MAT 180 Scribing Instructions

Due December 9

You are all responsible for producing a LaTeX typesetting of a lecture, as announced on Canvas. Please revisit this Canvas announcement and make sure you are aware of the Overleaf file we are using and of the google spreadsheet which you must use to sign up for a lecture date. The first two lectures have already been written in LaTeX format in the Overleaf file, and you can use this as an example to get you started. Your objective is to produce a section of the textbook corresponding to the lecture you signed up for. Your grade will be based on how closely you adhere to the following:

1. Transform the lecture notes from whichever lecture you are responsible for into the LaTeX format. After finishing, submit a document on gradescope which gives the following information:

   (a) which sections in the textbook you typeset (include the titles and labels (those created using the `\label{}` command) of the sections as the numbers might change)

   (b) which lecture date you were responsible for

   (c) names of all members of your group

   (d) which exercises you created (include the full problem statements as the numbers may change)

   Only one member of each group must submit such a document on gradescope.

2. Your lecture should be put into an appropriate context in the document in terms of `\chapter{}`, `\section{}`, `\subsection{}`.

3. Do not copy line for line what was done in lecture, but instead transform the lecture notes into a readable book format. This means including transitional paragraphs between definitions, examples, and theorems to guide the reader along. I suggest reading other textbooks, wikipedia articles, and so on, to provide some useful ideas which help to give the reader context of how the definitions or results fit into the bigger picture. Do not just write a list of results and definitions. It must be readable (aim for the format of a typical math textbook).

4. At the end of each chapter, there is an exercises section and a solutions section. You are responsible for adding three exercises with solutions. You must create the exercises yourself. The exercises should illustrate as many concepts as possible from the lecture in an interesting and creative way. These exercises must be created by you and not taken from another textbook.

5. Consistency of notation. Refer to previously completed sections to make sure you are using the same notations or conventions that are being used elsewhere. See the section at the top of the latex file marked CUSTOM COMMANDS, and use these commands for common symbols e.g. $\mathbb{R}, \mathbb{C}, \operatorname{argmin}$. If you have a common symbol which appears in your section and may appear later, you should create a new command for that symbol. For example, if you need to often reference the softmax function, and there is no command for softmax, you can insert the code `\newcommand{\softmax}{\mathrm{softmax}}` into the CUSTOM COMMANDS section and call it with something like `$\softmax(\vec{x})_i$` as needed, producing: $\operatorname{softmax}(\vec{x})_i$. Make sure to always check the CUSTOM COMMANDS section if you are about to use a symbol or notation which is likely often used.

6. Use proper environments. Most of the text you write should be enveloped in an environment such as 'theorem', 'example', 'lemma', 'proposition' etc. The exception to this rule are the transitionary sentences to lead the reader between these results. For example, to use a proposition environment, you would use the code

```
\begin{proposition}
   For all $x\in \R$, $x^2\geq 0$.
\end{proposition}
```

7. Anytime you wish to reference a result from anywhere in the textbook, use the command `\label{some-label}` in the environment of the result you wish to reference (it may already have a label) and reference it using the command `\ref{some-label}`.

8. If you wish to use an image file to include graphics, use the `\includegraphics` command. Place your image in the folder corresponding to the chapter you are writing in. If no such folder exists, create it. Initially there is only the folder Chapter1.

9. Follow these notation conventions:

   - Vectors are given as boldface letters, most commonly $\mathbf{u}, \mathbf{v}, \mathbf{w}, \mathbf{x}, \mathbf{y}, \mathbf{z}$ (these are created by the CUSTOM COMMANDS `\vu, \vv, \vw, \vx, \vy, \vz`).
   - Scalars are non-boldface lowercase letters, most commonly a, b, c, d
   - The components of the vector $\mathbf{v}$ are denoted by v_i
   - Both the zero vector and the zero matrix are $\mathbf{0}$ gotten by calling `\vzero`.
   - Matrices are boldface uppercase letters like $\mathbf{A}, \mathbf{B}, \mathbf{C}, \mathbf{M}, \mathbf{U}, \mathbf{V}$
   - Rows and columns of matrix $\mathbf{A}$ are written as $\mathbf{A}_{i,*}$ and $\mathbf{A}_{*,j}$ respectively. Entries of $\mathbf{A}$ are written as $A_{i,j}$ (not boldface).
   - Vectors are always assumed to be column vectors written between square brackets

$$\mathbf{x} = \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix}$$

but sometimes we may wish to save space and write them as row vectors, in which case we may use the transpose notation

$$\mathbf{x} = [x_1, x_2, x_3]^\top$$

Note: the transpose is not just a T, we use the command `^\top` as in

```
$\vx = [x_1,x_2,x_3]^\top$
```

- In a definition, the term being defined is put in the 'define' environment, which puts the term in italics. Use the command `\define{term}` which produces *term*. Do not use `\textit` or any other italics command for this purpose.
- Keep an eye on the other sections in the textbook. If you are going to use a notation which other people have likely used, search around and make sure that you are consistent with other instances of the same object or notation.