How to use the theorem environment

In your preamble (that is, between the \documentclass command and \begin{document}; this is in main.tex in the paper template), put a line like

\newtheorem{thm}{Theorem}

for each theorem-like structure you want to define (Lemma, Conjecture, Proposition, and Definition are other common ones). Here Theorem is the printed name of the structure, and I shall use \begin{thm} and \end{thm} around the theorem. For example:

\begin{thm}
Herding cats is hard.
\end{thm}

Theorem 1. Herding cats is hard.

\begin{thm}[Cain, 2002]\label{mattstemperflaring}
Herding Rickoids is harder.
\end{thm}

That was Theorem \ref{mattstemperflaring}.

Theorem 2 (Cain, 2002). Herding Rickoids is harder.

That was Theorem 2.

The tilde (˜) produces a nonbreaking space (you wouldn’t want a page break between “Theorem” and “2”). Note in the above example that the \begin{thm} command has an optional argument: you can put a theorem’s traditional name, date, discoverer, or the like in square brackets after the \begin{thm}, and it will be typeset in parentheses as part of the theorem’s heading.

By default, each theorem environment will have its instances numbered independently, so you can have both a Theorem 1 and a Lemma 1, for instance. Because you may disapprove of this, the \newtheorem command lets you specify that the new environment should use an existing theorem environment’s counter instead of its own independent counter: if, having already defined the thm environment, I say

\newtheorem{lem}[thm]{Lemma}

in the preamble, then my lemmata will be numbered using the same counter as my theorems. Thus, when I now say

\begin{lem}[\textit{Watership Down}]
We have $5=\infty$.
\end{lem}

Lemma 3 (Watership Down). We have $5=\infty$.

I get Lemma 3. Without the [thm] above, I’d have a Lemma 1 instead.

A theorem environment’s numbering normally counts 1, 2, 3, … without regard to the sectioning of the paper. You might instead want your theorems numbered independently within each section, so that the second theorem in section 3 shall be called Theorem 3.2. For this you would say
\newtheorem{prop}{Proposition}[section]

(note that the optional argument appears in a different position here than in the previous example).

So far I’ve said how to state a theorem, but not how to prove it. If you are using the \amsthm package (say \usepackage{amsthm} in the preamble), you can wrap your proof in the \texttt{proof} environment.

On the next page is an example document showing how to use these features of the \newtheorem command.
Theorem 0.1 (Wolfenstein, 1572). People have fun with beer.

Lemma 0.2 (Ventura, 1992). Guys have fun in cathouses.

1 Moo

Theorem 1.1 (Lu, 2000). God is bovine.

Conjecture 1.2 (Mihelich, 2002). Yuran Lu is insane.

Proof. (Heuristic.) Yuran moos a lot and thinks God is a cow. ’Nuff said.