

## REGULATIONS «CITY PASSING»

**Author:**

Organizing Committee of ROBOTEX CYPRUS

Original: [raimond.paaru@robotex.ee](mailto:raimond.paaru@robotex.ee) [www.robotex.ee](http://www.robotex.ee)

## Table of Contents

1	Introduction .....	3
2	Objective.....	3
3	Eligibility for Participation.....	3
4	The Field .....	3
5	The Robot .....	4
6	The Competition.....	4
7	Categories and Levels .....	5
8	Terms and Conditions of Participation.....	6
9	Robot Technical Control.....	6
10	Changes and Cancellation of Rules.....	6

## **1 Introduction**

The CITY PASSING challenge was first implemented in the international ROBOTEX competition in 2015. It is an innovative challenge that promotes the road safety culture.

## **2 Objective**

The task is to construct a robot that is able to drive through the city and park itself in a specific parking space. The robot must remain within the limits of the road and observe the traffic light and road signs in the city.

## **3 Eligibility for Participation**

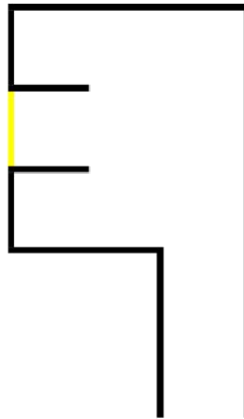
1. The competition accepts participation of teams and not individuals.
2. The team consists of 2-5 persons.

## **4 The Field**

1. The fields of the competition remain secret until the competition day. Participants are expected to take into consideration the details below and in Table 1 and develop a generic code that can perform successfully on any field.
2. The field surface is white.
3. The dimensions of the start area 25 x 25 cm.
4. The width of the road along which the robot has to drive is 25 cm.
5. There is a 20 mm wide black line at the edge of the road.
6. There are buildings in the city and other commuters may be encountered.
7. There may be buildings by the road, no closer than 3 cm from the road.
8. On the road, there may be one or more turns that are up to 90 degrees.
9. The minimum turning radius of the road is 0.
10. A 20 mm wide red stop line may be on the road. Upon encountering it, the robot must make a 5 second stop, which means, that the robot must be fully stopped, and no part of the robot may be on the red line or across it. If the robot fails to do so, 30 seconds will be added to the final time.
11. A barrier (boom) may be on the road. The height of the barrier is at least 15 cm and the robot has to stop in front of it. The robot may not touch the barrier, or 30 seconds will be added to the final time. The barrier will move after 10 seconds, after which the robot may continue moving.
12. A roundabout with a diameter of 25 cm may be in the city. On the roundabout, the robot can choose between two exits, both of which will lead to the finish. One exit leads to a narrower road with more turns, the other to a wider road with less turns. The order of the exits is not

specified beforehand.

- The robot can choose between multiple parking spaces at the end of the city. If the parking space is enclosed with a 20 mm wide black line from two sides and with a yellow line that forbids parking from one side, parking there is forbidden (see Figure 1). All other parking spaces are available for parking.



**Figure 1: Parking Places**

## 5 The Robot

- The robot must be autonomous.
- The maximum dimensions of the robot are 25 x 25 cm, its height is unlimited. The robot measure box will be 25 x 25 cm with plus 2 mm tolerance.
- The robot is forbidden to: Increase its dimensions; Damage the field and endanger the spectators in any way; Excrete liquids, gases, dust and other harmful substances.
- The robot must have a start and stop button or a remote control.
- Any violation of these rules will lead to the immediate disqualification of the robot.

## 6 The Competition

- The goal of the challenge is to reach the parking lot situated in the other side of the city as fast as possible. The robot must park itself between the parking lines as parallel as possible, while no parts of the robot may cross the parking lines. It is possible to choose between multiple parking spaces.
- Start
  - At the beginning of the challenge, the robot is placed in the square "Start", which is located at the beginning of the city.
  - It is not allowed that the wheels/crawlers of the robot cover or remain outside of the edges of the starting square when looking from above. Other parts of the robot may

cross the edges.

3. Restrictions/Penalties:

- While driving through the city, the robot is not allowed to cross the boundaries of the road (black line) with both wheels/crawlers. If the robot crosses the boundaries of the city with one wheel or crawler, a total of 5 seconds will be added to its final time. Crossing the boundary refers to a situation in which the wheel or crawler of the robot crosses the outer edge of the black line. Each subsequent city boundary crossing adds another 5 seconds to the final time.
- If the robot crosses the city boundaries with two wheels/crawlers, its final result will be its crossing site.
- If the robot touches a house, 5 seconds will be added to the time.

4. Competition trials

- Each robot has two trials, which must be completed within the specified period. It is not compulsory to use both trials.
- The final trial will be taken into account.

5. Announcing the winner

- The winner of the competition is the robot who passes through the city fastest.
- If none of the robots is able to pass the city in any attempt, the winner of the competition is the robot who ultimately reached the farthest point in the city.
- In case the robots have reached the same point, their arrival time will be considered.

## 7 Categories and Levels

The competition is organized for the **LEGO® MINDSTORMS**, **ARDUINO®**, **EDISON®** and **ENGINE®** platforms for the categories and levels indicated in the table below:

**Table 1: Categories & Levels for City Passing**

Category →		Primary	Primary	Gymnasium	Lyceum	University	Special Category
Challenges ↓	Level →	1 <sup>st</sup> – 3 <sup>rd</sup>	4 <sup>th</sup> – 6 <sup>th</sup>	1 <sup>st</sup> – 3 <sup>rd</sup>	4 <sup>th</sup> – 7 <sup>th</sup>	All Years of Study	Soldiers, Adults & Others
CITY PASSING (All Platforms)		X	√	√	√	X	X

√: Valid X: Not valid

## **8 Terms and Conditions of Participation**

1. Participation in ROBOTEX CYPRUS assumes and requires acceptance of all terms and conditions for participation by competitors, the coaches and the organizations they represent.
2. In case of any difference in the competition rules between the English and the Greek versions, the English version is considered as correct.
3. The robot must be registered before the competition. The registration process includes technical inspection of the robot, marking the robot with a number sticker, and the order in which it will compete which is generated by an algorithm in the information system supporting the ROBOTEX CYPRUS organization.
4. All questions and issues that may arise during the competitions must be reported to the judges.
5. The final decision about objections will be taken by the judges in cooperation with the organizers.
6. Judges' decisions on any objections are considered final and can not be challenged by participants, the coaches or the organizations they represent.

## **9 Robot Technical Control**

1. The robots' technical control will take place on the day of the competition at an area and on time specified by the organizers.
2. Failure of a team to come in time for a robot's technical check leads to the team being excluded from the event.
3. The leader of the team only is responsible to take the team's robot for technical control.
4. Technical control takes place before each phase of the competition (preliminary, qualifying, final) in which the team may participate.
5. Technical control includes the control of the robot based on the above and the paragraph "The Robot", if this paragraph exists. If the robot does not meet the requirements it will not be accepted to compete and will automatically be disqualified from the event.

## **10 Changes and Cancellation of Rules**

Any changes and/or cancellations in the rules of the competition are decided by the Cyprus Computer Society in consultation with the Organizing Committee of the CYPRUS ROBOTEX CHALLENGE. You may address comments and suggestions to the Organizers at [robotex@ccs.org.cy](mailto:robotex@ccs.org.cy) .

