

Declarative Theorem Proving

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Proof Language

HOL:

```
prove (``even (2 * z:num))`,  
      REWRITE_TAC [even_def] THEN  
      EXISTS_TAC ``z:num`` THEN  
      REFL_TAC);
```

Natural language:

We prove ``even (2 * z:num)`` as follows:

Using the definition of even with the above,

we have ``?y. 2 * z = 2 * y``

which is true when ``y`` is set to ``z``

QED

Tools

Type checker:

Prove $\text{``}x:\text{num. even } x \wedge p \text{ x''}$

...

so $\text{``}x = T\text{''}$

...

Theorem prover

Equational reasoning

$x = y$

$= z$

$= w$

rproves $x = w$