**INFO0948-2: Introduction to intelligent robotics** **(Due: 01/04/20 and 15/05/20)**

# Intelligent robotics milestones

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**Course Policy**: Read very carefully the instructions below as they are very important.

- Compulsory tasks **must** be achieved in order to pass the course.
- **One of the two optional** tasks **should** be achieved for obtaining a better grade.
- **The two optional** tasks **can** be achieved and would lead to an outstanding work.
- **Beware** that some MATLAB functions are forbidden and can thus not be used.
- During the exam, we will use your code on a new map. Thus, nothing should be hard-coded and your youbot should work for many different configurations. It is a good idea to test your code on modified house scenes (which you can get by playing with V-rep).

## Milestone Navigation

(2 compulsory, 1 optional tasks)

For this milestone, you should build a custom controller for the youBot, which should use its holonomic properties. In particular, **we do not allow the use of pure pursuit controller** `controllerPurePursuit` **from Matlab's Robotics System Toolbox**.

**(a - Compulsory)**: Explore the whole map (and build an appropriate representation), by accessing the GPS coordinates (i.e. `simxGetObjectPosition` can be used on the youbot). For this milestone you can call `simxGetObjectOrientation` on the youbot whenever needed.

**(b - Compulsory)**: Same as **(a)**, but `simxGetObjectPosition` can only be called once per minute (note that the exploration should remain fluid). For this milestone you can call `simxGetObjectOrientation` on the youbot **whenever needed**, there is **no restriction**.

**(c - Optional)**: Same as **(a)** but without calling `simxGetObjectPosition` at all, furthermore, for this milestone you **can not** call `simxGetObjectOrientation` on the youbot **at all**.

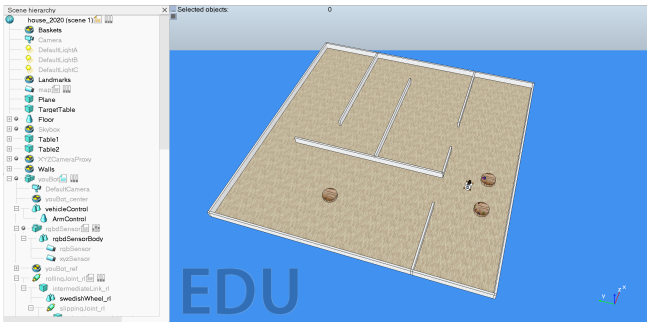
## Milestone Manipulation

(1 compulsory, 1 optional tasks)

For this Milestone, the youbot will need to access a "TargetTable" object, which position you will have to find thanks to the youbot's sensors. Note that this table is the same as the ones on which objects are initially lying. **To distinguish them, you can make the assumption that the "TargetTable" will always start empty (no objects initially lying on it).**

**(a - Compulsory)**: The youbot should grab all the object on table 1, without any falling on the ground and put them on the target table.

**(b - Optional)**: The youbot should grab all the object on both tables, without any falling on the ground and put them on the target table.


Scene hierarchy
house_2020 (scene 1)
Baskets
Camera
DefaultLightA
DefaultLightB
DefaultLightC
Landmarks
map
Plane
TargetTable
Floor
Skybox
Table1
Table2
XYZCameraProxy
Walls
youBot_center
vehicleControl
ArmControl
rgbdSensorBody
youBot_ref
swedishWheel_rl
Selected objects:
0
EDU