

Isabelle document preparation with Dagstuhl LIPICS style

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Abstract

Isabelle is a formal document preparation system. This example shows how to use it together with the Dagstuhl LIPICS style. See <https://www.dagstuhl.de/en/publications/lipics/instructions-for-authors> for further information.

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1 Some section

1.1 Some subsection

1.2 Some subsubsection

1.2.1 Some subsubsubsection

1.2.1.1 A paragraph.

Informal bla bla.

definition *foo* = *True* — side remark on *Document.foo*

definition *bar* = *False* — side remark on *Document.bar*

lemma *foo* ⟨*proof*⟩

1.2.1.2 Another paragraph.

See also [1, §3].

2 Formal proof of Cantor's theorem

Cantor's Theorem states that there is no surjection from a set to its powerset. The proof works by diagonalization. E.g. see

- <http://mathworld.wolfram.com/CantorDiagonalMethod.html>
- https://en.wikipedia.org/wiki/Cantor%27s_diagonal_argument

theorem *Cantor*: $\#f :: 'a \Rightarrow 'a \text{ set. } \forall A. \exists x. A = f x$

proof

```
assume  $\exists f :: 'a \Rightarrow 'a \text{ set. } \forall A. \exists x. A = f x$ 
then obtain  $f :: 'a \Rightarrow 'a \text{ set where } *: \forall A. \exists x. A = f x ..$ 
let  $?D = \{x. x \notin f x\}$ 
from  $*$  obtain  $a \text{ where } ?D = f a \text{ by blast}$ 
moreover have  $a \in ?D \longleftrightarrow a \notin f a \text{ by blast}$ 
ultimately show  $\text{False}$  by blast
qed
```

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— References —

- 1 Makarius Wenzel. *The Isabelle System Manual*. <https://isabelle.in.tum.de/doc/system.pdf>.