Robot Manipulation

Assignment 1

Firstname Lastname

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1 Summary

The summary is meant to prepare you for the exam. Make notes as you would use them for studying and use your own words.

- Some important point
- And relevant notes

2 This week's topic

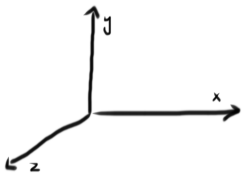
The purpose of the homework is to make us see how well you have grasped the concepts. You should always include all the steps on how you arrived at your answers on any homework. Your solutions must be self-contained. All arguments, theorems, equations, etc., behind your answers as well as their procedures have to be contained within your homework. Even if you use any external tools, remember that your submission must contain all the relevant (mathematical/conceptual) steps and explanations!

Don't forget to include the instruction text of the questions.

1. First question

   Answer containing all the steps. Remember that you can include the drawings by hand, as long as they are properly scanned. Use LaTeX to properly reference them.

Figure 1: *An example reference frame.*
Include the file name and scale the images accordingly.



2. Include the relevant snippets of your code in your answer. Include your working code with a README on how to run it in the zipped file of your assignment. Your code must be properly commented and your variable names must make sense.

   In this case, the template header is relevant only to show you the minimal information you should include. Don't forget to include your data (and your teammate's) in any file you submit.

code/example.py

```
1  # Example.py
2  # Very brief description of the file
3  #
4  # Date: dd.mm.yyyy
5  # Author: Name LastName
6  # Copyright: 2016, Name LastName
7
8  def some_function():
9      # This function does...
10     distance = 10 # Names for variables must make sense
11
12     # Print the results
13     print 'Example'
```

3. This basic example only shows the relevant lines of code.

code/transform.py

```
1  def homogeneous_transform(rotation_matrix, translation_matrix):
2      # This function returns a homogeneous transform built
3      # from an input rotation and a translation matrices
4
5      # Result is a 4x4 matrix, with the last row [0, 0, 0, 1]
6      T = np.vstack((np.hstack((rotation_matrix,translation_matrix)),
7                     np.array([[0,0,0,1]]) # T stores the homogeneous transform
8
9      return T
```

Don't forget to cite the relevant books [1], articles, tutorials or other materials that you used.

REFERENCES

[1] John J. Craig. *Introduction to Robotics: Mechanics and Control.* Pearson/Prentice Hall, 3rd edition, 2005.