

ELE Prototyping SoSe 2021

Programming – Task 4

If you have any questions during the week, send an email to

kristian.rother@hshl.de

ELE Prototyping Programming

Task 4 - Overview

- **Deadline: 24th of June 2021, 15:00h CET**
 - Send your files **via email** to kristian.rother@hshl.de (subject: ELE Prototyping Task 4)
 - **AND uploaded the files to your GitHub account**
- **Presentation of results: 25th of June 2021 (WebEx, see schedule)**
- **Extended Deadline for grading: Monday, 28th of June, 10:00h CET**
 - Anything that was sent to me until that time will be considered for grading.
 - I will only grade things that were sent via email AND uploaded to GitHub.
- Code in C (not C++)
- Feel free to use any programming environment you like. If you're unsure, you can use Visual Studio Code
 - <https://code.visualstudio.com/>
 - Install the extension for C/C++
 - Optionally install the Code Runner extension
 - Install/setup the compiler for your platform
 - Windows: <https://www.javatpoint.com/how-to-run-a-c-program-in-visual-studio-code>
 - Mac: <https://code.visualstudio.com/docs/cpp/config-clang-mac>

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Task 4 – Description 1/4

- The world that your robot navigates in gets a little more complex in this task. In addition to the things from the previous task it can now
 - Contain **sea targets ('t')** in addition to the land targets ('T')
 - Land targets turn into 'O' after they are picked up
 - Sea targets turn into '~' after they are picked up
 - Contain obstacles ('*') that can be **destroyed**
- The robot will also use energy
 - 10 energy per movement
 - 30 energy per toggle of the driving mode
 - **70 energy for trying to destroy an obstacle**

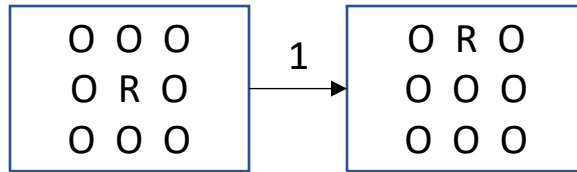
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Task 4 – Description 2/4

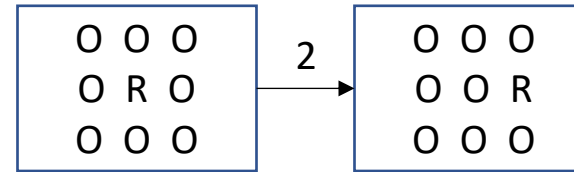
- Overview of return values for `move(char *world, int map_id)`

- Movement

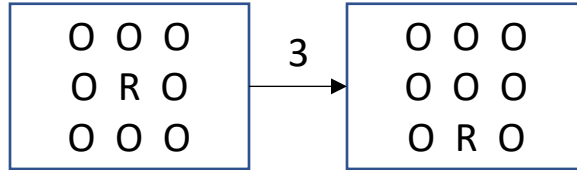
- 1: north



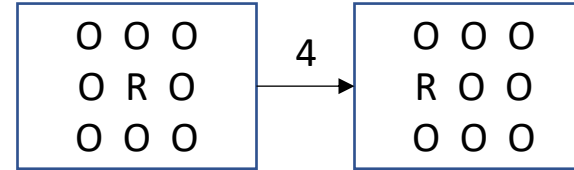
- 2: east



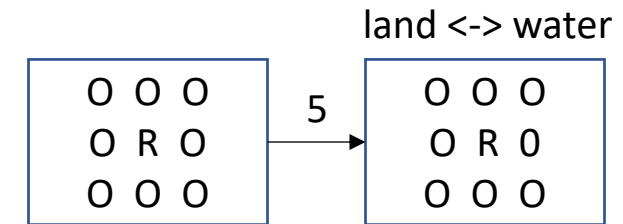
- 3: south



- 4: west

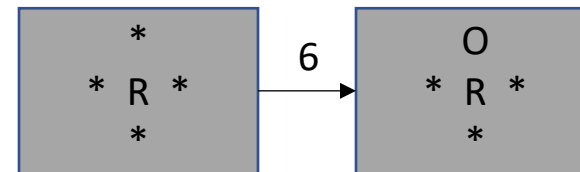


- 5: toggle land/water, stay at the same position

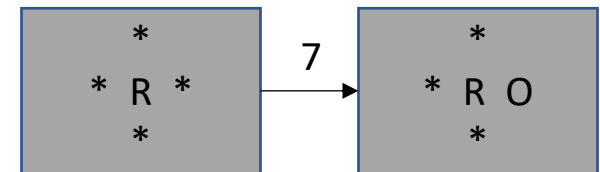


- Obstacle destruction

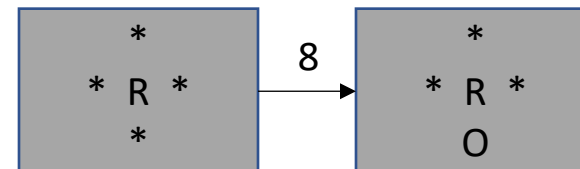
- 6: destroy an obstacle to the north



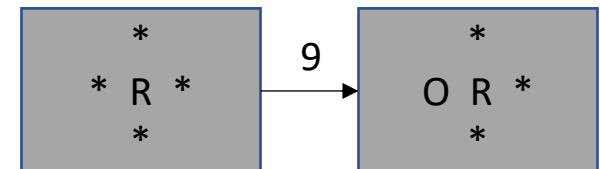
- 7: destroy an obstacle to the east



- 8: destroy an obstacle to the south



- 9: destroy an obstacle to the west



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Task 4 – Description 3/4

- Your robot has to **handle multiple maps sequentially** now, not just one at a time like in the previous tasks
- In order to run a simulation of multiple maps, the **signature for the move function has changed**
 - Previously, it was *move(char *world)*
 - Now it is ***move(char *world, int map_id)***
- **Update your code to handle this new requirement** and follow the new function signature
- Make sure to reset variables you use (like counters, internal maps) between different maps. You can look at the provided example robot to see how to do that

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Task 4 – Description 4/4

- To complete the map, the robot has to **return the target to the home base**
 - The home base is the starting spot of the robot
 - It is indicated by an 'X' after the robot leaves the spot
 - Your goal is to navigate to the target ('T' or 't') and after that, return to the 'X' spot.
 - There will be exactly one target and one home base on each map

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Task 4 – Your Task 1/2

- Your task is to write a robot, that can handle the new requirements
- **Do not change the function signature of move**
- **All your code should be written in *robot_teamname.c* and *robot_teamname.h*.**
- **Do not change anything else.**

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Task 4 – Your Task 2/2

- **Send** your final robot_teamname.c file and robot_teamname.h file to kristian.rother@hshl.de **via email AND upload the code to your GitHub** before the deadline
- **Prepare a presentation for Friday** to explain your code
- Important note: I will test your robot in my test environment. The environment contains different maps, not just the ones provided to you. **Do not hard code a solution.** The robot should handle different maps.
- The maps can now contain
 - One Robot ('R'), one target ('T' or 't') and one home base ('X') after the first step
 - Outside walls ('#') and inside walls ('#')
 - Water ('~')
 - Obstacles ('*') that can be destroyed
- Legal return values for move are
 - 1: north, 2: east, 3: south, 4: west
 - 5: toggle water/land mode
 - 6: destroy north, 7: destroy east, 8: destroy south, 9: destroy west