



REPUBLIC OF TURKIYE
MINISTRY OF NATIONAL EDUCATION
The General Directorate
of Technical and Vocational Education

16th INTERNATIONAL MoNE ROBOT CONTEST

DESIGN & BUILD ROBOT CATEGORY RULES

INTERNATIONAL
MoNE
ROBOT
CONTEST



DESIGN & BUILD ROBOT CATEGORY COMPETITION RULES

CHAPTER 1: COMPETITION RULES

Article 1 (Objective): This competition is based on competing professional skills, knowledges and programming experiences of students. Teams will provide all the products, materials, hand tools and laptops which are announced by the organization in the specifications necessary for robot construction in their province where their schools are located before the competition and will keep them ready with them. No materials will be given to the teams before the competition, only an envelope containing the information of the track where the robot will compete and the rules of the competition will be given and they will be asked to race them in competition area.

CHAPTER 2: COMPETITION FORMAT

Article 2 (Definition): The competition will last for three days. Each team has two competitors.

First day: All teams take the competency exam which will be held on first day (morning/afternoon)

Second day Session-1: On the second day (morning) of the competition, the teams who successfully passed the qualification exam will be placed on the tables where they will work according to the order of draw. Teams have **to design** their robots in a specific time and get ready for programming. There will be laptops and all materials which brought by the teams in each desk. The specifications of the track/platform where the competition will be held and the robot's tasks will be given to the competing teams in a sealed envelope just before the competition starts.

Second Day Session-2: On the second day of the competition (noon), the teams will program the robots they have designed by using the laptops given by the organization and the materials that they brought with them within the specified time and make them ready for the competition by trying them on the test track. At the end of the period, the referee committee will receive the robots from the competitors and will deliver them again on the third day at the time of the final competition. The ranking list will be announced by the referees at the end of the competition.

***** Computers will be provided by Erzurum Provincial Directorate of National Education and contestants will not carry any electronic devices such as mobile phones, tablets, USB sticks, external discs, smart watches, etc. with them.**

Third day: The final races will be held in the indoor hall in front of the spectators.

CHAPTER 3: EXAMINATION

Article 3 (Examination): Competency exam will be held at first day of competition. All team members will sit the exam at the same time.

Exam will consists of multiple choice questions which are related with the following topics.

- Basic Electric & Electronics,
- Basic Digital Electronics,



- Arduino
- Arduino Shield,
- Basic Arduino Programming.

*** You can see sample questions at the last page.

Teams will be sorted according to their scores at the end of exam.

If teams have same scores, the team which gives its exam sheet earlier will be listed upper than other.

If teams are still equal, the one has lower average age will be listed upper than other. Only 40 teams from top of list will get right to compete “design” session of the competition at second day.

CHAPTER 4: ROBOT SPECIFICATION

Article 4 (Definition of Robot):

- Robot move autonomously.
- While designing robot, using any kind of module except modules announced by organization is not allowed.
- Using any kind of communication modules such as wireless, bluetooth, etc is strictly forbidden.
- Power unit; Using any kind of power supply on robot except LI-PO battery which announced by organization will not be allowed.

CHAPTER 5: RULES

Article 5 Principles will be announced to the teams just before starting competition.

CHAPTER 6: RACING

Article 6 Teams will be informed of racing rules, how it is carry on and scoring just before starting the competition. Robots which are built will run by the order of drawing.

CHAPTER 7: ASSESMENT

Article 7 Assesment criterions will be announced to the teams just before starting competition.

CHAPTER 8: OTHERS

Article 8 Organization commitee reserves the right to change the rules in case of necessity without any reason.

Article 9 The computer to be used in the competition will be formatted by by the school assigned by the Erzurum Provincial Directorate of National Education and brought to the competition area in a re-installed and working condition.

Article 10: The computers that given by the organization will have the operating system, office application program, pdf reader program and the Arduino IDE program downloaded from



<https://www.arduino.cc/en/Main/Software> and the necessary libraries installed. Programming will only be done using this programme. There will be no different applications and programmes other than these software. It is important for the participants that the computer to be used in the competition is formatted and reinstalled just before coming to Erzurum.

The computers will be examined by the judging committee before the competition.

Article 11: Before the start of the competition, the following products and materials to be used in robot construction will be available on the work tables and the robot will be built using the defined product groups.

Mainboards:

Open source microcontroller board

DC motor driver shield (double motor driver board)

Sensors ;

Inside tool box , there will be the following sensors.

Object detection Sensor	3 pieces, 80cm range
Line Sensor (8 sensor)	1 piece, analog signal
Infrared sensor for color sensing	8 pieces, measuring range 1,27mm
Colour Sensor	1 piece, RGB infrared, motion detector
Ultrasonic Sensor	3 pieces, 2-450cm ultrasonic distance sensor
6 axes acceleration and Gyro sensor	1 piece
Encoders	2 pieces, magnetic encoder for micro metal motor with reductor
Pressure sensor	1 piece, Digital barometer air pressure sensor
Mercury sensor	4 pieces
Micro switch	4 pieces, middle size, long palet,

Batteries;

LI-PO Battery	1 piece, 7,4V Lipo, 2200mAh 8C-2s
Charger	1 piece, 20W 1600mAh

Motors;

DC Gear Motor	2 pieces 6V 12mm 60 RPM with Reductor
Mini servo motor	2 pieces Mini (9gr)



Others;

Motor Bracket	2 pieces 12mm Micro
Sensor holder	3 pieces
Wheel	2 pieces silicon, outer dia:30mm
Ball Caster 3/8"	2 pieces, metal 9.5mm
Robot body	1 piece 170mm, 105mm, 3mm made by flexiglass
Miscellaneous resistance and capacitors	50 pieces

Tool Box and Tools;

Inside tool box, there will be the following tools.

Tool box 19"	1 piece
12V 1A Power supply	1 piece
Bread Board	1 piece
Bread Board Power Supply	1 piece
Digital Multimeter	1 piece
Jumper cables	2 piece, male-male, female-male 40pin,100mm
Soldering iron	1 piece 40W
Soldering iron stand	1 piece
Solder	1 piece
Soldering Flux	1 piece
Desoldering pump	1 piece
Mini long nose plier	1 piece
Mini plier	1 piece
Mini diagonal plier	1 piece
Screwdriver set	1 piece
Glue gun	1 piece 20W
Plastic Distance Set	1 piece plastic, 180 pieces
Screw-nut Set	1 piece M2 size, enough number of YHB screws, nuts and washers
USB Cable (1meter)	1 piece compatible with board

Notice:

*** Participants will bring all the products in Article 11 with them.



SAMPLE QUESTIONS;

S-1) What is the value of resistance which has following color code: Red – Green – Yellow – silver?

- a) 2 K Ω b) 200 K Ω c) 250 K Ω d) 2 M Ω

S-2) Which one is the symbol of diode?



S-3) Which one is the decimal equivalence of number $(1001\ 1100)_2$?

- a) 146 b) 156 c) 166 d) 176

S-4) Which one is correct statement to activate output pin 3 of Arduino?

- a) `digitalWrite(3,LOW);` b) `digitalWrite(3,SET);`
c) `digitalWrite(3,HIGH);` d) `digitalWrite(3,high);`

S-5) Which codes can be used to activate digital output 7 if value of input A0 of Arduino becomes between 300 and 500?

- a)

```
if(analogRead(A0)>300 || analogRead(A0)<500)
  digitalWrite(7,HIGH);
else
  digitalWrite(7,LOW);
```
- b)

```
if(analogRead(A0)<300 || analogRead(A0)>500)
  digitalWrite(7,HIGH);
else
  digitalWrite(7,LOW);
```
- c)

```
if(analogRead(A0)>300 && analogRead(A0)<500)
  digitalWrite(7,HIGH);
else
  digitalWrite(7,LOW);
```
- d)

```
if(analogRead(A0)<300 && analogRead(A0)>500)
  digitalWrite(7,HIGH);
else
  digitalWrite(7,LOW);
```

S-6) Which script can be used to define all pins of Arduino from 3 to 9 as output?

- a) `for(int i=0;i<10;i++)` b) `for(int i=0;i<10;i++)`



```
pinMode(i,output);
```

```
pinMode(i,OUTPUT);
```

c) `for(int i=3;i<10;i++)`

d) `for(int i=3;i<10;i++)`

```
pinMode(i,output);
```

```
pinMode(i,OUTPUT);
```

S-7) `int a = 5; Serial.print(sizeof(a));`

When we run the codes above , what can we see on serial port screen?

a) 5

b) 1

c) 2

d) 4