

TRAINING STUDENTS IN THE PRACTICAL REALIZATION OF ELECTRONIC CIRCUITS BY SIMULATING CIRCUIT COMPONENTS IN VIRTUAL-LAB

Mr. Sc. ing. REXHEP NUSHI

European College Dukagjini; Department: Computer Science and Information Technology;

Email-i: rexnushi@yahoo. com

Abstract

This paper provides an overview of the research-project on training students in the realization of electronic circuits. They presents the selection of study subjects, the appropriate instruments, describe the collecting procedure and analyzing data. So, this paper studied the possibilities of the students to use modern technology, such as using the internet for absorbing information necessary resources to help the argumentation of solutions to problems that will arise, specifications provided by the lecturers developing attitudes towards technology, use online reference resources. The following issues are also included: How to use IT encyclopedias for projects and scientific research. Also present an initiative applied for the preparation of future applied informatics experts, through electronic portfolio development.

In this part of the conclusions drawn in summary, form each matter dealt with in the paper, the study research questions to be answered, presented necessary recommendations, limitations of the study and implementation options.

Key words: virtual- laboratorysimulation, realization of electronic circuits, training students.

INTRODUCTION

Information Technology (IT), configured an HTTP server and a provisional page of the site [www.crocodile-clips. com](http://www.crocodile-clips.com) › *Our Products* › *Design and Technology*, which can be accessed from any computer, not just from the European College Network Dukagjini - Pejë, but also from any computer on the Internet. In this server virtual labs are installed, that can be downloaded or executed by professors and students. Hopefully these laboratories help teachers to improve and enriched teaching process mainly in the first level courses of the exact subjects. But we hope that these laboratories to help students in the acquisition of Information Technology (IT) courses, especially the course of "Fundamentals of electronics". Objectives that the student is expected outcome, working on the problem and the application of basic knowledge of the subject can also by using virtual – laboratorysimulations. For. . . "students retain little of what they learned, especially when teaching is performed in a traditional lecture format". (ThesisVenerandaHajrulla, Faculty of Foreign. . . page17)

Virtual laboratories are in forms of demonstrations or experiments that the student perform on computer, by introducing data and taking results in similar manner as in real laboratories. In most of the cases they are simple simulations or animations phenomena or experiments. They gave the possibility the users not only to observe these phenomena or experiments, but also to perform any measurements or change the measured results and register results. Often these results are presented graphically or calculated by the programs that the user do not see, but can take the results of these calculations. In some laboratory are given and assignment to the student which can be enriched by users – teacher.

Most virtual laboratories (with the exception of a few cases from physics or electronics) are adaptations of virtual laboratories published in various sites on the Internet, mainly from sites of known universities.

Each virtual lab is equipped with clarification on the use or within the site where an animation/applet are performed, or in another site. Below is a list of experiments/virtual

laboratories. Just click on the titles to open the window of the appropriate experiment/lab. Virtual labs are implemented in different ways and platforms. Most of them are prepared in the form of Applets, via Java programming language and executed by Web browsers (Mozilla Firefox, Internet Explorer, etc.). But we are determined to the site-in [www. crocodile-clips. com](http://www.crocodile-clips.com) program: Crocodile Technology⁹¹

THE ASSIGNED DUTY SEMINAR TO THE STUDENTS, PREPARATION FOR EXPERIMENTAL MEASUREMENT AND ITS PRACTICAL IMPLEMENTATION OF DUTY.

As the students of the Department of Applied Informatics (IInd year) attend the course "Fundamentals of Electronics" at the European College Dukagjini- Pejë. By the lecturer of the course (author of the paper) is given to a student the seminar paper as follows:

- "To construct practically the signalization with lighting diode (LED diode) as shown in the figure, by experimenting of electronic components parameters through virtual Crocodile Technology program, for their optimal selection to function the given circuit. Describe the principle of work carried scheme by giving the characteristics of the elements used during the performance. The scheme should work, technical description should not be more than one page of A-4 format.
- Remarks: frequency signaling to be about 1. 5 Hz with selected elements!"

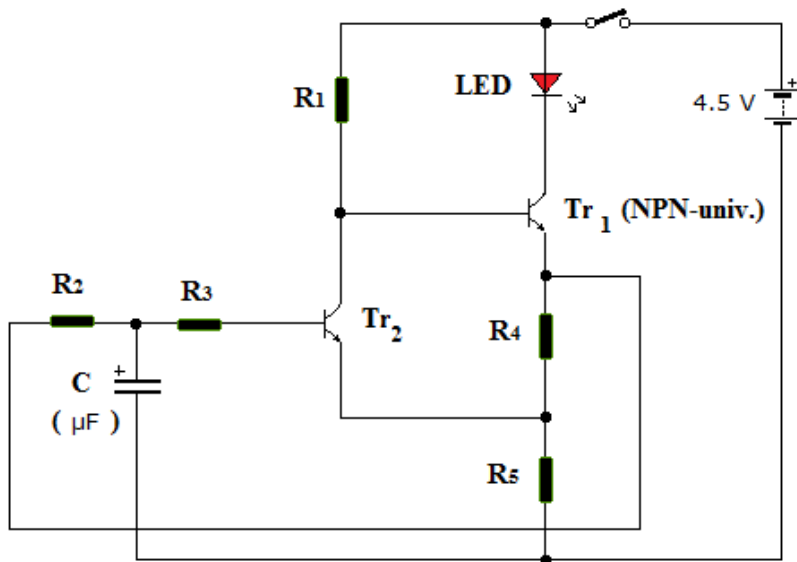


Fig. 1 Assigned the duty seminar of electronic circuit

Once the student have accepted the relevant seminar he simulated that by virtual Crocodile Technology program, simulating parameters R_1 , R_2 , R_3 , R_4 , R_5 and C (μF) and achieved the required success as sown in the following figure:

⁹¹[www. fshn. edu. al/projekte/lab-virtual](http://www.fshn.edu.al/projekte/lab-virtual)

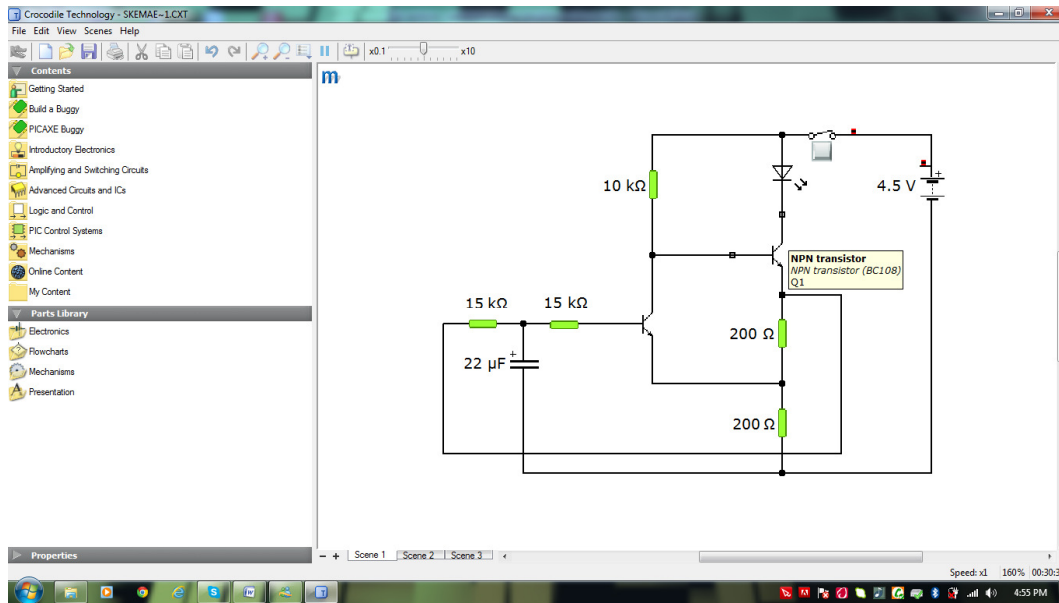


Fig. 2 The circuit scheme with appropriate parameters

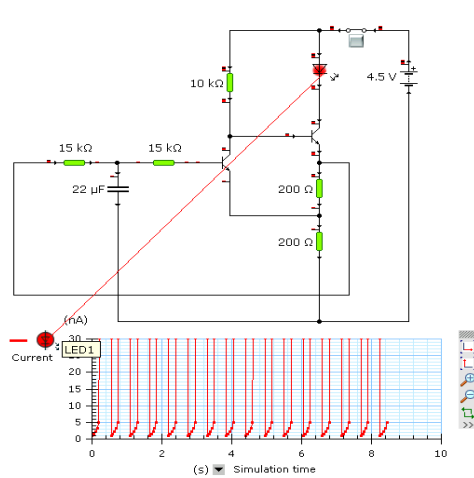


Fig. 3 Presentation frequency of the lighting LED- diodes

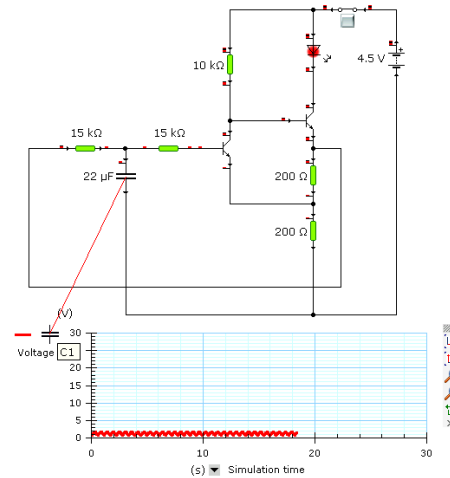


Fig. 4 Charge and discharge frequency of the condenser

Namely, through Crocodile Technology program can be realized the images of schemes in 3D format, e. g.

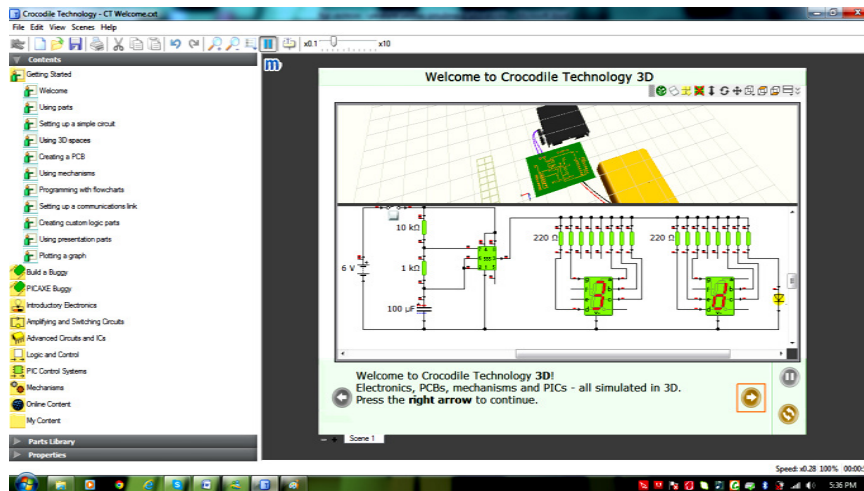
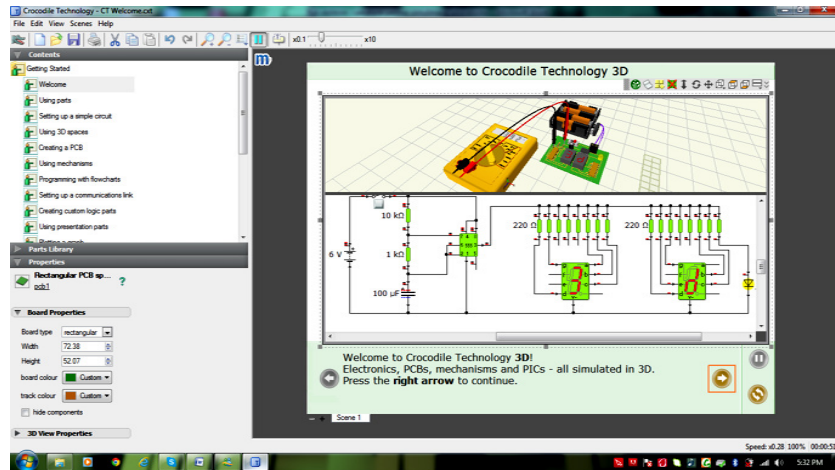


Fig. 5 View of an electronic circuit in 3D

Bill of Materials

Model: USHTR2~2 CXT, PCB1
 Date: 5/1/2014
 Time: 6:40:44 PM

Part ID	Part Name	Value	Assembly Info.	Order Code	Cost (£)
PWR1	PP3 (9V) battery	9V		18-1020	0.53
	PP3 (9V) battery mount			18-2997	0.99
S1	SPDT switch (PCB slide)			76-0265	0.18
LED1	LED (red, 3mm)		long leg positive	55-1770	0.04
Q1	NPN transistor (BC108)			81-0014	0.12
R1	Resistor	180	Brown Grey Brown Gold	62-0352	0.01
R2	Resistor	15k	Brown Green Orange Gold	62-0398	0.01
R3	Resistor	180	Brown Grey Brown Gold	62-0352	0.01
R4	Resistor	10k	Brown Black Orange Gold	62-0394	0.01
R5	Resistor	15k	Brown Green Orange Gold	62-0398	0.01
C1	Electrolytic capacitor (radial)	22u	polarised (align + and - correctly)	11-0335	0.04
Q2	NPN transistor (BC108)			81-0014	0.12
Totals					2.07

Fig. 6 The view of printed circuit and a list of used elements

The practical realization of the experimented electronic circuit is shown in Figure 7:

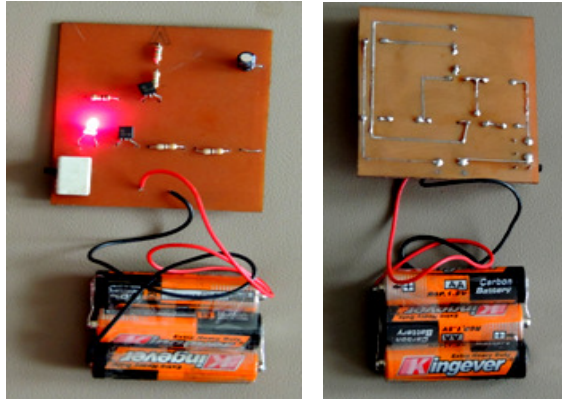


Fig. 7 Simulated practical electronic circuit

Conclusions

The knowledge based society need to possess a good communication and social skills, to be well informed, and always be willing to learn new things. To become a member of this society, students should actively participate in this college and similar colleges as ours and have the benefits offered by it, they should be given the opportunity to have and reach the necessary knowledge and skills. They also need in creatively manner to achieve knowledge and experience creating original solutions to the problems. In recent times the impact of information technology (IT) becomes more and more comprehensive in many social spheres. There is no doubt that education is one of the main segments in promoting and supporting the development of the information society, and that in two aspects. Firstly, this segment should be the promoter of information society and to initiate the establishment of a professional and competent staffs who can respond to the challenges of the information society and the needs of a knowledge-based economy^{92, 93}

Accumulation knowledge on the physical phenomena and semiconductors such as electronic components which enables students of relevant branches, possessing knowledge to deal with the current problems of professional courses and to understand the principles and methods that are applied in the models of department plan programs where in the virtual-lab exercises are given many practical examples that represent a sufficient basis for resolving the current problems where also is discussed and the ways of solving the problem.

And in the end it is worth mentioning these two "postulates": "When you hold the theory good, you analyze good practice and promote to deepen better in theory" and "what can not understand try to accept; what can not accept try to understand"

In this spiral development increases the helical personality of a technical personnel or engineer. ⁹⁴

Literature:

1. Dierig Seven, SchmindgenHeninget. The virtual laboratory: Essays and Resources on the Experimentalization of Life, 1830-1930. 2011, online at: <http://www.mpiwg-berlin.mpg.de/en/research/projects/Dierig02>
2. *Electrical Engineering* – online at: http://www.vlab.co.in/ba_labs_all.php?id=7
3. HajrullaVeneranda. Tëmësuarit e bazuar në zgjedhjen e problemeve. Universiteti Tiranës. 2011
4. Xheladin, Murati. Didaktika – Metodologjia e Mësimdhënjes – Tetovë: Çabej 2002
5. NushiRexhep. Problemetë zgjidhurateorikedhenumerikengaelektroteknikadheelektronika. Pejë. 2011
6. DalipiFisnik. Teknologjiainformatikekomunikuesenëarsim. Universiteti Sh. KirilidheMetodij, FakultetiPedagogjik, Shkup, 2013
7. Dierig Seven, KantelJoreg, SchmindgenHening. The virtual laboratory of Physiology. 2000
8. www.fshn.edu.al/projekte/lab-virtual

⁹²Teknologjia Informatike Komunikuese në Arsim - Dr. Fisnik

⁹³Xheladin, Murati, DIDAKTIKA – Metodologjia e Mësimdhënjes – Tetovë: Çabej 2002,

⁹⁴Mr. sc. ing. Rexhep Nushi: “ Probleme të zgjidhura teorike dhe numerike nga elektroteknika dhe elektronika” -Pejë 2011