REV 1.0





Wings & Wheels

GUIDELINES

BAKU 2023

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1. Introduction

- 1.1. "Wings & Wheels" category at SAF 2023 is a collaboration of educational robots and drones designed to bring out the potential of every student. The advanced modes and smart functions of these robots allow participants to program science, math, physics, and more. will provide an opportunity to deeply understand the fields.
- 1.2. Young robot and drone programmers are going to discover how to resolve challenging issues gradually by fragmenting them down into smaller, easier parts, whilst simultaneously comprehending the fundamentals of STEAM and competing while establishing learning, self-confidence, and teamwork skills.

2. Terms of Participation

- 2.1. 13-15-year-old school students from grades 7-9 can participate in the competition.
- 2.2. Teams of 3 people (including a mentor) should be formed for this competition.
- 2.3. Each team must have an mentor who is over 18 years of age. The person acting as a mentor **should not** provide any assistance to the team's project. The mentor undertakes to support the team until the final stage and to be with the team at the final stage.
- 2.4. Only one competition can be applied for with the same team. Applications from the same team or individuals applying for different categories of SAF 2023 will be considered invalid.
- 2.5. By registering, candidates are deemed to have read and accepted all of the above-mentioned terms and conditions.
- 2.6. Participating teams must respect the spirit of competition, not argue with or insult others, cause physical confrontation or provocation, or damage other teams' ships or steal their belongings.

3. Application Method

3.1. Applications will be accepted through the official website of SAF 2023 (https://saf.steam.edu.az/).

4. Qualification Stage

- 4.1. Registered teams will be required to qualify to participate in the finals. The locations of the selection stage will be announced after the registration is over.
- 4.2. The task for the selection phase will aim to bring out the knowledge and skills of the students who wish to participate and will include the performance of a task that includes coding, analytical thinking and problem solving.
- 4.3. Participants will be given 1.5 hours for the selection stage and 3 minutes to present the task.
- 4.4. Based on the selection results, the teams that will participate in the final will be determined.

5. Qualification Stage Criteria

- 5.1. Preliminary evaluation will be done by judges. Once the evaluation is complete, the scores will be final and will not be changed.
- 5.2. If the teams have the same score at the end, the team that finishes the process in the shortest time will be the winner of the competition.
- 5.3. The evaluation criteria for the selection stage will be as follows:

Criteria	Points
The level of explanation and clarity of the code	0-15
Code optimization level	0-15
Successful completion of the task	0-15

Table 1

5.4. In addition to the above points, the organizers can add another criterion if they consider it appropriate. Any update on the criteria will be announced to the team mentors.

6. Resources to be used in the final stage

6.1. All teams that have registered and progressed to the finals will need the following equipment:

- RoboMaster EP
- DJI Tello Edu
- DJI Tello Edu Mission Pads
- Robomaster software
- Python software
- DJI Tello coding environment

7. General terms of the final stage

- 7.1. Participants must perform the task in the most correct way in the competition at SAF-2023. The goal of the competition is to establish the correct connection between the robot and the drone, to ensure that the robot places the 3 mission pads in the appropriate places only **through the code**, and after the mission pads are placed, the drone reads them and executes the recorded commands.
- 7.2. The layout of the competition area is as follows:



- 7.3. In this category, teams must complete tasks using only **code**, creating the correct route between a robot and a drone.
- 7.4. During the task, Robomaster picks up the first of the mission pads and carries them to the designated point, moving in the directions of the designated route lines of the competition area. It then repeats the same process for the second and third mission pad.
- 7.5. At the same time, the drone should fly and identify the mission pad number 1 through its sensors and move to the 2nd station. Then, when it reads the mission pad number 2, it must remove the 4 balls located on the plate from the plate. After this operation is completed, the drone goes to the mission pad number 3, receives the data for "Landing" and arrives at the landing zone and lands.
- 7.6. The size of the task area is 600x600 cm. The height of the side barriers is 50 cm, the height of the Slope barrier is 10 cm, and the slope is 30°.
- 7.7. 180 seconds are given to perform the task.

N⁰	Task	Points
1	The robot picked up mission pad #1	5
2	The robot brought mission pad #1 to the designated location (incomplete/complete)	5/10
3	The robot picked up mission pad number 2	5
4	The robot brought mission pad #2 to the designated location (incomplete/complete)	5/10
5	The robot picked up mission pad number 3	5
6	The robot brought mission pad #3 to the designated location (incomplete/complete)	5/10
7	The drone took off	5
8	Dron read mission pad #1	10
9	Dron read mission pad #2	15
10	Dron read mission pad #3	20
11	The drone removed the balls from their containers (for each ball)	5
12	The drone made an incomplete landing	5
13	The drone made a full landing	10
	Task execution time	180 sec.

8. Competition evaluation table

Table 2