



ELECTRICAL TEAM TRAINING

TASK 3

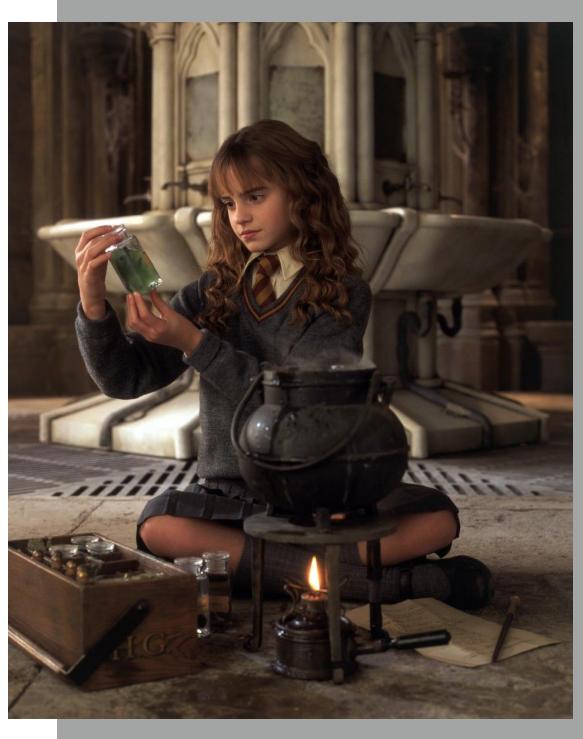
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TASK3.1

Hermione's Potions

ABSTRACT



Harry Potter, Ron Weasley, and Hermione Granger came to suspect that Draco Malfoy was the Heir of Slytherin. To investigate this, Hermione suggested the use of Polyjuice Potion to enable them to take on the form of Slytherin students and question Malfoy. Masterminding the effort, Hermione obtained the advanced potion's recipe (by getting Professor Lockhart to sign a note authorising her to borrow the book *Moste Potente Potions* from the library's Restricted Section), pilfered two of the rarer ingredients from Snape's cupboards, and undertook the complex and lengthy brewing of the base Polyjuice Potion.

Your task is to help Hermione by indicating the precise time and order of the recipe's tasks to correctly put the ingredients.

COMPONENTS

- 1x Arduino Nano
- 1x Push Button
- 1x Red LED
- 1x Green LED
- 1x White LED

INPUT

- Arduino Nano (Recipe Timing Indicator):
 - Push Button

OUTPUT

- Arduino Nano (Recipe Timing Indicator):
 - LEDs

EXPLANATION

Implement Arduino code for an Arduino Nano board.

- Reads a push button to start the main recipe routine
- Turns on the Red LED for 15 minutes to indicate the time that the heat should be turned on
- Flashes the Green LED for 5 seconds every 2 minutes to indicate the need for mixing the ingredients in the pot
- Flashes the White LED for 10 seconds at 5 minutes and at 8 minutes to indicate the need for adding the next ingredient to the pot

DELIVERABLES

- A **NAME_HermionePotions.ino** file that contains your Arduino code for the task solution.
- A **NAME_HermionePotions.pdf** document explaining the algorithm developed to solve the task.

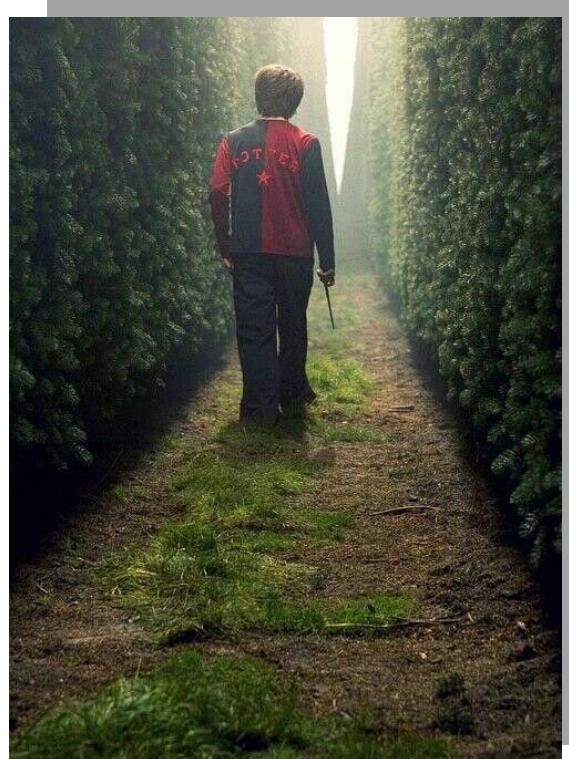
GUIDELINES

- Make sure your code compiles successfully without any errors.
- Use suitable names for the variables and functions. Don't use vague names such as (x, y, etc...)
- Your code **MUST** be well-commented and easy to follow up.

TASK3.2

Harry in the Maze

ABSTRACT



Navigating the Hedge Maze is one of the Triwizard Tournament grown on the Hogwarts Quidditch pitch. The maze was populated by various obstacles and dangers that each Champion had to overcome.

However, this time, Harry is not looking for a cup to win. Instead, he's looking for a safe where one of the Horcruxes is locked to take revenge for Cedric.

Your task is to mimick this scenario in Robotics

COMPONENTS

- 2x Arduino Boards
- 3x AMT103 Rotary Encoder
- 3x IR Sensors
- 1x Green LED

INPUT

- Arduino Nano (Harry):
 - IR Sensors
- Arduino Mega (The Safe):
 - Rotary Encoders

OUTPUT

- Arduino Nano (Harry):
 - Helper Functions
- Arduino Nano (The Safe):
 - Green LED

EXPLANATION

MAZE:

Implement Arduino code for an Arduino Nano board.

- Uses the 3x IR sensors to follow the lines on the ground and reach the end of the following maze



In order to simulate the robot movement you can use the following helper functions:

- moveForward();
 - moveBackward();
 - rotate90right();
 - rotate90left();

SAFE:

Implement Arduino code for an Arduino Mega board.

- Reads the position of each of the 3 attached encoders
 - Turns on the Green LED once the encoders are positioned as follows:
 - 1st encoder: 37 degrees
 - 2nd encoder: 10 degrees
 - 3rd encoder: 54 degrees

DELIVERABLES

- A **NAME_Harry.ino** file that contains your Arduino code for the first Arduino.
- A **NAME_Safe.ino** file that contains your Arduino code for the second Arduino.
- A **NAME_HarrySafe.pdf** document explaining the algorithm developed to solve the task.

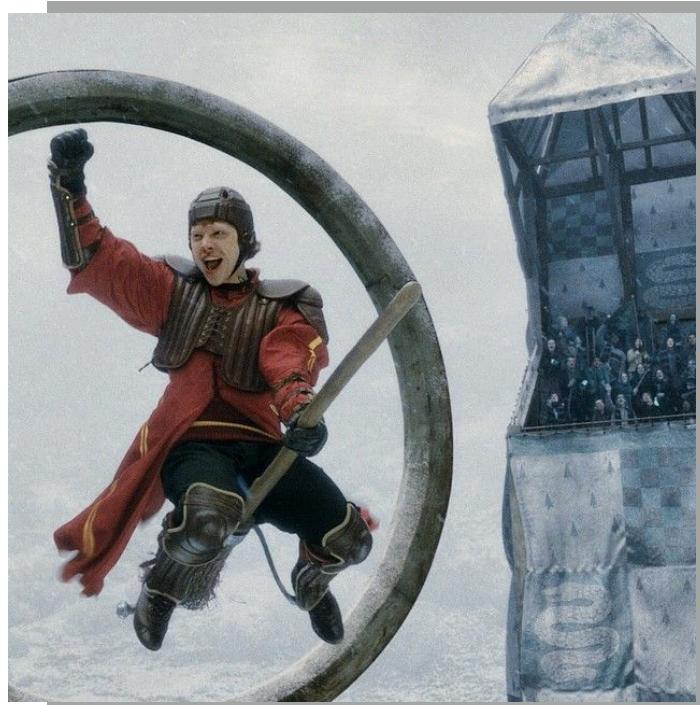
GUIDELINES

- Make sure your code compiles successfully without any errors.
- Use suitable names for the variables and functions. Don't use vague names such as (x, y, etc...)
- Your code **MUST** be well-commented and easy to follow up.

TASK3.3

Ron's Broomstick

ABSTRACT



The second Quidditch game of the season went poorly, with Hufflepuff scoring so many goals that Ginny catching the snitch only gave them a ten-point loss. In the final game of the season against Ravenclaw, Ron finally managed to pull himself together as Keeper, and Ginny Weasley beat Cho Chang in the race for the Snitch.

Ron is putting a lot of pressure to win the Cup, he's riding the broomstick with recklessness and with one target in mind.

Your task is to help Ron win the Cup by tracking his safety.

COMPONENTS

- 1x Arduino Nano
- 1x MPU 6050 Module
- 1x Red LED

INPUT

- Arduino Nano (Broomstick):
 - MPU 6050 Module

OUTPUT

- Arduino Nano (Broomstick):
 - LED

EXPLANATION

Implement Arduino code for an Arduino Nano Board

- Reads the orientation angles from the IMU
- Rapidly Blinks the Red LED if the pitch or roll angles exceeds 60 degrees

GUIDELINES

- A **NAME_RonBroomstick.ino** file that contains your Arduino code for the task solution.
- A **NAME_RonBroomstick.pdf** document explaining the algorithm developed to solve the task.

DELIVERABLES

- Make sure your code compiles successfully without any errors.
Use suitable names for the variables and functions. Don't use vague
names such as (x, y, etc...)
- Your code should be well-commented and easy to follow up.

SUBMISSION

- Submit your task to this form:
- Submitting a technical report is a **MUST**, and the code **WON'T BE GRADED** in case the report is not delivered.
- The deadline for the submissions is **19/09 at 11:59 pm**