e-Yantra Robotics Competition (eYRC-2018)
Task 1.2: Ant Bot

Objective:

- To detect patterns of ArUco markers (you familiarised with in Task1.1) using the specified dictionaries.
- Recognize objects of different colours by applying colour space and image thresholding techniques.
- Recognize the shape of the colour objects using basic concepts of Geometry and Image Processing.

Structure of Task Directories:

Please find the following folders within the folder that contains this ***"Read Me Task 1.2.pdf"*** file. The folders have been numbered:

- **1. Resources:** You will find a ***"Reading_Material.pdf"*** file in this folder. This document explains the different tutorials and their use as resource material before you dive into solving the **Task1.2**. The tutorials and resources are contained in the other documents in this folder namely-
  - ***ArUco_library.pdf***
  - ***Getting_started_with_ArUco.pdf***
  - ***Introduction_to_OpenCV_python***

  Apart from these resource tutorials, additional Image Processing resources will be provided to you under the **Resources** tab on the portal. You are required to first go through these resources and exercises provided to you before you attempt the **Task1.2**.

- **2. Code:** You will find two code files in this folder namely:
  - ***Aruco_lib.py*****:** This code file contains supporting API created by e-Yantra Team to help you learn and interface with the ARuCo library of OpenCV fast.
    Note: You **can edit** just a **single line** in this file which pertains to specified **Dictionary** to be used!
  - ***Task1.2.py*****:** You are supposed to edit this code file to create your algorithm to solve Task1.2. However, do **NOT** edit the already created skeleton code or change the name of the functions within this code file. The three functions in the file are:
    - **main():** calls the function to generate or create ArUco markers by specified Ids.
    - **aruco_detect():** function expects one parameter as arguments - name of the input image file with full path.
    - **color_detect():** function expects one parameter as arguments-the OpenCV Image file. Call this method only once the ArUco ID is detected.

- **3. Images:** You will find a set of 5 input Images; which contain the following within this folder-
    - An ArUco Marker whose ID is not specified. However, which dictionary it belongs to will be given in an input table described in the task document.
    - 4 colour objects of different shapes where no two same shaped objects have the same colour.

- **4. Task_Description:** You will find the document ***"Task1.2.pdf"*** in this folder. This document describes the problem statement, given assumptions, inputs and data along with the required outputs and their formats for **Task1.2**. Follow this document for understanding the problem statement and design your solution for the same to get the output in the format specified in it.

Submission Instructions:

- Save the code that you generated to solve the problem in a folder named ***"Code"***. Also, save the ***"Aruco_lib.py"*** you used in conjunction with your algorithm code in this folder.
- Save the generated output images in a folder named ***"Images.***
- Save the **metadata** of the ArUco's ID and centre coordinates of the objects in a csv as detailed the task document and name it as ***"<TeamID>_Task1.2.csv"*** i.e. **"1001_Task1.2.csv"** if your team ID is **1001**.
- Save both these folders within a folder named ***"<TeadID>_Task1.2"*** where if your team ID is **1001**, then the folder name will be **1001_Task1.2**.
- Compress the folder into a **.zip** file and upload it within 2 weeks as your submission.
  Note: The Task1.2 should be uploaded on the portal on or before
  11:59 pm, 28th November 2018
- Ensure your zip folder is **less than 5MB** in size.

Note: Do Not edit any line in ***"Task1.2.py"*** skeletal code, ***"Aruco_lib.py"*** and the Input Images in the ***"3. Images"*** folder. The files submitted by you will be run through a test script for automatic grading. **Teams making any changes will be disqualified.**

Warning:

- **IMPORTANT:** The document you submit should be ***YOUR WORK*** in ***YOUR WORDS***. To avoid any copyright violations, you must **NOT** copy phrases directly from manuals or web.
- The team should **NOT** mail or upload the document anywhere else, except on the e-Yantra portal.
- Teams failing to submit the document by the deadline will lose the marks for this task.
- e-Yantra **WILL NOT** entertain any request for an extension of the deadline for uploading the task.
- **e-Yantra has complete discretion to disqualify a team if any foul play is suspected.**