

Development of a new educational kit for introduction to engineering using Arduino

Oswaldo T. Neto (IC), Hugo E. Hernandez-Figueroa (PQ), Marli de F. G. Hernandez (PQ)

Abstract

In this research, we introduce RFID technology as a means of introduction to engineering telecommunications through the creation of a microcontroller educational kit by Arduino UNO platform. We will also present a teaching plan for implementing educational kit describing the topics covered at school.

Key words: Arduino, Telecommunications Engineering, Educational Kit.

Introduction

In Brazil, according to recent data from the Ministry of Education (MEC), in 2012 the dropout rate in higher education in public universities was 13.2%, while in private universities, there was a 15.6% index¹. The reasons for dropout in higher education are diverse, from the lack of a solid foundation in high school to the total disregard for the chosen course, with the consequences not only wastage of financial resources but also a social loss². To decrease the number of students who drop out graduation, several actions are beneficial, such as support for freshman through tutoring in core subjects.

For a possible eradication of this type of evasion, one of the alternatives is to take to the high school students information to help them to make the right decision on which course to choose. Thus, our propose was to develop an educational kit which themes present throughout the course could be applied in Brazilian public high schools, through RFID technology

Results and Discussion

The proposed educational kit, is based on RFID RC522 module and its control interface, the ATMEGA328P-PU microcontroller with an Arduino UNO boot loader. In general, the Arduino UNO's boot loader allows us to execute the code written on the Arduino platform, which ensures an easy to understand programming environment with an extensive collaborative network on the internet. In Figure 1 below, we can see the proposed educational kit properly manufactured and running



Figure 1 - Proposed Educational Kit

With low cost discrete components, the proposed educational kit becomes economically competitive because its low cost around US\$105.00.

Conclusions

In this research we introduced a new educational kit which aims at facilitating the introduction of telecommunications at the high-school level. The end goal is to mitigate the issue of evasion at the college level and engaging students as early as possible. The kit was designed in conformance with the requirements specified at the outset

Acknowledgement

The National Council for Scientific and Technological Development (CNPq), for the scientific trainee scholarship available for the research, the Application Laboratory and Research in Technological Education (LAPET) for equipment and room for development work, the State University of Campinas (Unicamp) by supporting the research and the project's Guides.

¹ Universidade Estadual de Montes Claros, "Ações proativas para evitar a evasão nas Universidades Públicas Brasileiras", 2013

² Maria Beatriz de C. M. L., "Panorama da evasão no ensino superior brasileiro: aspectos gerais das causas e soluções.", Instituto Lobo para Desenvolvimento da Educação, da Ciência e da Tecnologia., 2012.