MFC – Homework guidelines

It is a **single student** work.

The more you show how much you explored a topic the better.

You should be able to motivate during the homework discussion every single choice and discuss any statement (if you copy from a colleague it will come out from the discussion) and any piece of Matlab code. This requires a good knowledge of the theory.

Timing

- The deadline is strict.

- Send what you have at the deadline even if not complete, you will be allowed (and strongly advised to do so) to work back on the homeworks before the discussion.

- The homework has two goals:

    - Directly explore the topics that you have seen during the Lectures so that you self-assess your knowledge.
    - Show that you have understood and you have made all the concepts part of your control background. It is not a "Right" or "Wrong" type of problem, I am interested in your reasoning and how you used the MFC course tools.

Structure

- Every Homework needs to be in the form of a small report: either in LaTeX (soon or later you will probably find it useful, for example in order to write the thesis) or Word (or similar word processor). If necessary, I will provide a basic LaTeX template (based on `article.cls`). Quick information available at `https://en.wikibooks.org/wiki/LaTeX/Document_Structure` and the links within.

- There is no need to repeat the theory exposed in the Lectures, just the essential if strictly necessary to make your explanation more clear.

- Include the right amount of Figures, neither too many nor too few, which have to be commented and discussed in the text. For the format, follow the suggestions in the Figures guidelines.

- Pages should be numbered (very often, when we discuss a homework, if there is no page numbering it is a loss of time to comment specific parts of the text).

- Each assignment should be compressed in a folder named `HWXX_Surname` where `XX` will be the assignment number and `Surname` is the student surname. Example: `HW03_Lanari.rar` would be my third homework folder file name.

- Inside the folder there should be one `.pdf` file and its source (e.g., a LaTeX or a Word file) containing the homework development description and comments/observations if any. The name of the file would follow the general rule: `HWXX_Surname_Main.pdf`.

- The folder should also contain the Matlab and Simulink files that have generated the figures and the simulations.

Figures guidelines

- Any figure/plot included in the final document should be in .pdf (generated from a vector graphics source); in Matlab you can either save a figure in .eps (encapsulated postscript) and then transform it in .pdf outside Matlab, or generate directly a .pdf file from Matlab (you may need to crop it to get away all the unnecessary white space) or, clicking next to the figure "`Save as Vector Graphics`", directly as vector graphics. If you need, a sample file can be provided.

- Make sure the line width is sufficient (LineWidth option in Matlab).

- Figures should have *titles*, include a *legend* to distinguish between the different plots inside a plot, have a *caption* that describes the figure, and when commenting a figure in the text you should use figure numbering (e.g. "as shown in Fig. 2 ...")

- Figures should be meaningful and well scaled: very often one sees plots which have no interest or are useless (imagine showing the output of an unstable system or two variables in the same which have two order of magnitude difference). Subplots may be useful.

- Use, if you find it useful, the code for generating figures that is present in some of the Matlab examples posted in the Google Group.

Matlab guidelines

- Simulations Matlab/Simulink files should be well documented (this may take a lot of time).

```
% This file considers the problem of ...  and uses ....
% Student Name
% Created on xx/yy/zzzz
% Last version xx/yy/zz
% :
% Plant model
Sys_Plant = (s+1)/((s+2)*(s+3));
% First controller based on ...
Sys_C1 = ...
```

- A Matlab example with some useful plot options is already available (it is not necessary to use LiveScript).

- To generate figures from a Simulink file, you can, for example, save the signals to the workspace and then use the proper plot commands with all the desired options. In general it is not a good option to just copy the scope plot with a crop command.

Possible check list

☐ Report, homework number with student name in front-page, in pdf

☐ Report pages are numbered

☐ Report figures have captions, titles and units clear

☐ Report figures are meaningful, properly scaled and vector graphics based (e.g., pdf)

☐ Figures numbered in the text (e.g. "as shown in Fig. 2 ...")

☐ Original text source (LaTeX or Word) and Matlab/Simulink files are included

☐ Files names and folders are in the right format

☐ Matlab files are well documented

☐ Matlab filenames (if multiple) are summarized in a text file

☐ Would a course colleague understand the report?