Information Security Management - BCSE354E

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Title
Morse code Converter

Abstract
The project involves the creation of a Morse code converter using Arduino. The system translates alphanumeric text input into Morse code signals, demonstrating the integration of programming and hardware for educational and practical purposes.

Motivation
Morse code is a classic communication method that has stood the test of time. However, many people are unable to learn it due to a lack of practical resources. To address this issue, we are developing an Arduino Morse coder, a flexible tool that will allow anyone to learn Morse code with ease. Our aim is to make Morse code accessible to everyone and help them experience its benefits, including enhanced cognitive abilities, improved attention and concentration, and a deeper understanding of communication. signaling and amateur radio operation.

However, due to a lack of practical resources for practice and study, the skill of Morse code communication frequently stays out of reach for many. Seeing this gap, we are driven to create an Arduino Morse coder, a flexible tool that enables anyone to learn Morse code and encourages the next wave of Morse fans.

Scope of the project
This project converts text to Morse code. It uses an Arduino Uno microcontroller, a solderless breadboard, resistors, LEDs, a speaker, and jumper wires. The code reads a string of characters and converts them into their corresponding Morse code. It then blinks LEDs and plays tones to represent Morse code. The user can modify the code to change the speed and pitch of the Morse code.

Novelty

The novelty of this project lies in its ability to combine software and hardware to convert standard text messages into Morse code. The Arduino platform provides an accessible and programmable solution, making Morse code communication both interactive and educational.

System Architecture (Diagram and Explanation)

Hardware:

Arduino board: This is the main processing unit of the system. It controls the timing and logic of the Morse code generation.

Output device: This is often an LED (light-emitting diode) connected to the Arduino. The LED blinks representing dots and dashes based on the Morse code sequence.

Input device (Optional): This can be a button, a keyboard connected to the Arduino, or even a Bluetooth module to receive messages wirelessly. Users can use this to input the text they want to convert to Morse code.

Software:

Morse code lookup table: This is stored in the Arduino's memory and maps characters (letters, numbers, symbols) to their corresponding Morse code sequences (combination of dots and dashes).

Timing library (Optional): Libraries like "TimerOne" can be used for precise timing of the dots, dashes, and inter-character delays, improving the accuracy of the Morse code generated.

Main program: This program reads the input (if any), looks up the corresponding Morse code in the table, and then controls the output device (LED) to blink according to the dots and dashes. The program also handles timing delays between dots, dashes, characters, and words.

Overall architecture:

Input (Optional): The user enters text through the input device (button, keyboard, etc.).

Processing: The Arduino program receives the input and breaks it down into individual characters.

Lookup: The program uses the lookup table to find the corresponding Morse code sequence for each character.

Output: The program controls the output device (LED) based on the Morse code sequence. It turns the LED on and off for specific durations to represent dots and dashes.

Timing: The program maintains accurate timing between dots, dashes, characters, and words to ensure proper Morse code transmission.

Additional features:

Sound buzzer: Instead of an LED, a buzzer can be used to generate audible tones for dots and dashes.

Decoding Morse code: The system can be extended to read incoming Morse code using a microphone and interpret it as text.

User interface: An LCD screen can be added to display the entered text and the generated Morse code.

ARDUINO MORSE CODE PROJECT
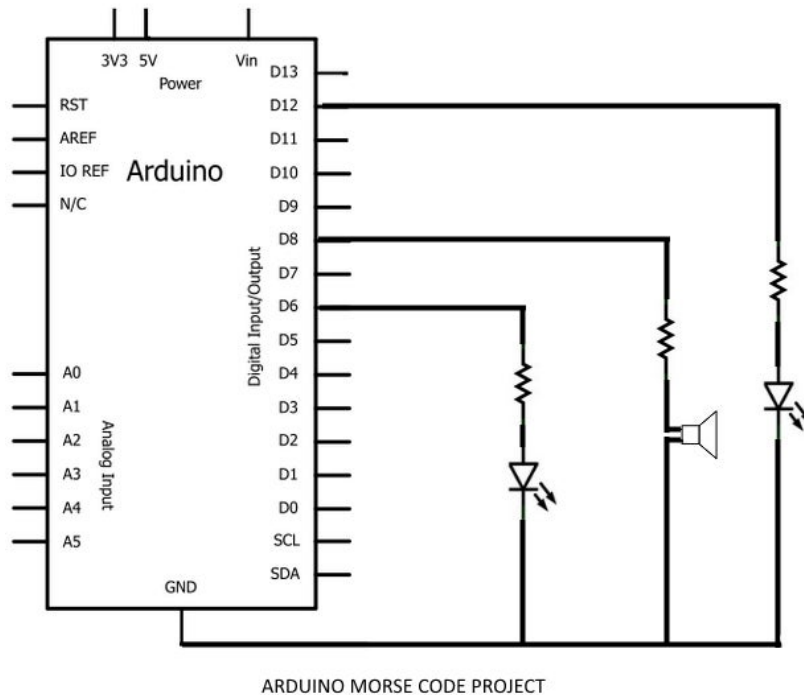
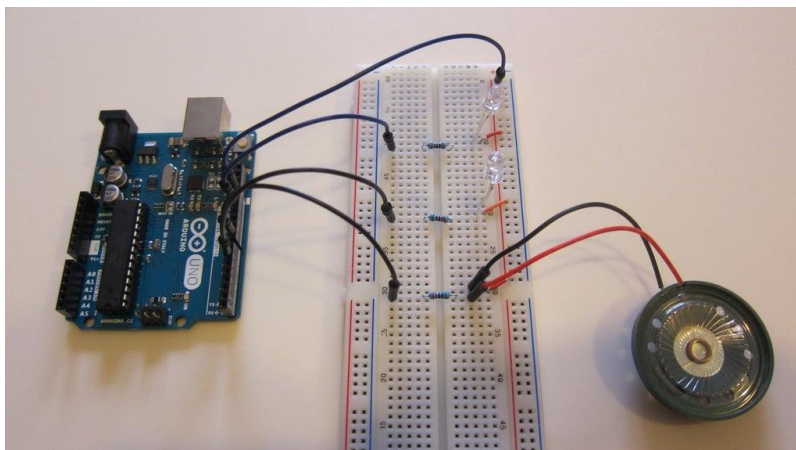## Software and hardware requirement

Software:
- Arduino IDE
- Morse code conversion algorithm

Hardware:
- Arduino board (e.g., Arduino Uno)
- Breadboard and jumper wires
- LED and buzzer for Morse code output
- Resistors
- USB cable for Arduino connection

Experimental Setup

Outcome

The project aims to achieve the following outcomes:

- Successful translation of text messages into Morse code signals.
- Integration of the Arduino platform for both software and hardware components.
- Educational value in understanding Morse code and value of encryption and decryption in communication system.