# Latex Certificate Course Instructions

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## 1 LaTeX Envirnoment

Environments are mechanisms for managing repeated patterns in your document. The `\begin` and `\end` commands are reserved as **enviroment delimiters**. In other words, `\begin{enumerate}` marks the beginning of an environment named 'enumerate' and `\end{enumerate}` marks the end of it. You are already familiar with an environment — 'document'.

### 1.1 List Environments

There are environments available for lists, tables, images, equations, matrices, theorems, etc. Major list environments in LaTeX are 1. `itemize` 2. `enumerate` and 3. `description`

LaTeX makes use of another command `\item` to identify different items on a list. Again, there are mechanisms to modify the type of bullets and the numbering schemes. Such details are discussed later.

#### 1.1.1 Itemize Environment

The **itemize** is a list enviroment used for writing bulleted lists.

```
\begin{itemize}
        \item Cabbage
        \item Sheep
        \item Wolf
\end{itemize}
```

- Cabbage
- Sheep
- Wolf

Figure 1: itemize environment

#### 1.1.2 Enumerate Environment

The **enumerate** is a list enviroment used for writing numbered lists. Since enumerate environments are independent of one another, the item number is reset to 1 at the beginning of each enumerate environment.

```
\begin{enumerate}
        \item Cabbage
        \item Sheep
        \item Wolf
\end{enumerate}
```

1. Cabbage
2. Sheep
3. Wolf

Figure 2: enumerate environment

You can easily switch between itemize and enumerate environments by changing the environment delimiters. Also you don't have to worry about changing the numbers, when rearranging the items on an enumerate list as the numbering is automatically done by LaTeX.

### 1.1.3 Description Environment

The **description** is a list enviroment used for writing definition lists. LaTeX writes definition lists in a different style compared to other list enviroments to suit its purpose.

```
\begin{description}
        \item[C] Cabbage
        \item[S] Sheep
        \item[W] Wolf
\end{description}
```

**C** Cabbage

**S** Sheep

**W** Wolf

Figure 3: description environment

## 1.2 An Environment inside another

We often require a list inside another for our document. LaTeX allows you to write a list inside another. And LaTeX has a set of bullets and numbering schemes for lists at different depth.

The **depth** of a list environment is the number of list environments containing it plus one. The maximum list depth allowed in LaTeX is 9. In figure 4, two enumerate environments are nested inside an itemize environment. The enumerate environments are at depth 2 and itemize environment is at depth 1.

### 1.2.1 Delimiter Mismatch Error

Using an environment inside another is called **nesting** of environments. When you are using nested environments, it is quite important that you end an inner environment before ending an outer environment.Current version of LaTeX won't tolerate a mismatch of environment delimiters. Forgetting to end an environment will be reported as **missing environment delimiter error** as

```
\begin{itemize}
\item Applied Mathematics
\begin{enumerate}
        \item Linear Programming
        \item Combinatorics
        \item Numerical Analysis
        \item Game Theory
\end{enumerate}
\end{itemize}
\item Pure Mathematics
\begin{enumerate}
        \item Abstract Algebra
        \item Topology
        \item Calculus
        \item Statistics
\end{enumerate}
\end{itemize}
```

- Applied Mathematics
  1. Linear Programming
  2. Combinatorics
  3. Numerical Analysis
  4. Game Theory
- Pure Mathematics
  1. Abstract Algebra
  2. Topology
  3. Calculus
  4. Statistics

Figure 4: Nesting enumerate inside itemize

`\end{document}` at the end of the file will look like an environment delimiter mismatch.

The same way, LaTeX uses braces, { and } as **block delimiters**. Any material inside a pair of braces, is called a **block**. And the mismatch of block delimiters also causes an error. Forgetting } after { also causes an error called **missing block delimiter error**.