Document Concept - Interactive System

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Abstract

Each student needs to implement the entire local pipeline to pass the course consisting of:
- Input (morse code) using a button.
- Processing pipeline on the microcontroller (WeMos, Arduino, ESP32 etc.)
- Output (hexadecimal) using a servo.
+ one alternative hardware encoding for either input or output.

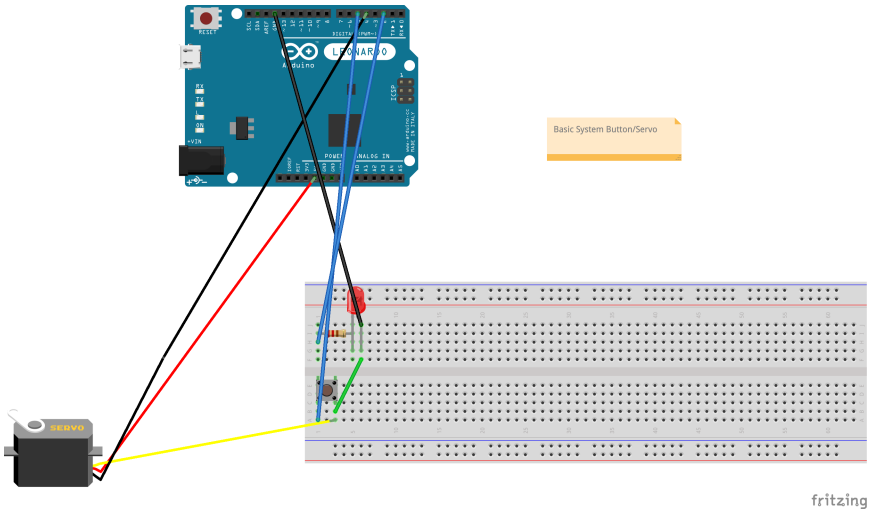
1 Content

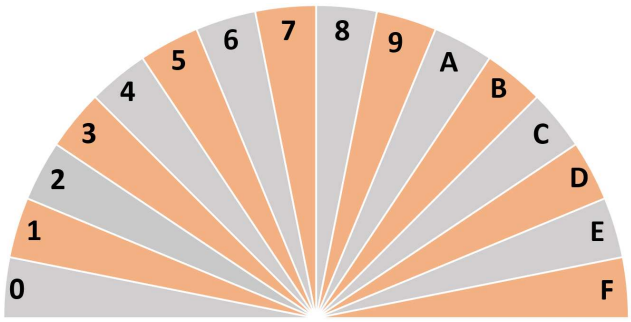
- What do you want to build (concept)?
  We want to build an interactive system that take like an input a char in Morse code, using a button. Then has to process the pipeline on the micro controller, in our case an Arduino. And in the end generate in output the corresponding value of char in hexadecimal code using a servo motor.
- How do you want to build it?
  We want to use an Arduino to process the input and move the servo motor in the corresponding direction to create that system.
- What do you need?
  - 1x Microcontroller (Arduino Leonardo)
  - 1x Servo 9G
  - 1x Bread Board
  - Resistors (200R and 100k)
  - LEDs
  - Jumper wires
  - Button
- Decide what alternative encoding and decoding methods you want to implement.
  - Input: We implemented in 2 ways:
    - 1: using 4 button to insert: dot, dash, end of string, print string
    - 2: Using a ldr to catch the user input in a sensitive way and provide the input to the system.
  - Output: Visual/Digital output for the user with a LCD Display.
- Explain why you chose these methods, how you want to implement them and what components you might need.
  - Why?
    We understood that provide input/the Morse code with a single button could take time and could not be really precise to use it for the user during our developing phases so we are looking for another way to interact with the system.The same for the output, the servo movement take time and could be miss understand from the user.

  - What?
    We would like to use this additional hardware to implement a better solution to provide the input and to read the output that doesn't take too much time and that provide a easier interaction for the user more error free like a 4 button pad or a ldr sensor to get the DIY bonus points. The LCD Display would be a faster solution to provide the output to the final user and would be more clear. For example we can print the entire word in the meanwhile the user is sending the Morse code.
  - Components
    * 4 button pad DIY
    * LDR sensor
    * Resistors
    * LCD Display
    * Potentiometer (for display)
    * (optional) Buzzer for alert the user about final output for example

- Think about what the concrete outcome of your project should be.
  We want to provide in a easy way some morse code to our system, error free and with a good user interaction for the user. Then we want to elaborate this data inside our microcontroller for then show a readable and understandable output to communicate with another or the same user.

- Simple hand-drawn sketches could be used to demonstrate ideas.





- (If applicable) The document should also cover those parts you want to implement for bonus points, e.g. alternative hardware encoding for either input or output, 3D visualization in Unity3D, etc. Note: Consider that you can implement only those input encoding and output

decoding methods which you added and explained here. Spend enough time on the document and figure out what it is that you and your teammate want to do.

- Input hardware encoding: 4 button pad/ LDR senso DIY
- Output hardware encoding: LCD Display
- Input Alternative conceptual encoding: Input like binary code
- Output Alternative conceptual encoding: Output like ASCII code
- For the 3D visualization in Unity 3D we plan on building a quite simple environment, with probably a base, on which you can see the fields for the hex code numbers and letters. With it there will be something like an arrow or some other GamoObject that can rotate to show the hex code. This is one way of presenting the output, another could be to print it. The Morse code input could be provided by a button the user clicks with his mouse keys or the keyboard of the user. (In alternative we want to develop a easier system like a pad/button for the input and a Display to provide the output of our pipeline in Unity3D environment.)

1.1 List of Components

- 1x Microcontroller (Arduino Leonardo)
- 1x Servo 9G
- 1x Bread Board
- Resistors (200R and 100k)
- LEDs
- Jumper wires
- Button
- **LCD Display**
- **Potentiometer**
- **Keypad/4 Button DIY pad**
- **LDR sensor**

2 Github Repository

Github Repository Project.