



DEVELOPMENT OF WEB-BASED SEVEN SEGMENT EXPERIMENTS

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Abstract - The scope of this paper includes the development and implementation of web-based seven segment experiments. The study of seven segments experiment is important for learner of Electronics, Computer Science and Engineering stream. This experiment can be evaluated by using the concept of virtual Intelligent SoftLab (VIS). The virtual experiments will help students to perform it at anytime and anywhere. The virtual screen shows the Characteristics of seven segments and its related outputs. There is a facility to change the Input values using virtual instruments and observed the desired outputs on the virtual Instrument. In this paper we check the characteristics of seven segments using virtual environment.

Keywords

SoftLab, Seven segments, Virtual Lab, Virtual Instrument, Softlab etc

1. Introduction

The basic concept of web-based experiments is to provide a virtual platform for learners to perform the experiment on their own smart device i.e. mobile or laptop. The working procedure of web-based experiment is similar to a real laboratory and its environment is the virtual workbench. Virtual experiments are basically design for those students who are not performing their experiments on real laboratory due to lack of resources. During the experiment, the learner can save and edit the data for their own analysis. Apart from these the basic focus is that the maximum number of learners performs the virtual experiments on virtual environment. Virtualizations of experiments could be broadly classified, based on the software data used for performing the experiment. The Soft Lab philosophy facilitates us to connect physical laboratory experiment with its theoretical simulation model with interactive environment. The basic goal for softLab laboratory is to create a software environment for learners. In virtual instrumentation project we evaluate the various issues involved in the design and development of SoftLab model. Electronics, Computer science and engineering learner easily use this Model to perform their experiments virtually. This model describes how the SoftLab philosophy is use to design and implements experiments. The VIS (Virtual Intelligent SoftLab) model force to address the challenge of solving experiments on virtual platform. Such systems require a huge range of expertise and flexibility. The SoftLab framework should provide the infrastructure and facilities for basic research.

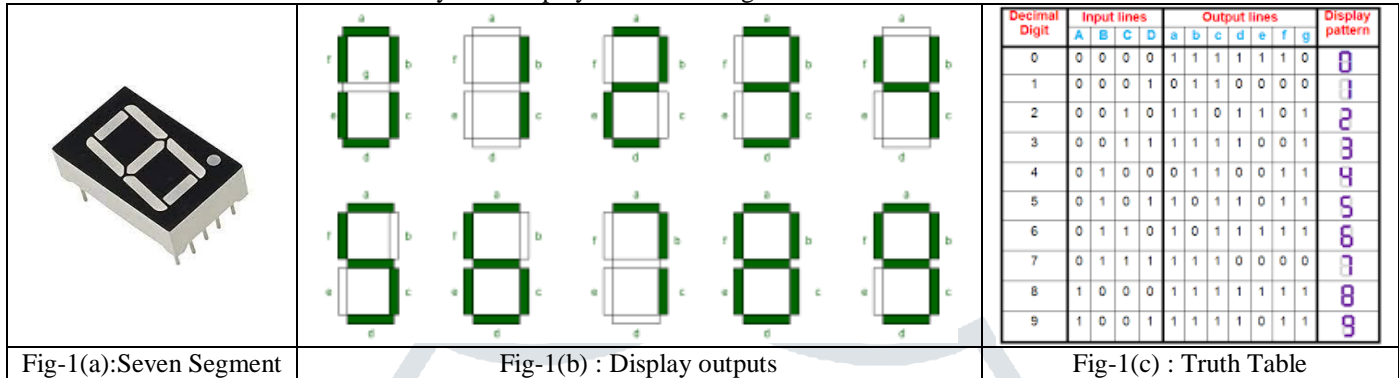
SoftLab is a flexible laboratory environment for learner. Its goal is to simulate a laboratory experiments on well-equipped virtual environment with variety of virtual materials. Using SoftLab a student may be guided by an instructor to perform their experiments, or the student might also conceive of one on his own. The student may choose a virtual material to study, take the instruments he needs, connect them together, make his measurements, and record his results. The computer screen is the laboratory room for learner. Learner can perform their experiment on virtual platform using VIS model. The basic advantages of virtual platform is that it can perform the experiment anywhere and anytime without any physical instrument. It is totally risk free laboratory because there no fear for damaging the instrument. New comers are easily using the laboratory to perform their experiments. The basic drawback of this laboratory is that the learner away from actual hardware hence the knowledge of hardware totally reduces. The experimental uses are open to all learners. Software developer gives maximize experimental facilities on virtual environment [1].

2. Experiments on Seven Segments

A seven-segment decoder is a logic circuit generally used for the visual display of digital information. The seven segment outputs of the decoder will drive the seven segments on a corresponding display. The BCD system represents the decimal numbers from 0 to 9 and this binary format suitable for most digital devices. A four-bit digital code is required with the decimal characters 0 to 9 represented by the combination of binary numbers 0000 to 1001. The combinations of 1010 to 1111 are not used. A BCD to seven-segment decoder and it will allow the display of a binary coded decimal on a seven-segment display. The input to the decoder is a number system from 0 to 9 in BCD and the output provides the seven pin inputs required to drive the seven-segment display. Although our experiment design will include the

development of logic circuits for the BCD system to seven-segment decoder, to simplify our laboratory circuit, the 7447 called BCD to seven-segment decoder driver will be used. Simple display switches will provide the BCD input to the 7447 and the output of which will drive the seven-segment display. The seven-segment displays are common used output device that displays decimal numbers. The seven segments of the display are labeled as a, b, c, d, e, f, g as shown in Figure 1(a). Seven segment displays representing decimal numbers from 0 to 9 are show in Figure 1(b).

Seven-segment displays are basic electronic display devices which are used in many displays decimal numbers. Seven-segment displays are the first became widely used in many popular way of displaying numbers. They are called segment displays because they are composed of several segments that switch on and off to give the appearance of the desired graph. The seven segments are usually single LEDs or liquid crystals displays. Seven-segment displays are broadly used in digital clocks, electronic meters, basic calculators, displays in home appliances, cars, and various other electronic devices that display numerical information. There are numerous types of segment displays available in the market but the most commonly used displays are Seven-segment.



3. Tools and Technology

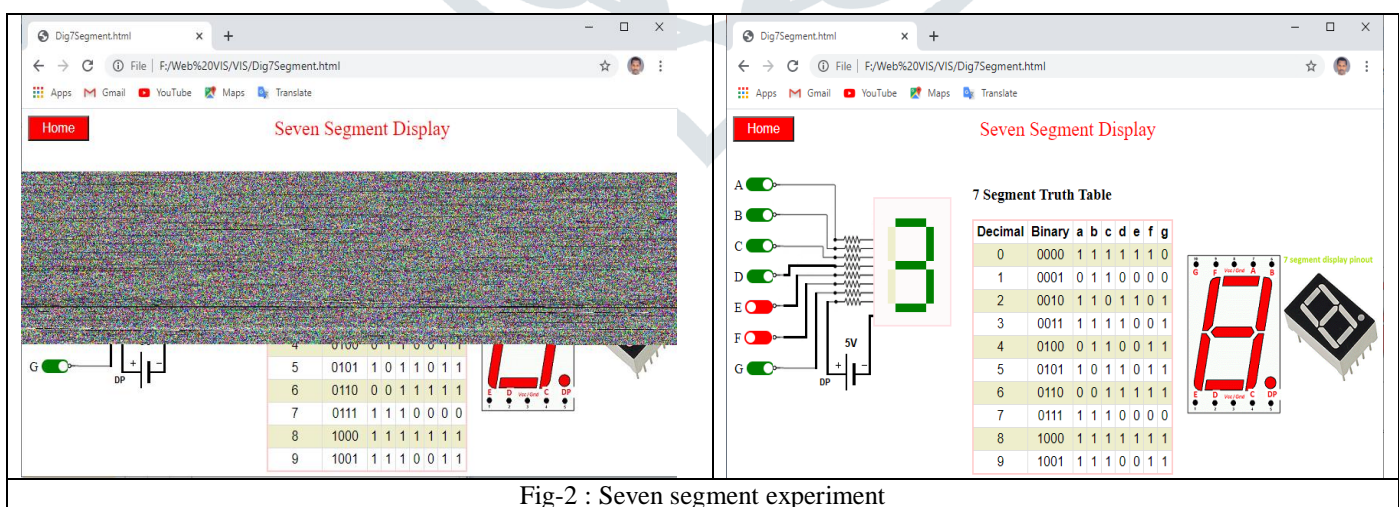
Web based application easily design with HTML, XML and JavaScript that they provide web communication facility. JavaScript is also considered as relatively easy to learn and use in HTML, because of its graphical features. Web based application easily available to user using any web browser such as Smartphone, Tablets or any computer device. The language not only allows programmers to create simple GUI applications, but can also develop complex applications. The beauty of this model is that it does not require the Database to manage data.

4. VIS Model

We have constructed the programs in HTML and JavaScript such that all the blocks in the model can be fully visualized on the screen. This model can demonstrate the activities of seven segments in digital Electronics. Inputs accepted throw software and virtual output will observe on the screen. In an experiment we can provide different input values and observe output.

4.1 Design Specification

A Program is constructed for checking the characteristic of seven segment experiment and observes the outputs on VIS model such that all the blocks in the model can be fully visualized on the screen. This model demonstrates the activities of seven segment experiment. Inputs accepted through virtual inputs and observe virtual output on the screen. Learner applies inputs using virtual instrument on A, B, C, D, E, F, G which is observable on the screen with virtual instruments and desire output will display on seven segment display. The 7-segment display shows the truth table and generates the output on virtual device. The circuit connection done by the learner virtually and perform their experiment on virtual environment. The screen shot for studying the seven segment characteristic is shown in fig-2.



5. Result

Virtual outputs are totally animated with the combination of software. We can easily observe the outputs virtually on virtual instruments. This model is more helpful for learner to perform their experiment on virtual instrument without any physical damages during observations.

6. Conclusions

SoftLab will help Electronics, Computer Science and Engineering learners to perform and practice experiments on virtual platform to improve their understanding of the subject. The design of the VIS model is more effective and realistic because a necessary input allows

setting using virtual instruments and desired outputs are visible on the monitor screen. This model is totally virtual and can be used anywhere and anytime on their smart device like mobile or tab. This virtual experiment provides practice for learners which is feeling like the actual traditional laboratory which is performed in the laboratory. VIS model replaces the traditional laboratory and performs the same work that is done in their physical laboratory. Seven segment display experiment gives real effect and appears on the device.

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