GP106 Computing Project

Department of Computer Engineering, Faculty of Engineering
University of Peradeniya

Batch:	E/21
Project Mode:	Group Project consisting of 4 or 5 members each.
Time Duration:	6 Weeks
Milestones:	2 Submissions, 1 Demonstration

Introduction

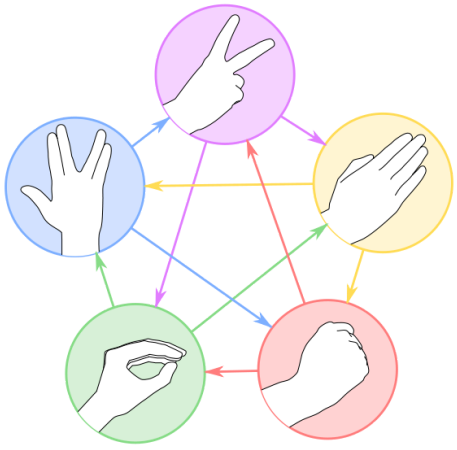
This project aims to provide students with practical knowledge in constructing a system that combines hardware and software elements. The implementation will be based on the concepts learned in class and the lab activities. Additional tutorial classes will be held to cover the usage of hardware components.

Description

Rock Paper Scissors Lizard Spock

"Rock Paper Scissors Lizard Spock" was popularised by the television show "The Big Bang Theory," specifically in Season 2, Episode 8, titled "The Lizard-Spock Expansion." The game was created by Sam Kass and Karen Bryla as an extension of the traditional Rock Paper Scissors game, adding two additional elements (Lizard and Spock) to create more variety and complexity. Here's how it works:

The Big Bang Theory: Rock Paper Scissors Lizard Spock (Clip) | TBS



Project Specifications

Create a Rock Paper Scissors Lizard Spock game using Arduino.

In this game, you (player 1) will compete against the computer (player 2) across seven rounds. There should be two sets of LEDs to showcase the scores for both players. In each round, an indicator LED should light up for about 3 seconds, signalling you to choose the gesture. There should be five push buttons, each representing Rock, Paper, Scissors, Lizard, and Spock, for you to select the gesture. After around 3 seconds pass, the indicator should turn off, and a piezo buzzer will buzz. Then, another set of LEDs will illuminate to reveal the computer's choice.

In one round, if there is a winner, the winner’s score will increase by 1. If there is a tie, no player gets any score for that round. If you don’t choose any gesture within the 3 seconds, then player 2 gets a score. After updating the score, the score should be visible from the corresponding LED sets. After a few seconds, the next round can be started.

Once all seven rounds conclude, the piezo buzzer should signal the game's end, and all LEDs corresponding to the computer's choices will blink to mark the end.

Use binary representation to light up the LEDs. Include a separate push button to start/end the game (toggle). You should be allowed to end the game in the middle of a round. Change the buzzer's tone to indicate the start and end of the game as you prefer. The serial monitor can show more descriptions of how to play the game and a summary of each round. Feel free to make your game board attractive. Let the games begin!

Component list

- Arduino & breadboard
- 10 LEDs (for indicator, player scores and computer’s choice).
- Piezo buzzer
- Six push buttons (for player input and start/end).
- Wires and resistors as needed.

Milestones

Flow chart submission

Create a flowchart illustrating how the Rock Paper Scissors Lizard Spock game system works using Arduino. This does not require any Arduino knowledge. Your flowchart should depict the sequence of actions and decisions involved in each game round, from the initialization to the conclusion of the seven rounds. Use on-page and off-page connectors as needed to maintain

clarity and organization. Submit your flowchart and a description of your design choices in a single PDF file. Make sure to include all the group members' names and E numbers.

Final Code, Hardware design and Video Submission

Submit your completed Arduino-Python code, a schematic of the hardware design (You can use tinkerCAD or a hand-drawn circuit), and a 3-minute video demonstrating how your game system works. Ensure your code adheres to best practices, including clear commenting, modular structure, and efficient logic.

Final Demonstration

Demonstrate your system to the evaluation panel. Each student in the group should articulate their contributions and be prepared to explain the system's functionality, including hardware implementation, flow chart, and Python code. Marks will be awarded collectively and individually based on overall performance and individual contributions.

Bonus

The current method of displaying marks and the computer's choice in binary format is not user-friendly. To enhance user-friendliness, implement a graphical user interface (GUI). You have complete freedom to unleash your creativity and choose any technology you prefer. However, ensure that the basic functionality remains intact, allowing users to input their choices using push buttons. **Do not include additional bonus features for the initial two submissions.** However, you can have an additional 2 minutes to extend your video to showcase bonus features.

Timeline

No extension dates will be provided.

Task	Deliverable	Deadline
Flow chart submission	Flowchart and a description of the design choices	26th May 2024
Final Code, Hardware Design and Video Submission	Python scripts, a schematic of the hardware design, and a 3-min Video	9th June 2024
Demonstration + Bonus	5 minutes face to face demonstration	Group AB - 11th June 2024 Group CD - 13th June 2024

Marks allocated

The project constitutes 15% of the total course grade.
Any plagiarism detected will result in zero marks.

Milestone	Component	Criteria	Marks
Flow chart submission	Flow chart	Completeness, clarity, and correct use of a flow chart	2
	Description of design choices	Clear and sufficient details	2
	Total (Submission1)		**4**
Final Code, Hardware Design and Video Submission	Python Code	Overall functionality and adhered to best practices	2
	Schematic of the hardware design	Completeness, clarity, and correct use of components	2
	3-min Video	Covers overall functionality, and a clear demonstration	2
	Total (submission 2)		**6**
Demonstration	5-min demonstration	Every team member should thoroughly understand and explain all aspects of the project, including flowchart, code, and hardware implementation.	5
	Total (demonstration)		**5**
Bonus			**2**
Total (project)			**15 + 2**