Chapter 1

A Header

theory *Demo* = *Main*:

1.1 A Section

1.1.1 A subsection

A subsubsection

Here some text with some antiquotations:
$'a$ *list*, $x \# xs$, $x \# xs = y \# ys$, *any text*

$[\![P\ [];\ \bigwedge a\ list.\ P\ list \Longrightarrow P\ (a \# list)]\!] \Longrightarrow P\ list$

Keywords are printed bold, rest is just copied verbatim into the document:

lemma $a = a$
— not a difficult proof
— note that the double quotes do not appear in the ouptput
proof –

but we could still want to have a longer text in here and do LaTeX tricks:

- **show** $a = a$ **by** *force*

qed

end

Chapter 2

More On Locales

locale *agroup* = *group* +
  assumes *com*: $x \cdot y = y \cdot x$

We are now in the *agroup* context where assumption *com*: $x \cdot y = y \cdot x$ is visible without any further premises.
All inherited and proved theorems of the *group* context are available as well:
$x \cdot y \cdot z = x \cdot (y \cdot z)$
$\mathbf{1} \cdot x = x$
$x^{-} \cdot x = \mathbf{1}$
$x \cdot \mathbf{1} = x$
$x \cdot x^{-} = \mathbf{1}$
etc.

Outside the context, these theorems would look like this. (for fun we replace $\Longrightarrow$ by $\longrightarrow$ in LaTeX).
agroup prod one inv $\longrightarrow$ *prod x y* = *prod y x*
semi prod $\longrightarrow$ *prod* (*prod x y*) *z* = *prod x* (*prod y z*)
group prod one inv $\longrightarrow$ *prod one x* = *x*
group prod one inv $\longrightarrow$ *prod* (*inv x*) *x* = *one*
group prod one inv $\longrightarrow$ *prod x one* = *x*
group prod one inv $\longrightarrow$ *prod x* (*inv x*) = *one*

Changing existing output syntax:

syntax (*latex* **output**)
  Cons :: *'a* ⇒ *'a list* ⇒ *'a list* (-·/- [*66*,*65*] *65*)

Now existing function definitios look different:

$map\ f\ []=[]$
$map\ f\ (x{\cdot}xs) = f\ x{\cdot}map\ f\ xs$

Creating new symbols and changing output syntax:

syntax (*latex*)
  notEx :: (*'a* => *bool*) => *bool* (**binder** ¬∃ *10*)
translations
  ¬∃*x*. *P* == ¬(∃ *x*. *P*)

lemma (∀ *x*. ¬*P x*) = (¬∃*x*. *P x*) **by** *blast*