# EN2532 Robot Design and Competition

## Title: Final Competition Submission Instructions

**Test arena**

Sensor readings can often be deviated according to the material type and material properties of the object they are taking the measurements from, therefore, proper testing and fine tuning the algorithms is the key to achieve robustness for your autonomous robots. The test arena provided to you contains samples of materials your robot will be exposed at the final competition.

Those material properties will not be changed during the final competition, and you can request to investigate the properties when in doubt.

- *Bridge* will be from the same material type as the black walls of the mosaic floor area.
- *Goal post* will be from the same material type as the white walls of the maze.

Final arena configuration will **not** be revealed before the submission time. However, your robot may expect;

- different orientations/placements of the objects such as ping pong balls and keys, however, the respective sections where they are placed in the CMYK mosaic grid will remain the same.
- different maze pattern, however, the exit will remain fixed.
- different and more complicated line following patterns and a different starting position; however, your robot will always be oriented such that the front of the robot is facing the line it is supposed to follow. You will be asked to confirm if you are satisfied with the initial placement of the robot in the starting square before your simulation starts.
- if it correctly follows the continuous line, your robot will always enter the maze correctly without any requirement to adjust the orientation. You can observe that behavior from the test arena as well.

**What do you need to prepare for the final submission?**

1. Your *robot node* exported as a ".wbo" file. Importing this file alone must spawn your robot in the simulation arena.

2. ".CPP" file of your *robot controller*. If you are using separate header files, include all the header files as well as the main ".CPP" file into a ZIP folder called "codes.zip". Hint: You can find these files under the subdirectory called "controllers" inside your main project folder. This is a compulsory submission.

3. Content of the *entire project* you have worked, compressed as a ZIP file. You do not need to modify or extract anything, simply ZIP the entire project folder (most recent

and most up-to-dated one) and upload. Name it as "project_folder.zip" and this submission is a compulsory requirement

4. All the additional *computer aided design (CAD) files* (eg: .STL files) that are inside your "worlds" directory, compressed as a ZIP file and named as "CAD_files.zip". This step is optional if you do not use separate CAD files, and compulsory otherwise.

    a. Note: While you are completing your robot design, always add the CAD design files, Image files, Texture files, etc. inside the directory "…\your_project_folder\worlds". This allows you to utilize those files without specifying the full path.

    b. E.g.: You can simply mention "chassis_design.stl" as the "url" for a "Geometry Mesh" instead of typing the full path "C:\EN2532\worlds\chassis_design.stl".

    c. Always remember that your robot simulation will be run on a different PC, therefore, if you have defined a path in Webots that is unique to your computer, it will not work in the final competition.

5. For each of your groups, we will randomly select a color "red" or "blue" at the starting time. To indicate that selection to your robot, include a text file named *"Instructions_to_set_color.txt"* explaining what the operator should do. Make sure to guide the operator correctly where to enter the value, and what is the value to be entered and what needs to be done after entering the value (e.g. compile again). This submission is compulsory.

6. If you are defining *contact properties* for different surfaces, this step is compulsory. Please prepare a text file named "contact_properties.txt" that mentions the following details.

    a. Contact material 01 name:

    b. Contact material 02 name:

    c. CoulombFriction value:

    You can define in a similar manner for any number of contact material pairs. Pay special attention to case sensitivity. If you do not provide this information, all contact materials are assumed to be named as "default" with Coulomb friction value = 1, i.e., the default setting in Webots "WorldInfo" tab.

7. A separate text file briefly explaining if you have any other comments for the operators/evaluators for setting up your robot for final evaluation. This step is optional.