Isar CheatSheet

bold - term. symbol *italic* - non-term. symbol *a* | *b* - either a or b
[*sqbracket*] - optional star* - repeat 0< times plus$^+$ - repeat 1< times

Syntax

main = **theorem** [*name*:]
[**fixes** *vars* ([**and**] *vars*)*]
[**assumes** *prop* ([**and**] *prop*)*]
(**shows** *prop* | **obtains** **(**_name_**)** **where** *prop*) *proof*

vars = *name* [**::** "*type*"] ([**and**] *name* [**::** "*type*"])*

props = *prop* ([**and**] *prop*)*

prop = [*name*:] "*formula*"

proof = **by** *method*
| **proof** [*method*] *step** **qed**

method = **-**
| **.**
| **(rule** *fact*$^+$**)**
| (**simp** | **clarify** | **clarsimp** | **auto** | **blast** | **force**)
| **(simp** [**add:** *fact*$^+$] [**only:** *fact*$^+$]**)**
| **cases** "*formula*"
| **induction** *vars* [**arbitrary:** *vars*]

step = **fix** *var* ([**and**] *var*)*
| **assume** *prop* ([**and**] *prop*)*
| [**moreover** | **ultimately**] [**from** *facts*] **have** *prop* *proof*
| [**ultimately**] [**from** *facts*] **show** *prop* *proof*
| **obtain** *var* **where** *prop* *proof*

facts = *name* ([**and**] *name*)*

Abbreviations

have *prop* **using** *facts* ≡ **from** *facts* **have** *prop*

show *prop* **using** *facts* ≡ **from** *facts* **show** *prop*

with *facts* ≡ **from** *facts* *this*

then ≡ **from** *this*

thus ≡ **then show**

hence ≡ **then have**

For more information, see https://isabelle.in.tum.de/dist/Isabelle2021/doc/prog-prove.pdf
and https://isabelle.in.tum.de/dist/Isabelle2021/doc/isar-ref.pdf