Introduction to LaTeX
Final Assignment (Group 5)

Clifford Gilmore

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The `.tex` file containing your solutions and any picture files should be emailed to me at `clifford.gilmore@helsinki.fi` by 18:00 on the 7th April 2011. The subject line of the email should be "LaTeX Final Assignment".

Your assignments can be reused as templates for future projects and theses so it's a good idea to keep them!

Create a LaTeX document containing the following:

1. A preamble with:
   (a) the following AMS packages: `amssymb, amsthm, amsmath, amsfonts`.
   (b) a package to include graphics.
   (c) In addition to these, there must be three theorem-environments, Theorem, Lemma and Definition, utilising the same numbering scheme, which is numbered by section. The Definition theorem-environment must use the `definition` theorem-style from the `amsthm` package.
   (d) You must include one command which you have defined yourself (it need not have any arguments).
   (e) a title, which should be "LaTeX Final Assignment".
   (f) the author, which should be yourself.
2. The document should commence with the title, followed by a table of contents and then the lists of figures and tables.
3. You must provide enough text to make four pages. The text can be the solutions to an exercise sheet from one of your mathematics courses or random text such as from `http://www.lipsum.com/`.

4. You must have four sections, and each section must contain one of the theorem environments you have defined, such that every environment is used at least once in the document. You must also use the command you defined above at least once.

5. The following (numbered) equation as well as a reference to it elsewhere in the text of your document:

$$\operatorname{ind} A = \int_M \operatorname{ch}(A)\mathcal{T}(M) \tag{1}$$

6. The below equation (without numbering):

$$\begin{pmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{pmatrix} \begin{pmatrix} b_1 \\ b_2 \\ b_3 \end{pmatrix} = \begin{pmatrix} c_1 \\ c_2 \\ c_3 \end{pmatrix}$$

7. The following aligned equations.

$$\begin{aligned} \int_\Omega u(x)\frac{\partial}{\partial x_i}v(x))\,dx &= -\int_\Omega \frac{\partial}{\partial x_i}(u(x))v(x)\,dx + \int_\Omega \frac{\partial}{\partial x_i}(u(x)v(x))\,dx \\ &= -\int_\Omega \frac{\partial}{\partial x_i}(u(x))v(x))\,dx + \int_{\partial\Omega} u(x)v(x)\nu_i\,dS. \end{aligned}$$

8. Any picture of your choosing, such that it has a caption and the caption appears in the list of figures.

9. The following table with the caption "Four researchers"

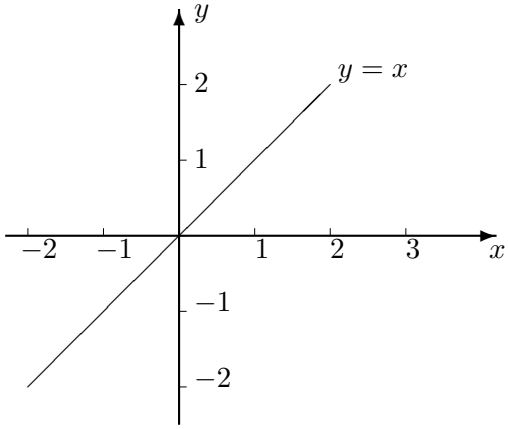
	Anneli	Patrick	Pekka	Fiona
Commutes by	car	train	bus	bicycle
Sport	ice-hockey	judo	football	rugby
Home town	Kirkkonummi	Helsinki	Helsinki	Vantaa
Height	164cm	175cm	181cm	169cm

   The caption should appear in the list of tables.

10. A numbered list with three entries.

11. A bibliography containing one book of your choosing, as well as the following article [1], in addition to citations for both in the document text.

12. **(Bonus Question)** Recreate the below picture using LaTeX picture commands:



References

[1] L. Fialkow: *Structural properties of elementary operators*, in *Elementary operators and Applications*. (World Scientific, 1992), pp. 55 - 113.