



Robotics: Final Project

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30.10.2023

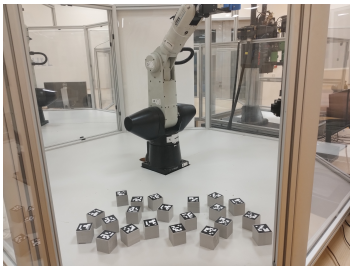
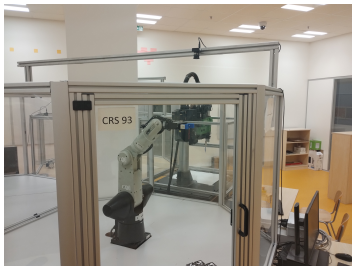
Overview

- ▶ Motivation: practical experience with real hardware
- ▶ Team of two students
- ▶ Two options for the project
 - ▶ Clean the workspace: pick-and-place with 6 DoF robot and vision
 - ▶ Drawing with a robot: draw polygons with 4 DoF robot



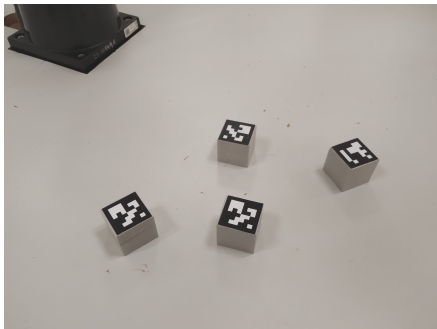
Option #1: Clean the workspace

- ▶ External camera, 3 robots
- ▶ Cubes with AruCo markers on top
- ▶ Goal: transfer all cubes into boxes



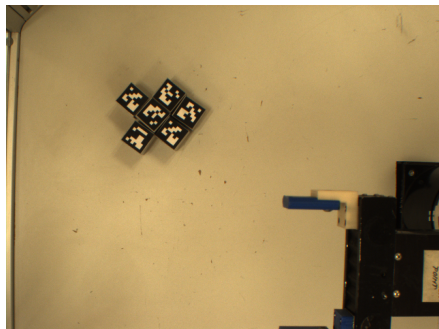
Option #1: Clean the workspace, variants

- ▶ Variant A: planar problem, separated cubes (max 10 points)



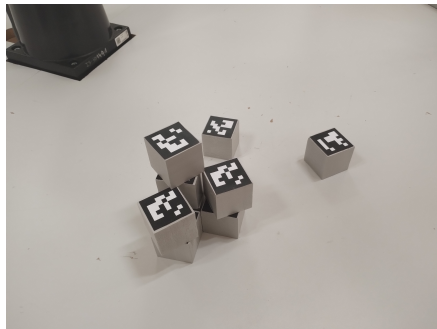
Option #1: Clean the workspace, variants

- ▶ Variant A: planar problem, separated cubes (max 10 points)
- ▶ Variant B: planar problem, touching cubes (max 15 points)



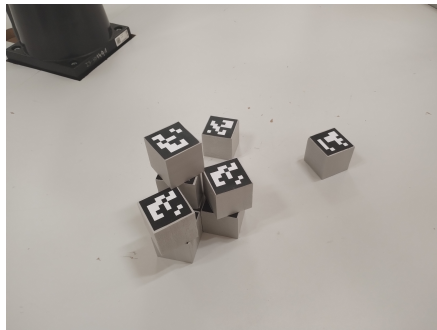
Option #1: Clean the workspace, variants

- ▶ Variant A: planar problem, separated cubes (max 10 points)
- ▶ Variant B: planar problem, touching cubes (max 15 points)
- ▶ Variant C: non-planar problem (max 20 points)



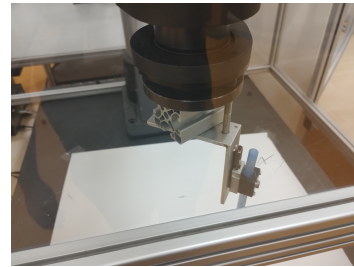
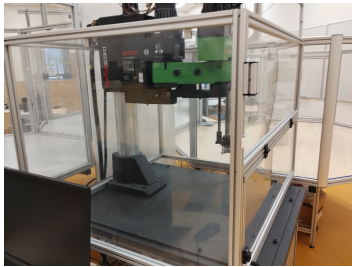
Option #1: Clean the workspace, variants

- ▶ Variant A: planar problem, separated cubes (max 10 points)
- ▶ Variant B: planar problem, touching cubes (max 15 points)
- ▶ Variant C: non-planar problem (max 20 points)
- ▶ Variant D: non-planar problem in ROS (max 23 points)



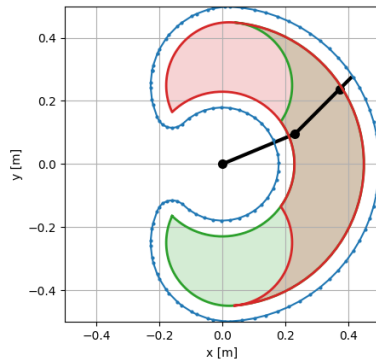
Option #2: Draw with a robot

- ▶ Draw polygon on a given pose
- ▶ No vision



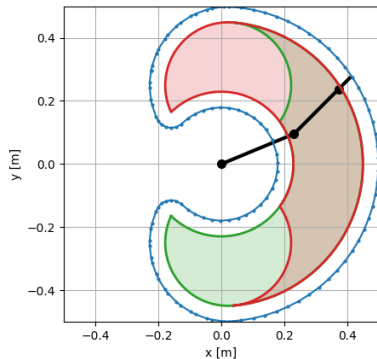
Option #2: Draw with a robot, variants

- ▶ Variant A: polygon fits into intersection of the red and green (max 5 points)



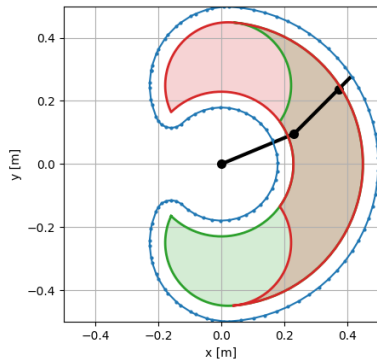
Option #2: Draw with a robot, variants

- ▶ Variant A: polygon fits into intersection of the red and green (max 5 points)
- ▶ Variant B: polygon fits either to the red or green (max 7 points)



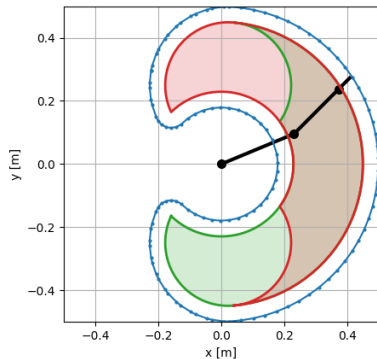
Option #2: Draw with a robot, variants

- ▶ Variant A: polygon fits into intersection of the red and green (max 5 points)
- ▶ Variant B: polygon fits either to the red or green (max 7 points)
- ▶ Variant C: polygon fits into union of red and green (max 10 points)



Option #2: Draw with a robot, variants

- ▶ Variant A: polygon fits into intersection of the red and green (max 5 points)
- ▶ Variant B: polygon fits either to the red or green (max 7 points)
- ▶ Variant C: polygon fits into union of red and green (max 10 points)
- ▶ Variant D: polygon fits into robot workspace (blue) (max 15 points)



- ▶ Sharing the resources: reservation system in BRUTE

The screenshot shows the BRUTE reservation system interface. At the top, there is a navigation bar with the following items: a logo, 'BRUTE', 'Course', 'AE & PD', 'Reservation', 'CW kiosk', 'Forum', and 'Help'. Below the navigation bar, there is a message: 'The latest BRUTE changes.' followed by a yellow banner: 'New! Customized grade functions implemented / More information.' Below this, there is a section for '2023Z Old courses'. The main content area displays a table of courses with the following details:

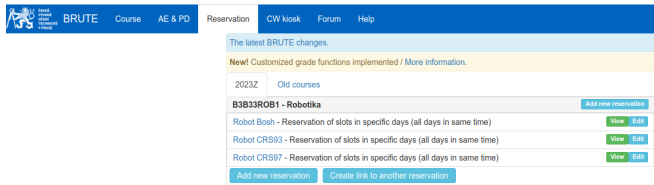
B3B33ROB1 - Robotika		Add new reservation
Robot Bosh - Reservation of slots in specific days (all days in same time)	View Edit	
Robot CRS93 - Reservation of slots in specific days (all days in same time)	View Edit	
Robot CRS97 - Reservation of slots in specific days (all days in same time)	View Edit	

At the bottom of the table, there are two buttons: [Add new reservation](#) and [Create link to another reservation](#).



Laboratories

- ▶ Sharing the resources: reservation system in BRUTE
- ▶ Consultations
 - ▶ during the labs: one of TAs (Krsek, Smutny, Petrik) is prepared on a phone
 - ▶ other timeslot: contact all TAs by email



The screenshot shows the BRUTE reservation system interface. The top navigation bar includes the university logo, 'BRUTE', and menu items: 'Course', 'AE & PD', 'Reservation', 'CW kiosk', 'Forum', and 'Help'. Below the navigation bar, there is a section for 'The latest BRUTE changes.' with a yellow highlight for 'New! Customized grade functions implemented / More information.' Below this, there are tabs for '2023Z' and 'Old courses'. The main content area displays a list of courses under the heading 'B3B33ROB1 - Robotika'. Each course entry includes a description and two buttons: 'View' and 'Edit'. At the bottom of the list, there are two buttons: 'Add new reservation' and 'Create link to another reservation'.

Course	Description	View	Edit
B3B33ROB1 - Robotika			
Robot Bosh	Reservation of slots in specific days (all days in same time)	View	Edit
Robot CRS93	Reservation of slots in specific days (all days in same time)	View	Edit
Robot CRS97	Reservation of slots in specific days (all days in same time)	View	Edit



Delivering final project

- ▶ Technical report and demonstration
- ▶ Report needs to be uploaded in advance
- ▶ Reservation system for the last week of the semester and exam-period
- ▶ **Contact us if you want to deliver sooner**

