



American International University – Bangladesh (AIUB)

Faculty of Engineering

Department of CSE, EEE, and CoE

EEE4103 MICROPROCESSOR AND EMBEDDED SYSTEM COURSE CAPSTONE PROJECT PROPOSAL FORM

Instructions:

- ** Rename your pdf file as, **GROUP NUMBER #_PROJECT PROPOSAL**
- ** Submit in the assessment Submission Link on or before: 27/10/2023

SEMESTER: FALL 2023-2024

PROJECT TITLE:

Laser Security Alarm System Using Arduino

SURVEY:

- Background:
 - It's likely that a mix of respondents, including both experienced hobbyists and beginners, have built or used these systems.
 - Usage environments might vary from homes and offices to workshops and specific areas requiring protection.
- System Design and Functionality:
 - Common motivations for building these systems could be cost-effectiveness, customization options, or the educational value of DIY projects.
 - Core functionalities likely include laser beam interruption detection and audible alarms, with some implementing additional features like visual alerts or notification systems.
 - Challenges might include sourcing specific components, overcoming limited technical knowledge, or encountering reliability issues.
- User Experience and Satisfaction:
 - Satisfaction levels would likely vary depending on individual experiences and expectations.
 - Recommendation rates could depend on the perceived benefits and trade-offs compared to commercially available options.
 - Desired improvements might focus on increased reliability, easier setup, remote control options, and wider customization possibilities.
- Additional Comments:
 - Comments might address specific challenges, potential applications, or suggestions for further development and user support.

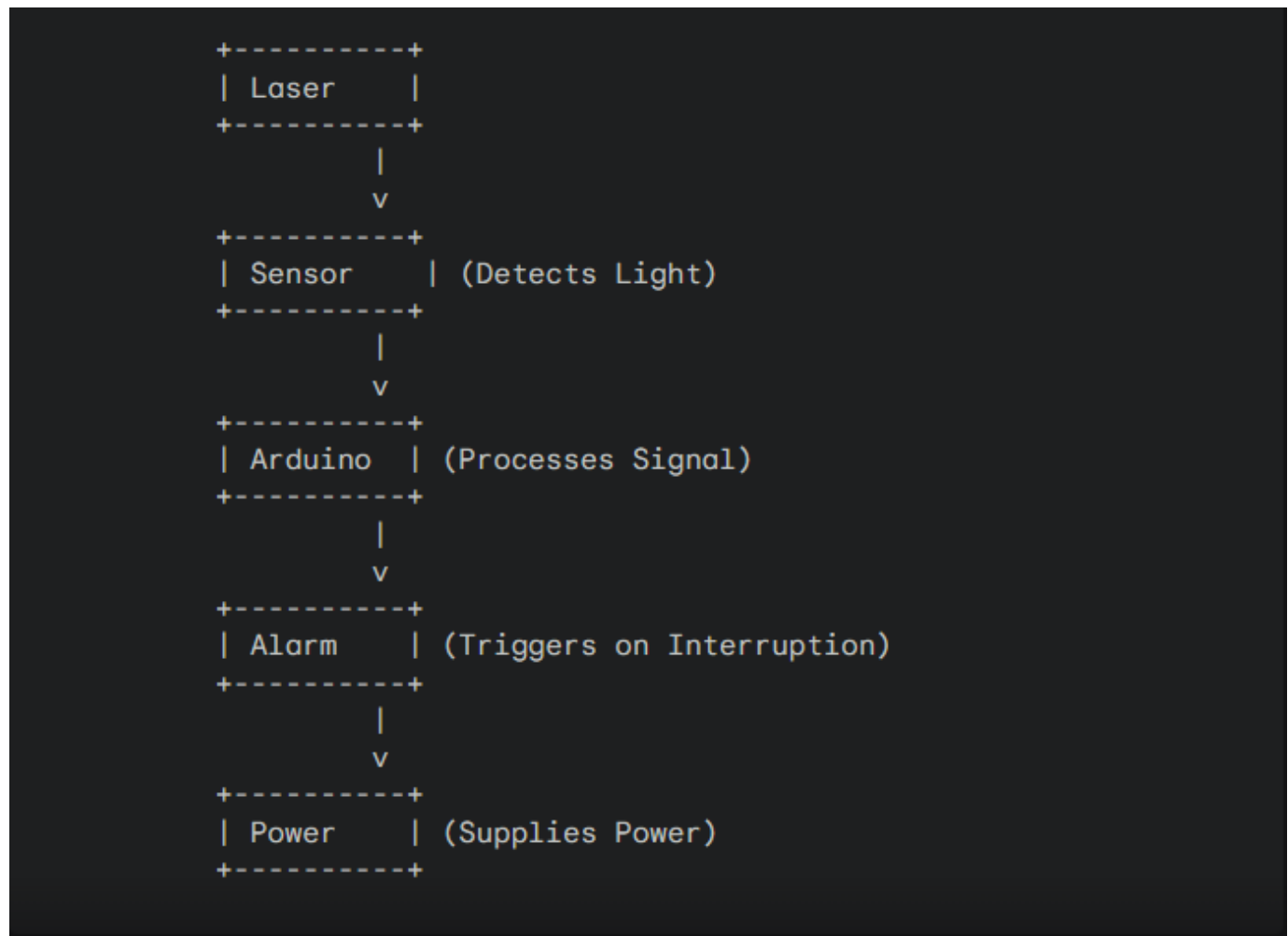
AIMS AND OBJECTIVES OF THE PROJECT: This project's main goal is to create and put into use an Arduino-based laser-light security system, determine the functions of an Arduino, laser, and light dependent resistor; Use the functions of the laser, light dependent resistor, and Arduino; and create a program that will sound the alarm when something blocks the laser's path.

The following scopes are included in the laser-based security system powered by Arduino:

- This project has the capacity to alert people in the area.
- This project is not reliant on the local area's primary power source.
- By human vision, the laser light is hardly perceptible.

LITERATURE REVIEW: A study was done to help people secure their houses due to an increase in crime involving the design and execution of an Arduino-based security system employing laser light. When the switch is pressed, this laser security system starts working. The buzzer will then automatically sound if anything or anyone entered the space between the laser light and the light-dependent resistor. The test results indicate that the prototype is 80% successful. The capabilities of the laser, light-dependent resistor, and Arduino as the microcontroller were discovered and used by the researchers. The researchers draw the conclusion that the study was successful as a result.

EXPERIMENTAL BLOCK DIAGRAM:



POSSIBLE OUTCOMES OF THE PROJECT: An additional layer of security through a specific area can be provided by an Arduino-based security system that uses laser light. This project can be used for other purposes besides security, such as safety. For instance, some machines will stop working if a hand or other body part is placed in its path because the laser light will be blocked. This project can assist other researchers in innovating, growing, and enhancing their current project

PROJECT TIMELINE (GANTT CHART):

This is a general timeline for building a basic Laser Security Alarm System using Arduino.

Week 1:

- **Research:**
 - Understand the working principle of a laser security system.
 - Research different Arduino models and their capabilities.
 - Explore online resources for project tutorials, schematics, and component recommendations.
 - Identify and research specific components needed (laser module, LDR, Arduino board, buzzer, etc.)
- **Planning:**
 - Sketch a block diagram of the system to visualize the connections and functionalities.
 - Create a list of required components and their estimated costs.
 - Define the desired functionalities for your system (e.g., audible alarm, visual alert, notification system).
 - Develop a basic program flow to understand the Arduino code logic.

Week 2:

- **Gather Materials:**
 - Order or purchase the necessary components based on your research and budget.
 - Gather any additional tools or materials you might need (e.g., breadboard, jumper wires, resistors, soldering tools).

Week 3:

- **Hardware Assembly:**
 - Based on your chosen schematics or tutorials, assemble the hardware components on a breadboard or PCB (Printed Circuit Board) if using one.
 - Connect the laser module, LDR, Arduino board, and other components as per the chosen design.
 - Ensure proper connections and double-check for any errors.

Week 4:

- **Software Development:**
 - Start writing the Arduino code based on your planned program flow and functionalities.
 - Utilize online resources, community forums, and libraries to understand specific programming functions and troubleshoot any issues.
 - Test and debug the code step-by-step, ensuring proper functionality of each component.

Week 5:

- Testing and Refinement:
 - Test the overall functionality of the system by simulating different scenarios (e.g., laser beam interruption, triggering the alarm).
 - Refine your code and hardware connections if necessary to address any bugs or improve performance.
 - Consider testing in your intended environment to ensure proper operation and adjust sensitivity if needed.

REFERENCES:

- Olarewaju .I. K, Ayodele, O. E, Michael. F. O, Alaba. E. S, Abiodun. R. O, 2017. "Design and Construction of an Automatic Home Security System Based on GSM Technology and Embedded Microcontroller Unit", American Journal of Electrical and Computer Engineering, Vol. 1, No. 1, pp. 25-32, Doi: 10.11648/j.ajece.20170101.14
- Zungeru. A. M, Kolo. J. G, Olumide. I, September 2012. "A Simple and Reliable Touch Sensitive Security System", International Journal of Network Security & its Applications, ISSN 0975-2307, Volume: 4; Issue: 5; pp. 149-165, DOI: 10.5121/ijnsa.2012.4512
- British Security Industry Association (BSIA), "Journal on security system section strategy for intruder alarm system", Page 1-3, April 2005. Accessed at <https://www.thenbs.com/PublicationIndex/documents?Pub%20=BSIA>
- "History of Security Alarms", <http://www.icee.org/organization/history%20center/fire%20alarm.html> [5] Mohd. Saifuzzaman, AshrafHossainKhan, NazmunNessa Moon, Fernaz NarinNur, "Smart Security for an Organization based on IoT", International Journal of Computer Applications Volume 165 –No.10, May 2017
- Suresh.S, J.Bhavya, S.Sakshi, K.Varun and G.Debbarshi, "Home Monitoring and Security System", ICT in Business Industry & Government (ICTBIG)
- E.Kanniga, M .Sundararajan, "Design of 8051 Microcontroller Based Security System with a Laser Beam Network", Indian Journal of Science and Technology, Vol 8
- Waqar Ali, Ghulam Dustgeer, Muhammad Awais, Munam Ali Shah, "IoT based Smart Home: Security Challenges, Security Requirements and Solutions", Proceedings of the 23rd International Conference on Automation & Computing
- <https://www.arduino.cc/>
- <https://gemini.google.com/app/>
- <https://techatronic.com/how-to-make-a-laser-security-alarm/>

Sample for the conference paper:

[1] M. H. Bhuyan and Q. D. M. Khosru, "Linear Asymmetric Pocket Profile Based Pinch Off Voltage Model for Nano Scale n-MOSFET," Proceedings of the IEEE sponsored International Conference on Electrical, Computer and Communication Engineering (ICECCE2017), organized by the Chittagong University of Engineering and Technology (CUET), Cox's Bazar, Bangladesh, 16-18 February 2017, pp. 28-32.

Sample for the journal paper:

[1] M. H. Bhuyan and Q. D. M. Khosru, "Effects of Temperature on Reverse Short Channel Effect in Pocket Implanted Sub-100 nm n-MOSFET," Journal of Materials Science and Engineering, USA, 1934-8959, vol. 4, no, 7, July 2010, pp. 18-23, DOI:10.17265/2161-6213/2010.07.004.

FOR FACULTY USE ONLY

COMMENTS BY COURSE TEACHER:

COURSE TEACHER'S NAME

COURSE TEACHER'S SIGNATURE

DATE

GROUP MEMBERS

(Maximum 7 students are permitted to carry out a single Project. However, depending on the capability of the students, 4 students may be allowed but not less than that)

NAME: Md. Abdullah Shishir ID #: 22-46410-1 PROGRAM: CSE EMAIL: abduallahshishir786@gmail.com	NAME: Effat Ara ID #: 22-46090-1 PROGRAM: CSE EMAIL: 22-46090-1@student.aiub.edu
NAME: Most. Sayma Khatun ID #: 22-47035-1 PROGRAM: CSE EMAIL: 22-47035-1@student.aiub.edu	NAME: Fatema Akter Sujana ID #: 21-45693-3 PROGRAM: CSE EMAIL: 21-45693-3@student.aiub.edu
NAME: Habibul Hasan ID #: 17-34505-2 PROGRAM: EEE/CoE/CSE EMAIL: 17-34505-2@student.aiub.edu	

REMARKS (for OFFICE use only)			

Course Name:	Microprocessor and Embedded System	Course Code:	EEE 4103
Semester:	Fall 2023-2024	Sec:	G
Faculty Member:	SUJAN HOWLADER		

Capstone Project Title:	Laser Security Alarm System Using Arduino
Project Group No.	03

Sl #	Student ID #	Student Name	Obtained Marks
37	22-46410-1	Md. Abdullah Shishir	
36	22-46090-1	Effat Ara	
38	22-47035-1	Most. Sayma Khatun	
28	21-45693-3	Fatema Akter Sujana	
1	17-34505-2	Habibul Hasan	

Assessment Materials and Marks Allocation:

COs	Assessment Materials	POIs	Marks
CO3	Course Capstone Proposal Form	P.c.2.C6	30

Assessment Rubrics:

KPIs	Excellent [2]	Proficient [1.5]	Good [1]	Acceptable [0.5]	Unacceptable [0]	No Response [0]	Secured Marks
Project Title	The title reflects an issue related to complex engineering problems showing targets and methods with possible outcomes.	The title reflects an issue related to complex engineering problems showing targets and methods but some missing issues.	The title reflects an issue related to the course capstone project but there may be some missing issues.	The title reflects an issue related to the course capstone project but is not complete or specific.	The title does not reflect any issues related to the course capstone project.	No Response at all/ copied from others /identical submissions with gross errors/ image file printed	
Comments						Total Marks (2)	

KPIs	Excellent [5]	Proficient [4]	Good [3]	Acceptable [2]	Unacceptable [1]	No Response [0]	Secured Marks
Survey	The survey developed as a process for complex engineering problems considering cultural and societal factors has superior variables, targets, measures, and the implementation process is clear and challenging for future project implementation	The survey developed as a process for complex engineering problems considering cultural and societal factors has good variables, targets, measures, and the implementation process is clear and challenging for future	The survey developed as a process for complex engineering problems considering cultural and societal factors has moderate variables, targets, measures, and the implementation process is clear and challenging for future	The survey developed as a process for complex engineering problems considering cultural and societal factors has good variables, targets, measures, and the implementation process is somewhat clear for future project	The survey developed as a process for complex engineering problems considering cultural and societal factors has poor variables, targets, measures, and the implementation process is very unclear for future project	No Response at all/ copied from others /identical submissions with gross errors/	

	with several possible outcomes having good impacts.	project implementation with some possible outcomes with little impact.	project implementation with a few possible outcomes with impacts.	implementation with very few possible outcomes with little impact.	implementation with a few possible outcomes but no impacts.	image file printed	
Comments						Total Marks (5)	
KPIs	Excellent [3]	Proficient [2.5]	Good [2]	Acceptable [1]	Unacceptable [0.5]	No Response [0]	Secured Marks
Aims and Objectives	Aims and objectives are written to solve complex engineering problems considering cultural and societal factors with specific targets, measurement, and implementation processes that are clear and challenging and have several possible outcomes having very good impacts.	Aims and objectives are written to solve complex engineering problems considering cultural and societal factors with general targets, measurement, and implementation processes that are not clear and challenging and have some possible outcomes having good impacts.	Aims and objectives are written to solve complex engineering problems considering a few cultural and societal factors with narrow targets; measurement, and implementation processes are clear and challenging and have a few possible outcomes having some impacts.	Aims and objectives are written to solve complex engineering problems considering cultural or societal factors with a very target; measurement and implementation processes are not clear or challenging and have little possible outcome having no impact.	Aims and objectives are written to solve complex engineering problems but do not consider cultural and societal factors with any targets; measurement, and implementation processes are not clear and challenging and no possible outcomes have no impacts.	No Response at all/ copied from others /identical submissions with gross errors/ image file printed	
Comments						Total Marks (3)	

KPIs	Excellent [5]	Proficient [4]	Good [3]	Acceptable [2]	Unacceptable [1]	No Response [0]	Secured Marks
Literature Review	Specific formats are maintained to review and cite the literature with recent publications. Identified and analyzed the problem correctly.	Specific formats are maintained to review and cite the literature with recent publications. Identified and analyzed the problem correctly, but all issues were not addressed with relevant or intended work.	Specific formats are maintained to review and cite the literature with recent and past publications. Identified and analyzed the problem correctly, but all issues were not addressed with relevant or intended work.	Specific formats are maintained to review and cite the literature with recent and past publications. Identified but could not analyze all the problems correctly, and all issues were not addressed with relevant or intended work.	No specific formats are maintained to review and cite the literature with recent publications. Could not identify and analyze all the problems correctly, and all issues are not addressed with relevant or intended work at all.	No Response at all/ copied from others/ identical submissions with gross errors/ image file printed	
Comments						Total Marks (5)	

KPIs	Excellent [4]	Proficient [3]	Good [2]	Acceptable [1]	Unacceptable [0.5]	No Response [0]	Secured Marks
Experimental Block Diagram	The block diagram is drawn to show the connections of all the possible components or sub-systems to show their interdependence with all possible flows of signals from inputs to outputs.	The block diagram is drawn to show the connections of all of the possible components or sub-systems to show their interdependence with a few missing flows of signals from inputs to outputs.	The block diagram is drawn to show the connections of most of the possible components or sub-systems to show their interdependence with a few missing flows of signals from inputs to outputs.	The block diagram is drawn to show the connections of a few possible components or sub-systems to show their interdependence with some missing flow of signals from inputs to outputs.	The block diagram is not drawn to show the connections of all possible components or sub-systems to show their interdependence and flow of signals from inputs to outputs.	No Response at all/ copied from others /identical submissions with gross errors/ image file printed	
Comments						Total Marks (4)	

KPIs	Excellent [4]	Proficient [3]	Good [2]	Acceptable [1]	Unacceptable [0.5]	No Response [0]	Secured Marks
-------------	----------------------	-----------------------	-----------------	-----------------------	---------------------------	------------------------	----------------------

Possible Outcomes	Outcomes are written to achieve complex engineering problems' solutions considering cultural and societal factors and showing measurement, and implementation processes to attain the outcomes with all possible impacts.	Outcomes are written to achieve complex engineering problems' solutions considering cultural and societal factors and showing measurement, and implementation processes to attain the outcomes with some impacts.	Outcomes are written to achieve complex engineering problems' solutions considering cultural and societal factors and do not show measurement, and implementation processes to attain the outcomes without showing any impacts.	Outcomes are written to achieve complex engineering problems' solutions but do not consider cultural and societal factors and do not show measurement, and implementation processes to attain the outcomes without showing any impacts.	Outcomes are not written to achieve complex engineering problems' solutions do not consider cultural and societal factors and do not show measurement, and implementation processes to attain the outcomes without showing any impacts.	No Response at all/ copied from others /identical submissions with gross errors/ image file printed	
Comments						Total Marks (4)	

KPIs	Excellent [5]	Proficient [4]	Good [3]	Acceptable [2]	Unacceptable [1]	No Response [0]	Secured Marks
Gantt Chart	Specific formats are maintained to draw the Gantt chart and there is the order of workflow with all work to be done.	Specific formats are maintained to draw the Gantt chart and there is the order of workflow with a few works missing.	Specific formats are maintained to draw the Gantt chart and there is the order of workflow with some works missing.	No specific formats are maintained to draw the Gantt chart and there is little order of workflow with some works missing.	No specific formats are maintained to draw the Gantt chart and there is no order of workflow with the most important works missing.	No Response at all/ copied from others/ identical submissions with gross errors/ image file printed	
Comments						Total Marks (5)	

KPIs	Excellent [2]	Proficient [1.5]	Good [1]	Acceptable [0.5]	Unacceptable [0]	No Response [0]	Secured Marks
References	Specific formats are maintained to write the references, and all are recently published journal and conference papers having no missing information.	Specific formats are maintained to write the references, and all are journal and conference papers, but some old papers have missing information.	No specific formats are maintained to write the references, and many are internet sources with several missing information and very old references.	No specific formats are maintained to write the references and most of them are internet sources with missing information.	No specific formats are maintained to write the references, and all are internet sources with missing information.	No Response at all/ copied from others /identical submissions with gross errors/ image file printed	
Comments						Total Marks (2)	