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

15th INTERNATIONAL MoNE ROBOT CONTEST

DESIGN & BUILD ROBOT CATEGORY RULES

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CHAPTER 1: COMPETITION RULES

Article 1 (Objective): This competition is based on competing professional skills, knowledges and programming experiences of students. A tool box in which there are necessary materials to make a robot will be given to teams and it is requested that teams design their own robots and race them in competition area.

CHAPTER 2: COMPETITION FORMAT

Article 2 (Definition): Competition consists of three sessions. Each team has two competitors.

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

Second day Session-1: On the second day of the competition (morning), the teams who successfully passed the qualification exam will be placed on the tables where they will work according to the order of lots. Teams have **to design** their robots in a specific time and get ready for programming. There will be toolbox in each desk. There are all necessary materials to design robot such as electronic equipments, boards, tools, specification of racing course, tasks for robot etc. in the toolbox.

Second Day Session-2: On the second day of the competition (noon), the teams will program the robots they have designed with the computers given to them by the organisation 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 Bursa Provincial Directorate of National Education and contestants will not carry any electronic devices such as computers, 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.
- When designing robot, using any kind of module rather than modules given 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 given 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 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 the school assigned by the Bursa Provincial Directorate of National Education and brought to the competition area in a re-installed and working condition.

Article 10: The computers that will be given to the participants by the competition organisation in the competition area 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.

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 given product groups.

Mainboards:

Open source microcontroller board

Screen shield

DC motor driver shield (double motor driver board)

Sensors ;

Inside tool box , there will be only the sensors among the following sensors which are suitable for competition tasks.

Object detection Sensor	3 pieces
Line Sensor (8 sensor)	1 piece
Infrared sensor for color sensing	8 pieces
Colour Sensor	1 piece
Ultrasonic Sensor	3 pieces
6 axes acceleration and Gyro sensor	1 piece
Encoders	2 pieces
Pressure sensor	1 piece
Mercury sensor	4 pieces
Micro switch	4 pieces

Batteries;

LI-PO Battery	1 piece
Charger	1 piece

Motors;

DC Gear Motor	2 pieces
Mini servo motor	2 pieces

Others;

Motor Bracket	2 pieces
Wheel	2 pieces
Ball Caster 3/8”	2 pieces
Special design body made by flexiglass	1 piece
Miscellaneous resistance and capacitors	50 pieces

Tool Box and Tools;

Inside tool box, there will be only the tools among the following tools which are suitable for competition tasks.

Tool box 22 inch	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
Soldering iron	1 piece
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
USB Cable (1meter)	1 piece

Notice:

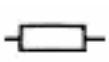
**** Bringing any kind of electronic 5oard sor equipments to the competition desks is strictly forbidden.*

SAMPLE QUESTIONS;

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

a) 1 K Ω b) 100 K Ω c) 150 K Ω d) 1 M Ω

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

a)  b)  c)  d) 

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++)
pinMode(i,output);

b) for(int i=0;i<10;i++)
pinMode(i,OUTPUT);

c) for(int i=3;i<10;i++)
pinMode(i,output);

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