

To implement BCD to 7 Segment LED display decoder

AIM:-

To study a BCD to 7 Segment LED display decoder as an example of a multiple input and multiple output combinational digital circuit.

THEORY:-

The purpose of this experiment is to design and implement combinatorial logic that will decode a 4-bit BCD input to a seven segment LED display.

Binary Coded Decimal (BCD or “8421” BCD) numbers are made up using just 4 data bits (a nibble or half a byte) similar to the Hexadecimal numbers we saw in the binary tutorial, but unlike hexadecimal numbers that range in full from 0 through to F, BCD numbers only range from 0 to 9, with the binary number patterns of 1010 through to 1111 (A to F) being invalid inputs for this type of display and so are not used.

BCD to 7-Segment Display Decoders

A binary coded decimal (BCD) to 7-segment display decoder such as the TTL 74LS47 or 74LS48, have 4 BCD inputs and 7 output lines, one for each LED segment. This allows a smaller 4-bit binary number (half a byte) to be used to display all the denary numbers from 0 to 9 and by adding two displays together, a full range of numbers from 00 to 99 can be displayed with just a single byte of 8 data bits.

PROCEDURE:-

Components used:

We used the following components for this experiment-

1. IC 7447
2. 7 segment Display

How to make connection:

After Starting the experiment first click on the Components button to get component list. Now you can Drag and Drop any component in the circuit designing area. To make connection between components, just click on the Blue bubble of any components and Drag it to another Blue bubble of the same or any other components. To delete connection or to remove any component use Double click on that component or connection.

How to run:

After connecting all the required components, click on the Start button and you will get a new start window, where you can give the inputs. After this, you click the run button and finally the outputs are shown

PRETEST:-

1. Binary coded decimal is a combination of:

☐ a: Two binary digits ☐ b: Three binary digits ☐ c: Four binary digits ☐ d: None of the Mentioned

2. Code is a symbolic representation of _____ information:

☐ a: Continuous ☐ b: Discrete ☐ c: Binary ☐ d: None of the Mentioned

3. When numbers, letters or words are represented by a special group of symbols, this process is called :

☐ a: Decoding ☒ b: Encoding ☐ c: Coding ☐ d: None of the Mentioned

POSTTEST:-

1. The decimal number 10 is represented in its BCD form as:

☐ a: 1010 ☐ b: 01010 ☐ c: 00010000 ☒ d: 001010

2. The output sum of two decimal digits can be represented in

☐ a: Gray Code ☐ b: Excess-3 ☒ c: BCD ☐ d: Hexadecimal

CONCLUSION:-

- It is possible to display any single digit number on a 7-segment display by sending a high digital signal to the specific segments that make up the number. However, this method requires us to encode the letters manually. It is not the best solution to output changing numbers for application such as counters.
- It is possible to display the decimal value of a binary number on a 7-segment display using a BCD decoder.
- However, this method will allow displaying only digits from 0 to 9 and letters A to F.
- The only way to display number more than 9 is to use a display that has more than 7 segments or just using multiple 7-segment displays at once with the corresponding BCD decoder.