

MRC 2020

Tooling and Infrastructure

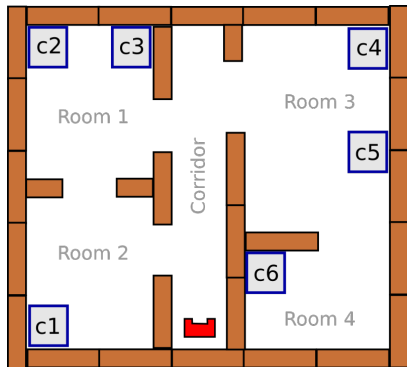
Bob Hendrikx

Eindhoven University of Technology
Department of Mechanical Engineering

April 22, 2020

The Assignment

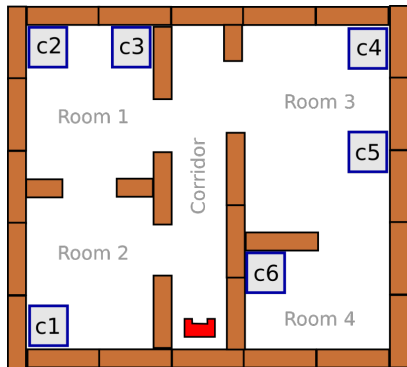
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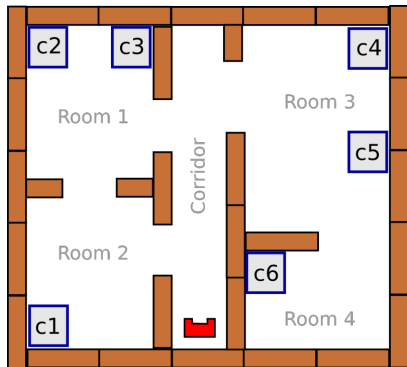
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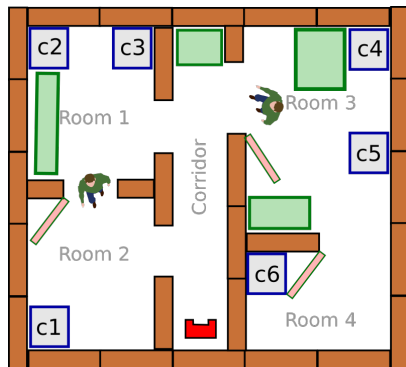
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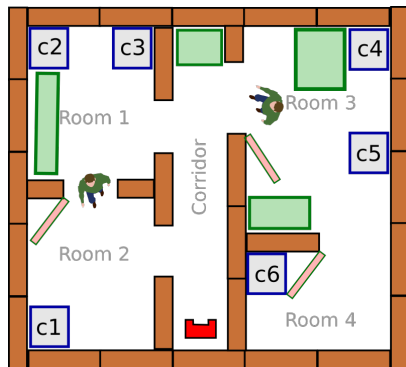
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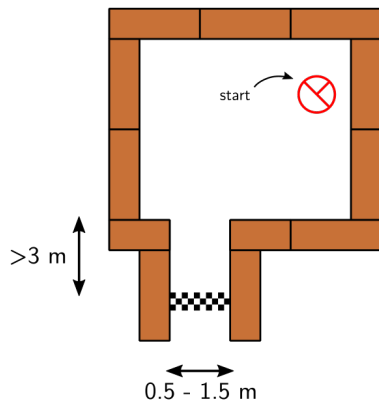
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- ▶ Important Dates:
 - ▶ Final Presentations: **June 3**
 - ▶ Competition Day: **June 10**



Intermediate Assignment

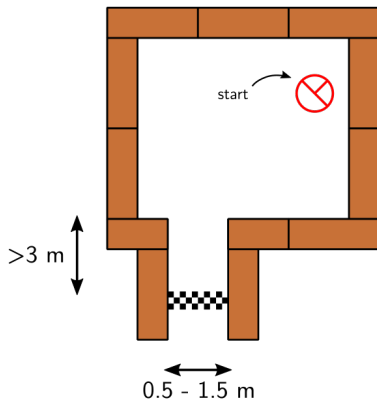
Escape Room Competition: let a robot escape the room through the door.



Intermediate Assignment

Escape Room Competition: let a robot escape the room through the door.

- ▶ Goal:
 - ▶ try to be *as fast as possible*
- ▶ You can use:
 - ▶ The **Laser Range Finder** to detect walls
 - ▶ The **encoder** data from the wheels
 - ▶ The ~~control effort signal to notice touches~~
- ▶ Competition day: **May 13**



Simple, right?

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Don't worry, we supply you with some tools to get you started!

Introducing the Robot: PICO

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- ▶ Telepresence Robot from Aldebaran
 - ▶ Robot type: *Jazz*



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- ▶ Computer:
 - ▶ Intel I7
 - ▶ Running *Ubuntu 16.04*

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- ▶ However, you are still **allowed** to use ROS!

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- ▶ Linux-based operating system
- ▶ Use version **16.04** (not 14.10, 15, 17 or 18!)
- ▶ 32- and 64-bit (**64-bit recommended**)

C++

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- ▶ We will use C++ as programming language
- ▶ C++ is object-oriented C
 - ▶ “C with Classes”
 - ▶ Encapsulate data and functionality within objects
- ▶ It is a **powerful** but **complex** programming language.
- ▶ However, we provide you the **MRC framework** to get you started

Creating code: Qt Creator

- ▶ Integrated Development Environment
 - ▶ Advanced code editor
- ▶ Many advantages over 'simple editors':
 - ▶ Syntax highlighting
 - ▶ Code completion
 - ▶ Visual compiler feedback
 - ▶ Static code checking
 - ▶ Refactoring tools
 - ▶ Parenthesis matching
 - ▶ ...
- ▶ Or your own favorite editor that supports CMake..



Git Version Control

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 - ▶ *'Manages files and directories, and the changes made to them, over time'*
- ▶ Used to **store** and maintain your code on the server
 - ▶ (Like Dropbox)

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- ▶ More info on the Wiki

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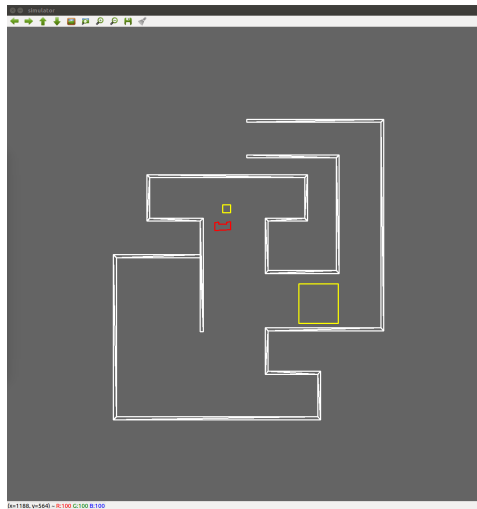
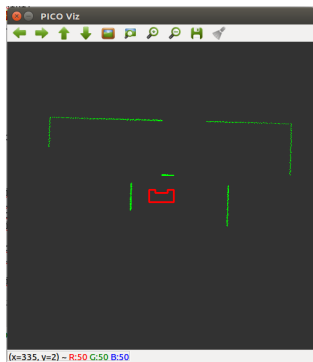
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- ▶ Can easily create test environments using **height maps**
- ▶ **Integrates** well with our provided software
 - ▶ If your software runs in the simulator, it runs on the robot

PICO Simulator



Example

- ▶ **Full Example:** from requirements, through Task-Skill-Motion to Software Executable.
- ▶ (far) from perfect!
- ▶ Focus on decoupling parts of functionality, explicitly in the code.

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Tutorial lectures will introduce robotics concepts in more detail!

Wiki

- ▶ MRC Wiki:
 - ▶ http://cstwiki.wtb.tue.nl/index.php?title=Mobile_Robot_Control
 - ▶ Info on practical assignment, installation, getting started
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- ▶ Overall use:
 - ▶ Everyone can [edit](#)
 - ▶ If you see a mistake: [correct it](#)

Working together

Because working together face-to-face is not possible:

- ▶ We recommend using [Microsoft Teams](#) within your group
- ▶ Meet with your tutor once every week using video call
- ▶ Use [canvas](#) for asking general MRC questions to tutors and fellow students
- ▶ Use [canvas](#) for FAQ about problems (e.g. dual boot issues)
- ▶ If you had a problem and know how to fix it: [add it](#)
- ▶ Use [canvas](#) to discuss the video lectures

Recap

- ▶ Robot: [Simulator only](#)
- ▶ OS: [Ubuntu 16.04](#)
- ▶ Programming language: [C++](#)
- ▶ Code editor: [Qt Creator](#)
- ▶ Version control: [git](#)
- ▶ Documentation: [Wiki](#)
- ▶ meetings: [Microsoft Teams](#)
- ▶ General questions and discussion: [Canvas](#)

That should get you started!

Groups

Each group will be supervised by a tutor:

- | | |
|-----------------------------------|------------------------------------|
| 1. Wouter Houtman | 7. Elena Torta |
| 2. Bob Hendrikx | 8. Wouter Houtman |
| 3. Hao Liang Chen | 9. Bob Hendrikx |
| 4. Marzieh Dolatabadi
Farahani | 10. Hao Liang Chen |
| 5. Jordy Senden | 11. Marzieh Dolatabadi
Farahani |
| 6. Wouter Kuijpers | 12. Jordy Senden |

It is *your* responsibility to get in touch with your tutor (see Wiki)

What should I do now?

- ▶ Make your own groups of **max. 6 people**
 - ▶ By adding your name and contact info to one of the groups on the wiki
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 - ▶ with one username for access to your Git, (tutorial)
- ▶ Check the Wiki & Finish the Tutorials:
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