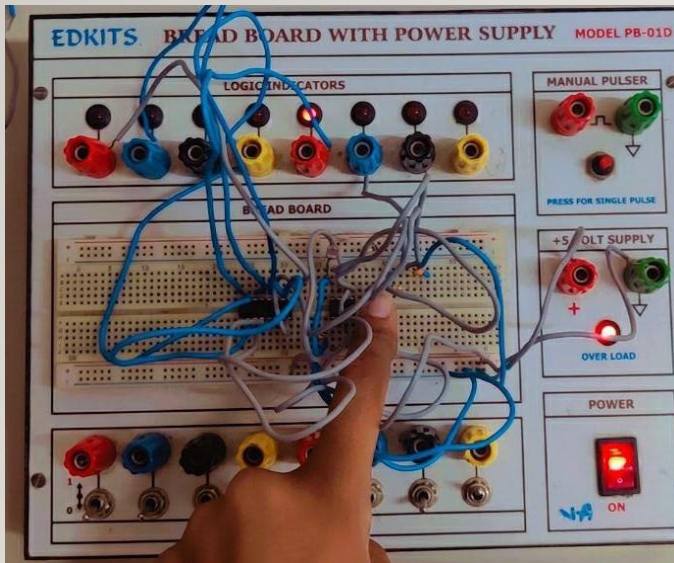
- The LED glows accordingly to the count .
- So when 4 is the count ,4th LED glows. The count increases till seven . After that the circuit resets itself as the seventh count and is given to reset pin which is 15 –PIN.

USES OF ELECTRONIC DICE

- Due to transformation of many things from hardware or solid mode , many devices or objects are now available on electronic devices . So digital dice is used in games available on the electronic devices.
- Snakes and Ladders
- Chutes and Ladders
- Ludo
- Monopoly
- Business

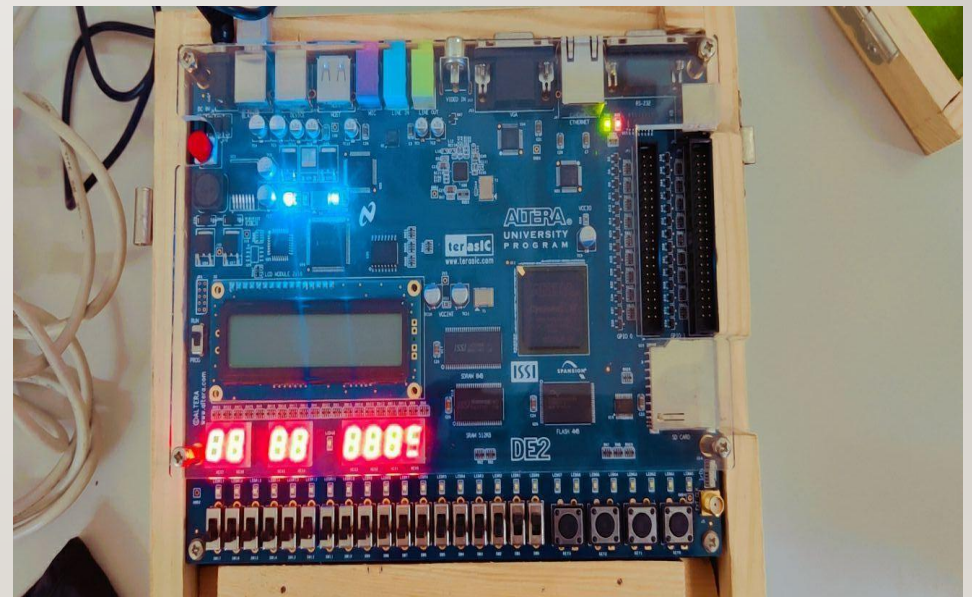
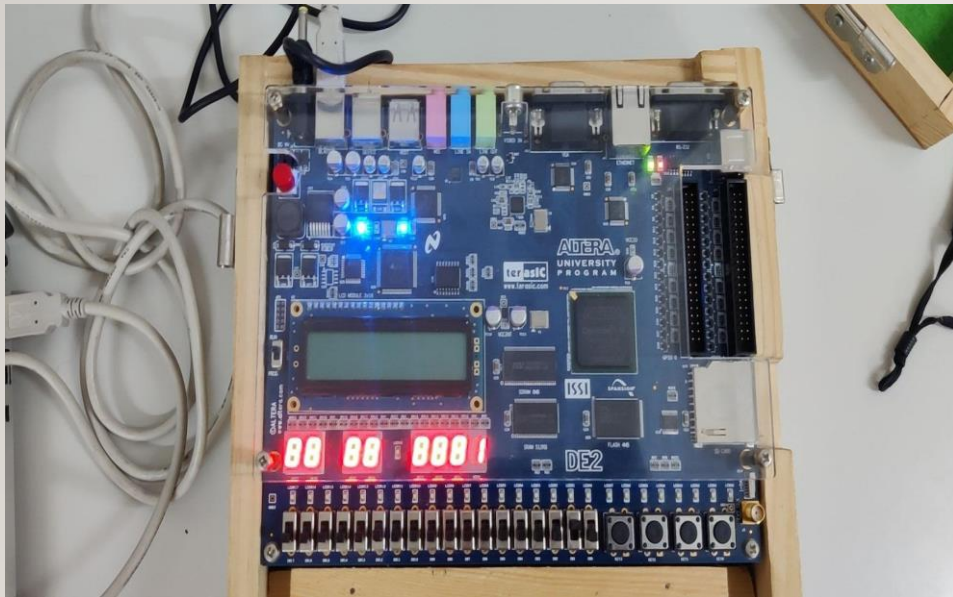
IMPLEMENTATION ON BREADBOARD

We have implemented the above circuit on the breadboard.

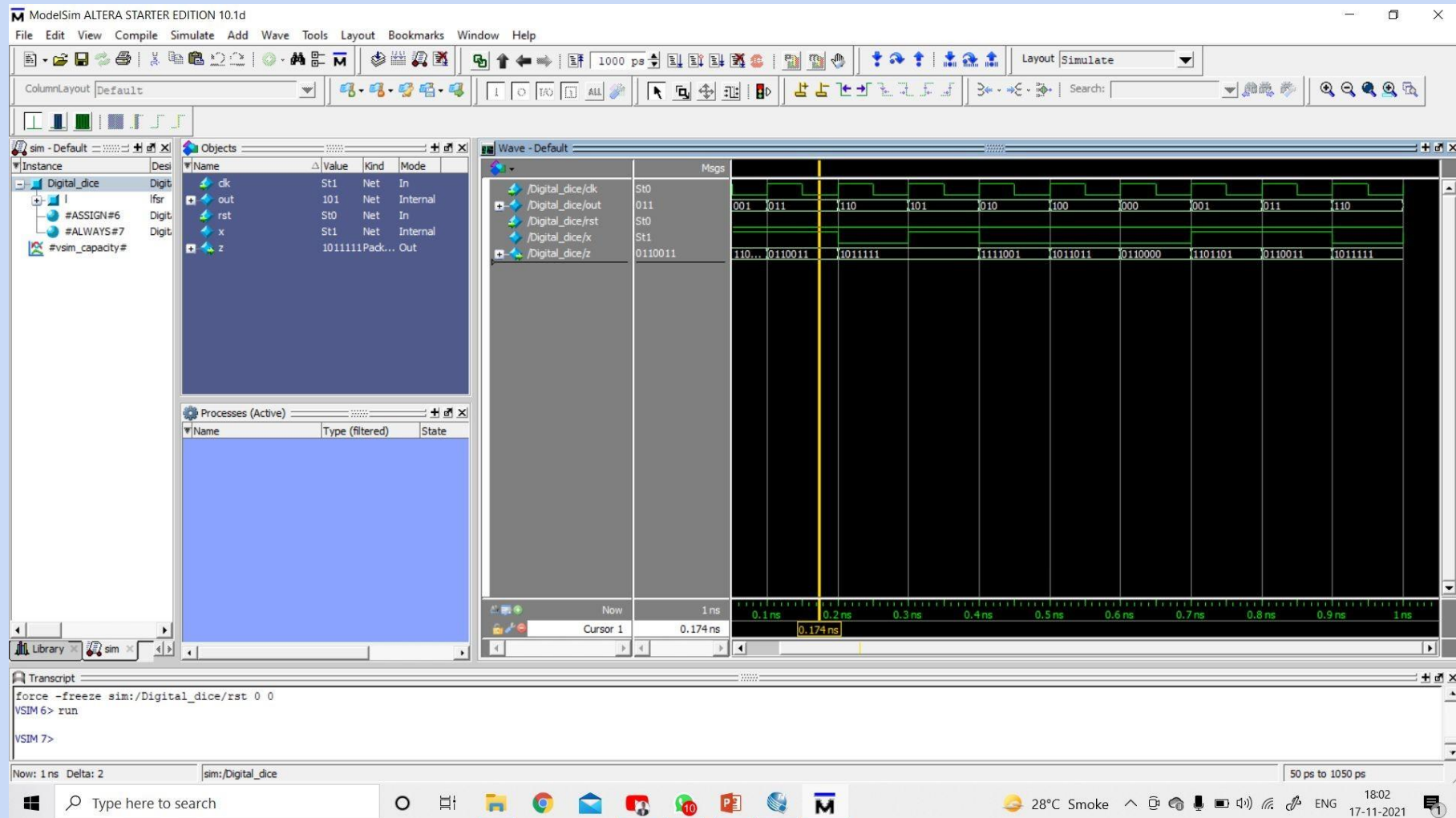


IMPLEMENTATION ON FPGA USING VERILOG CODE

We have implemented our project on FPGA using our Verilog code.



RTL SIMULATION





THANK
YOU

