Overview

It is required to implement a full ROV system with the given specs. The software team will implement motion, PID, communication and image processing systems. The hardware team will fabricate all needed PCBs to simulate ROV system.

You should **submit a report** representing your work to rov.torpedo@gmail.com before the deadline day.

The report must have the whole electrical system, in addition to a section including for everything you did in the final project.

Finally, it is required to **prepare a presentation (in English)** with descriptive **PowerPoint** in which all team members will participate and demonstrate their work within the final project's period.

You can send us emails of your questions (maximum 1 email/day), and we will try to answer you.

Deadline

FROM 4/10 TO 20/10

Coordinators

Name	Job
Mo’men Magdy | Youssef El-Nady	**CEOs**
Merna Magdy	**CFO**
Ziad Hassan	**Motion & Control**
Ahmed Hamdy	**Communication**
Mohamed Badran	**Computer Vision**
Kero Youssef	**Hardware**

Software

Name	Motion & Control	Communication	Computer Vision
Omair Walid			
Rana Medhat			
Ahmed Hamdy			
Nada Samy			
Merna Magdy			
Mariam Mohamed			
Youssef El-Nady			
Abdelrhman Sakr			
Mohamed Badran			
Asmaa Gamal			
Ziad Hassan			

Hardware

Members
Mo’men Magdy
Omar Ramadan
Kero Youssef

Notes

- You should make a group for chatting (include electrical heads in it), and communicate among yourselves in it.
- You will decide the GUI team yourselves.

Available Components

Name	# Of pieces
Cytron Motor Drivers	3
H-Bridge	3
Cytron Motors	2
Pressure Sensor	2
Arduino Mega	+2
LCD	1
Ethernet module	2
Logitech	1
12V DC power supply	1
Driller	1
Fabricated Boards	+2
XT-60	+2
Buck Converter	1
USB Host shield	1

Components You Might Need to Buy:

Name
4Motors
Copper board
XT-60
Wires+ Data cables

Motion & Control

- Implement systems for handling joystick signals for a 45˚ motors configuration, with 6 motors (or any other configuration you like and explaining it).
- Implement systems for sensors readings and showing it on lcd.
- Implement PID control to handle stop, horizontal and vertical cases. (With IMU and Pressure sensors).

NOTE: You're required to implement 2 separate systems, one with Arduino mega as a console, the other with the laptop as a console.

Communication

- Implement communication system (Ethernet) for sending any signals needed to the box and vice versa.
- Show required signals on LCD.
- Sending the required data to the GUI. (Sensor readings, direction of ROV, and anything you see required)

Computer Vision

- Object Detection system using YOLO and R-CNN (2 separate systems), to detect ordinary shapes (circle, triangle, square) on a video feed.
- Trace the red line, and number each square accordingly. (Like first square is labeled 1, second is 2, etc.…)
  On this image -- shorturl.at/lALOW
  The start of the line is the circle, the end is the square.
- We took in sessions 2 fields in computer vision:
  1. Image Classification and you did a task on it.
  2. Object Detection

  It is required to search for other fields and write a paper that demonstrates how it can benefit us and how we can use it.

GUI

- Implement a GUI showing the following:
  - Sensor readings.
  - Camera. (Laptop camera).
  - Buttons to start and terminate communication.
  - ROV Direction.

HINT: You can use PyQt.

Hardware

- Full library with all needed components.
- Design and Fabricate box motherboard.
- Design and Fabricate Console shield.

Very Important Notes

- The code must be clean, using OOP and well organized.
- You should make GitHub **private** organization (Include electrical team heads in it).