ARDUINO-BASED PLASTIC BOTTLE CONVERSION INTO POINTS TO DUTY HOURS IN CITY COLLEGE OF TAGAYTAY

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Title: Arduino-Based Plastic Bottle Conversion Into Points To Duty Hours In City College Of Tagaytay

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Note: Original copy to be filed in the College Library and one copy to the following: College Research and Extension Service Office, School of Computer Studies, and capstone project students.

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DEDICATION

This humble achievement is dedicated to the researchers' family and friends, whose unwavering support, encouragement, and understanding have been a constant source of strength during the study. Their kindness and belief have helped the researchers through both the challenging and rewarding times.

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BIOGRAPHICAL DATA

Baral, Renzo Symon T.

Renzo Symon T. Baral, born on April 2, 2003, in Balayan, Batangas, is the eldest child of Angelita T. Baral and Wilson B. Baral.

He started his early education at Sunstar Academy in 2014 and completed his junior and senior high school at Infant Jesus Academy of Silang Inc. in 2021.

He is currently a fourth-year student at City College of Tagaytay, where he is pursuing a Bachelor of Science degree in Information Technology.

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Clark Jude S. Caretas was born on April 1, 2002, in Alfonso, Cavite, and is the youngest child of Myrna M. Caretas and Rogelio C. Caretas.

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Michaela R. Castillo was born on September 30, 2001, in Tagaytay City, and is the youngest child of Josefina R. Castillo and Francisco C. Castillo.

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She is currently a fourth-year student at City College of Tagaytay, where she is pursuing a Bachelor of Science degree in Information Technology.

Florentino, Erika Roseann S.

Erika Roseann S. Florentino, born on January 7, 2001, in Maybunga, Pasig City, is the youngest daughter of Rebecca S. Florentino and Eduardo A. Florentino.

She started her early education at Sinaliw Elementary School (SES) in 2012 and completed her Junior High School at Alfonso National High School (ANHS) in 2016, and completed her Senior High School at National College of Science and Technology-Institution of Industrial Research and Training (NCST-IIRT) in 2018.

She is currently a fourth-year student at City College of Tagaytay, where she is pursuing a Bachelor of Science degree in Information Technology.

ABSTRACT

BARAL, RENZO SYMON T., CADACIO, DANIEL T. JR., CARETAS, CLARK JUDE S., CASTILLO, MICHAELA R., FLORENTINO, ERIKA ROSEANN S. Arduino-Based Plastic Bottle Conversion into Points to Duty Hours in City College of Tagaytay Undergraduate Capstone Project, Bachelor of Science in Information Technology, City College of Tagaytay, Tagaytay City, Cavite, January 2025. Prepared under the supervision of Mr. Christian R. Anda

Plastic waste, particularly from single-use plastic bottles, has become a concern, as per the Dean of the Office of Student Empowerment and Support (OSES) in the City College of Tagaytay (CCT). Despite efforts to promote recycling, a significant proportion of plastic bottles are left around the campus. In CCT, duty hours monitoring is in place where each student must complete a required number of duty hours. To encourage recycling while earning duty hours, this study aims to develop an Arduino-based plastic bottle conversion into points to duty hours that will be able to count the points of plastic bottles and convert them into duty hours, and to properly store them in CCT. The study used prototyping methodology and focused on six categories, i.e., Requirements Gathering and Analysis, Quick Design, Build Prototype, User Evaluation, Refining Prototype, and Implement and Maintain. The prototype is supplied with a stable and uninterrupted power source via an Uninterruptible Power Supply (UPS), thereby ensuring a continuous flow of Direct Current (DC) power. Key electronic components, such as the Arduino Mega 2560 microcontroller and associated sensors, are provided with a regulated voltage through the implementation of an LM2596S DC-DC Buck Converter. Signal and control connections are established using jumper wires. Additionally, a thermal printer and an LCD panel are integrated into the system to facilitate the real-time display of transaction outcomes. The evaluation was systematically conducted based on the ISO 9126 software quality model,

which yielded an average score of 4.44 (Excellent). Functionality received the highest rating among the evaluated criteria, indicating that the prototype effectively fulfilled its intended purpose and aligned well with user expectations.

Keywords: Arduino, Plastic Bottle Conversion, Prototyping Model

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