A LaTeX Tutorial

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Preface

This e book is a supporting material prepared for the hand-on session on *The Art of Documentation*, that was held on 11 January 2019 in the Workshop on Research Methodology. This document helps the user to prepare a LaTeX document on his/her own with much ease.

Happy LaTeX ing!!!!

Chapter 1

Installation

Several editors are available for preparing LaTeX documents. Each one its own merits and which one to select is a bit personal and need based.

We can classify the editors as follows:-

- Online Editors
- Linux
- Windows

1.1 Online Editors

Online editors relieve the pain of installing an editor from us. But we have to be online for preparing our LaTeX documents. Here are few such editors:

- Overleaf (https://www.overleaf.com/)
- ShareLatex (https://www.sharelatex.com/)
- Online Latex Editor (https://www.tutorialspoint.com/online_latex_editor.php)

1.2 Linux

On Linux machines, we can find the *texlive* package in most repositories. We can use any text editor to prepare the .tex files and compile the .tex files with the command

line tool *pdflatex*. *Kile* is a good editor with graphical user interface, but it requires the KDE libraries and Qt to be installed.

A good starting point for installing Kile on Ubuntu can be see here: https://tecadmin.net/install-kile-ubuntu/

Another way to install LaTeX on Ubuntu is as follows:

- To install Tex Live LaTeX distribution on ubuntu use the following command: sudo apt-get install texlive-full
- To edit LaTeX documents we need an editor. There are a number of LaTeX editors we can find. Texmaker is a cross platform LaTeX editor. To install Texmaker on Ubuntu use following command: sudo apt-get install texmaker
- To open Texmaker on Ubuntu use following command: texmaker
- Now let's create a simple document using Texmaker. Click on File -¿ New and do your first LaTeX document as described in Chapter 2
- Now save the document as a 'tex' file by clicking File -¿ Save. Compile the document clicking the arrow Quick Build. PDF output of the document will be created

1.3 Windows

MikeTex bundle is one of the easy way to start LaTeX on Windows. Here are the steps to install MikeTex on a Windows machine.

1. Go to miktex.org and Got to Downloads Tab
2. Download MiKTeX
3. Run MiKTeX Installer
4. Select install missing packages automatically
5. Installation is complete at this point.
6. Open *TexWorks* which is part of the MikeTex bundle. You will get a window like this (See Figure 1.2).
7. Type your first Tex file and hit compile (See Figure 1.2).

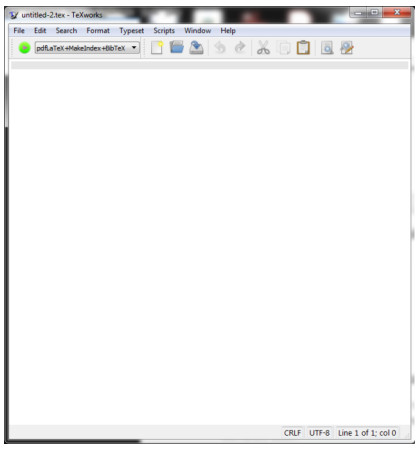

Figure 1.1: Creating a new Tex document

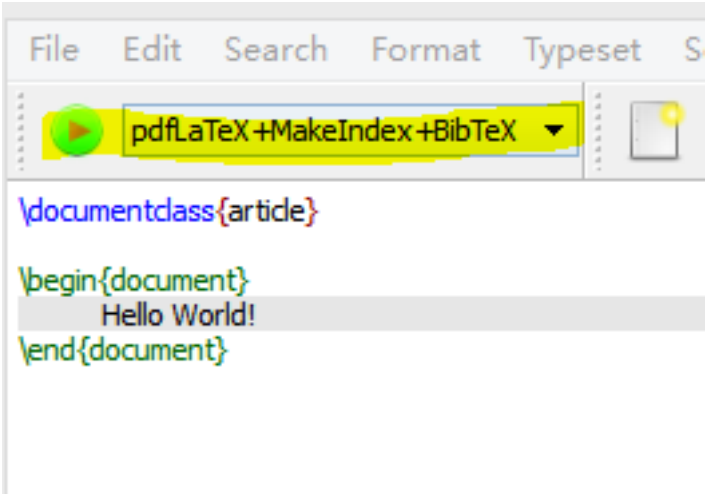

Figure 1.2: Compiling Tex

Chapter 2

Preparing the First Latex Document

LaTeX document preparation is not in the WYSIWYG mode - we have to embed both the content and formatting in the same document. A basic example document can be created with the following code:

```
\documentclass{article}
\begin{document}
  Hello World!
\end{document}
```

Compile the this code and we get the out put as Hello World! in the formatted form!

Please note the following:-

- All LaTeX commands will be starting with a back slash character
- The first part of the command immediately after back slash indicates the name of the command and the second part in braces sets an option for this command

2.1 Anatomy of a LaTeX Document

Look at the following code:

```
\documentclass{article}
```

```
\title{My First LaTex}
\author{Put Your Name Here!}
\date{Add today's date}
\begin{document}
\maketitle
Hello world!
\end{document}
```

Please note the following:-

- All commands between \documentclass {...} and \begin{document} is called the *preamble* of the document.
- Preamble contains commands that affects the entire document.
- The body of our manuscript is typed in between \begin {document} and \end{document}.

2.2 The First LaTeX Document

Prepare a LaTeX document as follows:-

```
% Preamble of the document begins here!
\documentclass{article} %to specify the type of the document
\title{My First LaTex} %to specify the title of the document
\author{Put Your Name Here!} %to specify the name of the author
\date{Add today's date} %to specify the date authored
% Preamble of the document ends here!
\begin{document}
\maketitle %to prepare the title!
Hello world!  %content!
\end{document}
```

Compile this document and see the output. The output should be similar to Figure 2.1. We just now created a document of type "article' with author and date of creation. The commands used for these tasks are documented with comments in the preceding code. Please note that everything after % is considered as a comment in LaTeX .

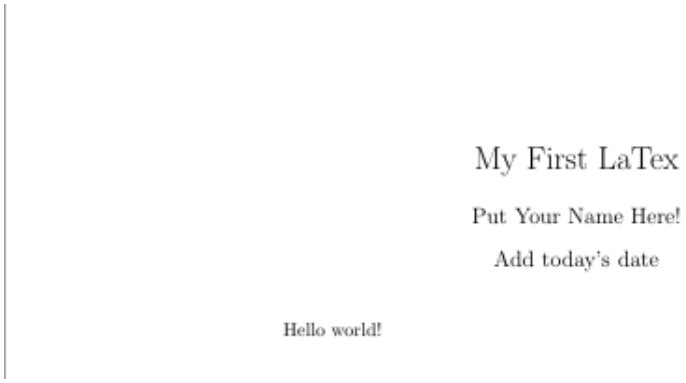

Figure 2.1: Creating a new Tex document - Title

2.3 Adding Text

Now add the following paragraph to the document. This paragraph is to be added just below the Hello World line:

```
Text can be added like this in the latex document.
The end of a paragraph is
specified by a \emph{blank line}
in the input. In other words,
whenever you want to start a new
paragraph, just leave a blank line and proceed.
It is possible to have
basic formatting such as making \textbf{bold}, \textit{italics},
\underline{underline} and  \emph{emphasize} can be done!
```

Note that the commands for text formatting.

2.4 Text Positioning

Now let is add a new page in to the document. For this add the following command:

```
\newpage
```

Now let us attempt positioning of text - center, left and right aligned text. We will create a certificate for this purpose! Type the following text:

```
\begin{center}
Department of Computer Science, Farook College (Autonomous)\\[.75cm]
Certificate
\end{center}
\noindent This is to certify that has undergone a
course on \LaTeX at this institute.
\begin{flushright}
The Head\\
Department of Computer Science
\end{flushright}
```

The above text produces a simple certificate! Please note the commands we have to position the text as center, and right aligned.

We will customize this certificate by adding a bit more formatting.

```
\begin{center}
\huge Department of Computer Science \\
\huge Farook College (Autonomous)\\[.75cm]
\Large Certificate

\end{center}
\noindent This is to certify that Mr X has undergone a
course on \LaTeX at this institute.
\begin{flushright}
The Head\\
Department of Computer Science
\end{flushright}
```

Add this text to your document and compile - you will get a better certificate now. Note that this certificate can be further customized and beatified as per our need.

Some of the available font type size are as shown in Figure 2.2.

size	{\tiny size}	size	{\large size}
size	{\scriptsize size}	size	{\Large size}
size	{\footnotesize size}	size	{\LARGE size}
size	{\small size}	size	{\huge size}
size	{\normalsize size}	size	{\Huge size}

Figure 2.2: Setting Font Type Size

Chapter 3

Sectioning The Document

Documents will become more readable when the contents are logically arranged in sections. Managing sections especially in a thesis is a tough job - we may have to alter sections and move them even across chapters.LaTeX provides us an easy method to handle this.

Let us add a section to our document now. Before we do this, add a command to insert a new page!

3.1 Adding Sections

Add the following code to your document:

```
\section{\label{ch3intro}Introduction}
This is the first section I have created. Note what
Latex created for me - the section number and section heading!

\section*{\label{ch3intro}Introduction}
Section without numbering!
```

Please note the following:-

- A section linked to the current chapter will be created when \section command is used.
- Section can have a label. We can refer to the sections using this label. Labels are to be given inside the curly braces.

- If we do not require a number with a section name, we can give the command as follows \section*

3.2 Adding Sub Sections

Sections can have subsections. Add the following code in to your document!

```
\section{\label{ch3intro}Introduction}
This is the first section I have created. Note what
Latex created for me - the section number and section heading!

\subsection{\label{ch3intro1}Subsections}
This is how a subsection is created in .\LaTeX \ .
```

Please note the following:-

- Similar to section command, if we do not require a number with a sub section name, we can give the command as follows \subsection*

3.3 Adding Sub Sub Sections

We can add a sub sub sections too! Modify the code segment that you have tried before as follows:

```
\section{\label{ch3intro}Introduction}
This is the first section I have created. Note what
Latex created for me - the section number and section heading!

\subsection{\label{ch3intro11}Subsections}
This is how a subsection is created in \LaTeX \ .

\subsubsection{\label{ch3intro111}Sub Sub Sections}
Yes - the sub sub section in \LaTeX \ .
```

Please note the following:-

- Similar to section command, if we do not require a number with a sub sub section name, we can give the command as follows \subsubsection*

3.4 Adding Paragraph

Our document can have many paragraphs within sections. A paragraph may have sub para's within them. Let us see hown LaTeX takes care of this. Paragraphs are sections within the document without any numbering. But they are different from sections! Please try the following:

```
\section{Dividing the document}
To see the other commands in action, suppose at this point of text I type
\subsection{Example}
In this example, we show how subsections and subsubsections
are produced (there are no subsubsubsections). Note how the
subsections are numbered.
\subsubsection{Subexample}
Did you note that subsubsections are not numbered? This is so in the
\texttt{book} and \texttt{report} classes. In the \texttt{article}
class they too have numbers. (Can you figure out why?)
\paragraph{Note}
Paragraphs and subparagraphs do not have numbers. And they have
\textit{run-in} headings.
Though named paragraph we can have several paragraphs of text
within this.
\subparagraph{Subnote}
Subparagraphs have an additional indentation too
```

Note the difference between a paragraph and section.

Chapter 4

List Your Points

Making lists is essential in a document to meticulously list out our points. LaTeX allows many kinds of lists such as bullet lists, numerical lists and definition lists.

4.1 Bullet Lists

Add the following code to your document:

```
One should keep the following in mind when using \LaTeX \
\begin{itemize}
\item \LaTeX \ is a typesetting language and not a word processor
\item \LaTeX \ is a program and and not an application
\item Theres is no meaning in comparing \LaTeX \ to a word processor, since the
purposes are different
\end{itemize}
```

Please note the following:-

- A bullet list will be created using the \begin {itemize} \end {itemize}command.
- \item adds a text with a bullet to the list.

4.1.1 List within a List

A list can contain another list. Upto four levels of nesting is allowed in Latex. Try the following:

```
One should keep the following in mind when using \TeX
\begin{itemize}
\item \TeX\ is a typesetting language and not a word processor
\item \TeX\ is a program and and not an application
\item Theres is no meaning in comparing \TeX\ to a word processor, since the desi
purposes are different
\item \TeX\ is the natural choice in one of these situations
\begin{itemize}
\item If we want to typeset a document containing lot of Mathematics
\item If we want our typed document to look beautiful
\end{itemize}
\end{itemize}
```

4.1.2 Changing the Shape of Bullets

Shape of the bullet in the list can be changed in different ways. The easiest approach is demonstrated here. Try the following code:

```
\begin{itemize}
\item[--] Dash
     \item[$-$] Dash
           \item[$\ast$] Asterisk
\end{itemize}
```

4.2 Ordered Lists

When items are to be placed in a particular order, we have to use the ordered lists. Try the following:

```
\begin{enumerate}
\item Prepare a source file with the extension ‘‘tex’’
\item Compile it with \LaTeX to produce a ‘‘dvi’’ file
\item Print the document using a ‘‘dvi" driver
\end{enumerate}
```

Note the difference between a paragraph and section. Similar to enumerated lists, four levels of nesting is possible in ordered list also.

4.3 Definition Lists

Try the following code:

```
\begin{description}
\item[\TeX] A typesetting program
\item[Emacs] A text editor and also
\begin{description}
\item a programming environment
\item a mailer
\item and a lot else besides
\end{description}
\item[AbiWord] A word processor
\end{description}
```

Chapter 5

The Art of Tabulation

Tables add vigour and vitality to our documents. Try the following code:

5.1 Making a Simple Table

```
\begin{center}
\begin{tabular}{lr}
Planet & Diameter(km)\\[5pt]
Mercury & 4878\\
Venus & 12104\\
Earth & 12756\\
Mars & 6794\\
Jupiter & 142984\\
Saturn & 120536\\
Uranus & 51118\\
Neptune & 49532\\
Pluto & 2274
\end{tabular}
\end{center}
```

Please note the following:-

- The \begin{center} ... \end{center} commands centralize the table
- A table can be created using the \begin {tabular} \end {tabular}command
- The {lr} specification immediately after the \begin{tabular} indicates there

are two columns in the table with the entries in the first column aligned on the left and the entries in the second column aligned on the right

- Actual data in the table is added just below the \begin {tabular} command portion. The entries in each column are separated by the & symbol and the termination of each row is signaled by the \\symbol
- First row contains the column headings.
- The \\[5pt] after the first row specifies as usual, an additional vertical space of 5 points after this row in the output
- In addition to the column specifiers **l** and **r** we also have a specifier **c** which makes the entries in the corresponding column centrally aligned
- If we have to add more columns then we can add more columns then we can add a **l** or **r** or **c** to the {lr} specification as per our requirement. Try adding a remark column in the above example.

Now, try changing the alignment of Diameter column in the above example - replace the {lr} part of begin {tabular} with {lc}!

5.2 Putting Lines in a Table

Let us make our table more attractive. Lines can be added to the table. Try the following example:

```
\begin{center}
\begin{tabular}{|l|r|}
\hline
Planet & Diameter(km)\\[5pt]
\hline
Mercury & 4878\\
Venus & 12104\\
Earth & 12756\\
Mars & 6794\\
Jupiter & 142984\\
Saturn & 120536\\
Uranus & 51118\\
Neptune & 49532\\
Pluto & 2274 \\
```

```
\hline
\end{tabular}
\end{center}
```

Please note the following:-

- The vertical bar placed in \begin {tabular} \end {tabular}command - { —l—r—} - is responsible for the vertical lines visible on the output
- The vertical bar can be placed in various formats such as { —l r—}. Try this combination in the above example.
- The \hline command puts the horizontal line. You can place this command after every row, if you need a horizontal line to be placed at the bottom of each row

5.3 Spanning Columns in a Table

Try the following example:

```
\begin{center}
\begin{tabular}{lrr}
Planet & \multicolumn{2}{c}{Distance from sun (km)}\\
& Maximum & Minimum\\
Mercury & 69400000 & 46800000\\
Venus & 109000000 & 107600000\\
Earth & 152600000 & 147400000\\
Mars & 249200000 & 207300000\\
Jupiter & 817400000 & 741600000\\
Saturn & 1512000000 & 1346000000\\
Uranus & 3011000000 & 2740000000\\
\end{tabular}
\end{center}
```

Compile this and see the output.

Please note the following:-

- The {lrr} specification is to create 3 columns

- But in the second row in the output, the column heading **Distance from sun (km)** spans over columns 2 and 3! This is made possible with the \multicolumn{2} command. The digit 2 in the command indicates that 2 columns are to be spanned. Hence the \multicolumn{2}{c}{Distance from sun (km)} indicates that the item within the last set of braces is to span two columns as specified by the 2 within the first set of braces. The entry**c** within the second set of braces indicates that this text is to be centered within the column.

- The general form of the command is \multicolumn{num}{align} {item} where *num* is the number of columns to be spanned, *align* is the alignment of the item within the column and *item* is the text of the item

- In the second line after the \begin {tabular} command, the input for the second row starts with an & character. This is because there is no entry in the first column of the second row

Now try adding lines to this table! All you have to change is the {lrr} specification in the \begin{tabular} command by inserting the vertical bars in {lrr}!

Chapter 6

Packages

When we install LaTeX (MakeTex in Windows or Texlive on Ubuntu for example), the entire software will be installed depending upon the type of installation we did. All functionalities of LaTeXwill be available by default. Still we may have to import packages for additional functionalities such as using graphics or mathematical equations. To import a package, we have to add a **\usepackage** directive to the preamble of your document - ideally just beneath the **\documentclass** directive.

For example, if we want to use mathematical equations in our text, we had used **\equation** directive (Refer Chapter 7). Now to suppress the equation numbers of a equation we have to use a package in the document: **amsmath**. This package is to be imported as follows: \usepackage{amsmath}. Now insert this command in the preamble part of your document - just below the **\documentclass** directive.

Hence we can summarise that (i) packages add new functions to LaTeX, (ii) all packages must be included in the preamble, and (iii) packages add features such as support for pictures, links and bibliography. We will be using packages in the coming chapters.

Chapter 7

Typesetting Mathematics

7.1 Mathematical Text

A mathematical expression occurring in running text (called in-text math) is produced by enclosing it between dollar signs. Try the following code:

```
\begin{center}

The equation representing a straight line in the Cartesian plane
is of the form $ax+by+c=0$, where $a$, $b$, $c$ are constants
\end{center}
```

Please note the following:-

- The text within dollars is typeset in math italic
- LaTeX has its own spacing rules in math mode. Try inserting blank spaces before and after the operators in the given equation
- Mathematical text can be included in between ... or ....

Try the following code:

```
\begin{center}
All the following attempts make the same output!

The equation representing a straight line in the Cartesian plane
is of the form $ax+by+c=0$, where $a$, $b$, $c$ are constants
```

```
The equation representing a straight line in the Cartesian plane is of
the form \(ax+by+c=0\), where \(a\), \(b\), \(c\) are constants.

The equation representing a straight line in the Cartesian plane is
of the form \begin{math}ax+by+c=0\end{math}, where \begin{math} a
\end{math}, \begin{math} b \end{math}, \begin{math} c \end{math} are
constants.
\end{center}
```

Now if we would like to see the equation being printed in a separate line, try the following code:

```
\begin{center}


The equation representing a straight line in the Cartesian plane is
of the form
$$
ax+by+c=0
$$
where $a$, $b$, $c$ are constants.

\end{center}
```

Note the presence of two dollar symbols!

7.2 Equations

As we discussed in Chapter 6, we will include a package called **amsmath** in our document before we proceed. This package is used to suppress the numbers given to an equation automatically by Latex. This package is to be imported as follows: \usepackage{amsmath}. Now insert this command in the preamble part of your document - just below the **\documentclass** directive.

An equation can be displayed in LaTeX using the \begin {equation} environment. Try the following code:

```
\begin{center}
\begin{equation}
```

```
  1 + 2 = 3
\end{equation}

\begin{equation*}
  1 = 3 - 2
\end{equation*}

\begin{align*}
  1 + 2 &= 3\\
  1 &= 3 - 2
\end{align*}

\end{center}
```

Please note the following:-

- The output displays the first equation by automatically placing a number for the equation
- This equation number is suppressed for the remaining equations - this is done by placing a * in the \begin {equation} environment
- The \{align*} environment aligns the equations at the ampersand & symbol. Each equations , except the last one has to be separated by a line break

7.3 Superscripts and Subscripts

Try the following code:

```
\begin{center}
The sequence $(x_n)$ defined by
$$
x_1=1,\quad x_2=1,\quad x_n=x_{n-1}+x_{n-2}\;\;(n>2)
$$
is called the Fibonacci sequence.

This formula $f(x) = x^2$ is an example for superscripts.
\end{center}
```

Please note the following:-

- Subscripts are produced using the _ character
- \quad insert the blank spaces after $x_1 = 1$,
- See the equation of superscripts - it is produced using the cap symbol (symbol on the key 6 on the keyboard)

7.4 Mathematical Notations

Many mathematical notations can be easily inserted using LaTeX. Few of them are provided here for illustration.

7.4.1 Square Root Symbol

Try the following code:

```
\begin{center}
$\sqrt{2}$   produces $\sqrt{2}$
$\sqrt{x+y}$   produces $\sqrt{x+y}$
Which is greater $\sqrt[4]{5}$ or $\sqrt[5]{4}$?
\end{center}
```

Please note the following:-

- The first command produces the symbol for square root of 2 (given in braces)
- The Second command produces the square root symbol for x + y (given in brace bracket)
- Third command produces the square root symbol for nth (given in square brackets) square root symbol of 5 (given in brace bracket)

7.4.2 Fractions and Integrals

Try the following code:

```
\begin{center}
\begin{align}
   f(x) &= x^2\\
```

```
   g(x) &= \frac{1}{x}\\
 F(x) &= \int^a_b x^3 \\
   F(x) &= \int^a_b \frac{1}{3}x^3
\end{align}
\end{center}
```

Please note the following:-

- **\frac** creates the fractional part in the equation (3)
- The integral symbol is produced using the **\int** command

7.4.3 Matrix

Matrix symbols can be created as follows:

```
\begin{center}
\begin{align}
  \begin{math}
\begin{matrix}
1 & 0\\
0 & 1
\end{matrix}
\end{math}
\end{align}
\end{center}
```

Please note the following:-

- **\begin {matrix}** environment only works within the **\begin {math}** environment

Brackets can be used to surround the elements of a matrix. Try the following code:

```
\begin{math}
[
\begin{matrix}
1 & 0\\
0 & 1
```

```
\end{matrix}
]
\end{math}
```

Brackets can be scaled up.

```
\begin{center}
\begin{math}
\left[
\begin{matrix}
1 & 0\\
0 & 1
\end{matrix}
\right]
\end{math}
\end{center}
```

A list of mathematical symbols are provided in [2].

Chapter 8

Working With Images

A picture is worth thousand words! LaTeX has its own unique ways to handle images. To include images in our document we have to use the package **graphics** in the preamble of our document (Refer Chapter 6). Include this package to your working document now!

8.1 Inserting an Image

Images can be inserted into the LaTeX document using the **figure** environment and the **graphicx** package.

Try the following code:

```
\begin{center}
\begin{figure} %Insert Image - the Figure Env!
\begin{center} %Align the Image
\scalebox{0.70} % Scale down to 70 /% of the original size!
{\includegraphics{fig7.png}} %include the image - image is in the working folde
\caption{Caption of the Image} \label{altbin1} %Caption of the image and label
\end{center}
\end{figure}
\end{center}
```

Please note the following:-

- The position of the images can be forced by using the following options with the **\begin{figure}**

- – h (here) - same location
  – t (top) - top of page
  – b (bottom) - top of page
  – p (page) - on an extra page
  – ! (override) - will force the specified location

8.2 Inserting Subfigures

It is possible to add multiple subfigure environments within a figure environment. Before trying this taks we have to add the following package to the preamble of the document: **subcaption**. Now try the following code:

```
\begin{center}
\begin{figure}[h!]
 \centering
  \begin{subfigure}[b]{0.4\linewidth}
    \includegraphics[width=\linewidth]{fig7.png}
    \caption{Figure 1}
  \end{subfigure}
  \begin{subfigure}[b]{0.4\linewidth}
    \includegraphics[width=\linewidth]{fig7.png}
    \caption{Figure 2}
  \end{subfigure}
  \caption{Two Figures Displayed in the same column.}
  \label{fig:coffee}
\end{figure}
\end{center}
```

Note:- Here we have fixed the width of the image. Please note that even if the widths of these images are set to 0.4, yet they fill up the whole space. We should always set this value to .1 less than we expect. If we want to align three images next to each other, then we should consecutively add three subfigures, each with a **0.2\linewidth**. It is a trial and error game, after all!

8.3 Referring Images

Images can be referred in the document such as Figure 1 using the label of the image we specify using the \label command.

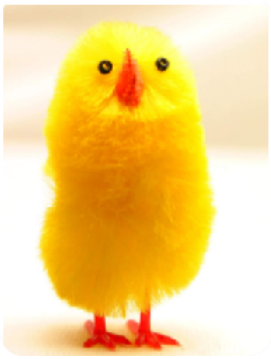

Figure 8.1: Born less Chicken

For example see the following Figure.

This figure is created with a label **chicken**. Now to refer this image, we will use **\ref{chicken command** - See Figure 8.1.

Chapter 9

Cross Referencing

In books an articles we have seen sentences as such as as shown Figure 2.1 or as mentioned in Section 3.1. This is called cross referencing. It is very easy to manage this in Latex.

To cross reference a section, chapter or figure, first we have to specify a label for it. Remember how we had created sections in Chapter 3. Let us see how to create a section again. See the code below to create a section:

```
\section{\label{ch3intro}Introduction}
This is the first section I have created. Note what
Latex created for me - the section number and section heading!

\section*{\label{ch3intro}Introduction}
Section without numbering!
```

No need to create this section again, if you had successfully created while learning Chapter 3. Now note the **label** part of the **section** command.We will use this label along with the **\ref** command to refer this section as follows:

```
As mentioned in \ref{ch3intro}, sections can be either
                    numbered or without numbered.
```

Add this code and see the output. Similarly we can add labels to subsections, figures, tables, equations and chapters so that they can be cross referred.

Chapter 10

Adding Bibliography

Bibliography is the environment which helps the author to cross-reference one publication from the list of sources at the end of the document. It is easy to convert the style of bibliography to that of a publishers requirement, without touching the code inside the bibliography.

There are several ways to create bibliography and insert the relevant citations in the text using LaTeXIn this tutorial we will learn one method. We will practice one more sophisticated method as part of our exercises.

10.1 Creating Bibliography

Add the following code in your document in the place where you want to the Bibliography section is to be displayed:

```
\begin{thebibliography}{99}
\addcontentsline{toc}{chapter}{Bibliography}
\bibitem{L86} L. Lamport. {\bf \LaTeX \ A Document Preparation System}
Addison-Wesley, California 1986.
\end{thebibliography}
```

Please note the following:-

- Bibliography is created using the environment **thebibliography**
- The **\begin{thebibliography}** command requires an argument that indicates the width of the widest label in the bibliography. If we have citations between 10 and 99, we can give 99, as we have done above

- The **\bibitem** command creates the bibliographic items (List of References) to the cited
- We have to give the key of the bibliographic item, along with the **\bibitem** command. A key can be suitably created - it can be a combination of all the first letters of the authors and the year of publication, for instance. In the above example, key is given as L86
- Then we have to add the name of the author, the name of the book / title of the publication, publisher and year of publication

Now add the following items to the bibliography. Do not forget to add keys as described before:

- C. Vellage. Discover the Beauty of LaTeX A Document Preparation System, Available at https://www.latex-tutorial.com/. Accessed on 18/02/2019
- TUG, LaTeX Tutorials, A Primer, Indian TeX Users Group, Trivandrum, India. September 2003

10.2 Citing Bibliography Items in the Document

Publications added in the bibliography section can be cited in the document using the **\cite** command. LaTeX will replace the **\cite** command with appropriate labels in the text. Add the following text to your document, before the **begin {thebibliography}** command:

```
It is very easy to create bibliography list in \LaTeX\ \cite{L86}.
```

See the text after compilation. LaTeX added the citation with a number. This number is the same as the number of the bibliography item in the Bibliography Section. We can reorder the list of bibliography items - LaTeX will take care of the ordering and numbering of items in the document!

Please note the following:-

- Note the portion of text after the **cite** command - it is the **key** of the bibliography item to be cited
- It is possible to add more keys with a **cite** command - \cite{L86, C19}

10.3 Creating a Bibliography Database

We created our bibliogrpahy items in the same document where we have prepared the text. A separate Bibliography Database can be created and this file can be used in our document. A bibliography database has the extension **bib**. There specific fields for each publication item such as book, conference proceeding, journal and website. Let us create a BIB file. Create a new document using your TEX editor and add the following contents:

```
@article{GJDS07,
 author = {Greg White and Jaakko Kangasharju
and Don Brutzman and Stephen Williams},
 title = {Efficient {XML} Interchange Measurements Note},
 year = {2007},
  month = {July},
 note = {{Available} at http://www.w3.org/TR/exi-measurements/}
 }
```

Save this document with the name test.bib (choose the save as option to save and choose Bibliography Database type as the type of file). We have created a bibliography database to define an article. The field @article specifies that we are defining the item to define an article. Key of the item is given along with this. Then we have added the fields of this record such as author and title.

Now we will use this BIB file in our document. Just comment the bibliography specific commands that we have added just now - the portion beginning from \begin{thebibliography}{99} till \end{thebibliography}. To comment a line just place a **percent symbol** in front of that line!

Now add the following code below the commented portions:

```
\addcontentsline{toc}{chapter}{Bibliography}
\bibliographystyle{IEEEtran} % Bibliography Style choosen
\bibliography{test} %Name of the BIB file
```

Now, replace the key in the following statement as follows:

```
It is very easy to create bibliography list in \LaTeX\ \cite{GJDS07}.
```

Note the the key GJDS07 is the key of the bibliographic item we just created in the test.bib file. Now compile your file and see the output.

Please note the following:-

- You can add any number of items in the BIB file. Each type such as Book, Proceedings has its own format
- The fields to be added specify the BIB items may differ with the bibliographic style we have chosen
- To choose a bibliographic style, we have to use the **\bibliographystylestyle** command. There are many styles available. We have chosen **IEEEtran** style now
- We may have to download specific BST files for a chosen style. Note that you have the **IEEEtran.bst** file in your working folder now

Bibliography

[1] L. Lamport. **LaTeX A Document Preparation System** Addison-Wesley, California 1986.

[2] C. Vellage. **Discover the Beauty of LaTeX A Document Preparation System** Available at https://www.latex-tutorial.com/. Accessed on 18/02/2019.

[3] TUG. **LaTeX Tutorials, A Primer** Indian TeX Users Group, Trivandrum, India. September 2003.