

**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 “**<TeamID>\_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, 28<sup>th</sup> 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.