

# Premise-Conclusion Arguments using L<sup>A</sup>T<sub>E</sub>X

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## 1 Introduction

At times, it makes sense to set out a set of numbered premises and conclusions. This document explains how to set up your pre-ample to satisfy the following desiderata.

- The premises should be numbered with small roman numerals, i.e., (i), (ii), ...
- The numbering should be fully functional, i.e., you should be able to refer back to the premises and conclusions using `ref tags`.
- You should be able to mark conclusions with some symbol, such as `∴`.
- You should be able to modify the numbering either with primes on the premises, or with symbols prefixed to the arguments.

## 2 The Preamble

Add the following definitions into your preamble. (\* indicates a linebreak you should remove.)

```
\newcommand{\premise}[1] [] {
  \renewcommand{\theenumi}{#1\roman{enumi}}
  \renewcommand{\labelenumi}{(\theenumi)}
}

\newcommand{\conclusion}*
{\renewcommand{\labelenumi}{$\therefore$(\theenumi)}}

\newcommand{\normal}{\renewcommand*
{\theenumi}{\arabic{enumi}}}}

\newcommand{\premisep}[1] [] *
{\renewcommand{\theenumi}*

```

```
{#1\roman{enumi}$'$$}

\newcommand{\conclusionp}*
{\renewcommand{\labelenumi}*
{${\therefore}$\theenumi}$'$$}}
```

Note that the *therefore* symbol  $\therefore$  is provided by the `amssymb` package. In order to get the full effect, you need to call that package in your preamble, as well.

### 3 Examples

#### 3.1 Simple Arguments

```
\begin{enumerate}
  \premise
  \item Socrates is mortal.
  \label{item:1}
  \item All animals are mortal.      (i) Socrates is mortal.
  \label{item:2}                    (ii) All animals are mortal.
  \conclusion
  \item Socrates is an animal.      \therefore(iii) Socrates is an animal.
  \label{item:3}
\end{enumerate}
\noindent
One might have thought that (i) and
(ii) entail (iii).
One might have thought that
(\ref{item:1}) and
(\ref{item:2}) entail
(\ref{item:3}).
```

Note here especially that, though the  $\therefore$  precedes the number of the conclusion, when you refer to the conclusion using the `ref`-tag, the reference doesn't have the  $\therefore$  in it.

### 3.2 Arguments With Primed Premises

However, a much more promising approach replaces (\ref{item:2}) with (\ref{item:4}), yielding the argument.

```

\begin{enumerate}
  \premise
  \item Socrates is mortal.
  \premise
  \item All mortals are animals.
  \label{item:4}
  \premise
  \conclusion
  \item Socrates is an animal.
\end{enumerate}

```

However, a much more promising approach replaces (ii) with (ii'), yielding the argument.

- (i) Socrates is mortal.
- (ii') All mortals are animals.
- ∴(iii) Socrates is an animal.

### 3.3 Arguments with Prefixes

A different argument is offered here, where the intermediate conclusion (\ref{item:7}) had to be drawn.

```

\begin{enumerate}
  \premise[A-]
  \item $p \rightarrow q$.
  \label{item:5}
  \item $p$.
  \label{item:6}
  \conclusion
  \item $q$.
  \label{item:7}
  \premise[A-]
  \item $q \rightarrow r$.
  \label{item:8}
  \conclusion
  \item $r$.
  \label{item:9}
\end{enumerate}

```

A different argument is offered here, where the intermediate conclusion (A-iii) had to be drawn.

- (A-i)  $p \rightarrow q$ .
- (A-ii)  $p$ .
- ∴(A-iii)  $q$ .
- (A-iv)  $q \rightarrow r$ .
- ∴(A-v)  $r$ .