

# Z Examples Found on the Internet

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## 1 Introduction

### 1.1 Z section heading

section *gearsystem* parents *standard\_toolkit*

### 1.2 Free types paragraph

$\text{gearing} ::= \text{Single} \mid \text{Hub} \langle \mathbb{N} \rangle \mid \text{Deraillleurs} \langle \mathbb{N} \times \mathbb{N} \rangle$

### 1.3 Horizontal definition paragraph

$\text{Wellgeared} == [\text{gears} : \text{gearing} \mid \text{gears} \in \text{ran } \text{Deraillleurs}]$

### 1.4 Generic axiomatic description paragraph

$[X, Y]$	
$\text{First} : X \times Y \rightarrow X$	
$\text{Second} : X \times Y \rightarrow Y$	
$\forall x : X; y : Y \bullet$	
$\text{First } (x, y) = x \wedge$	
$\text{Second } (x, y) = y$	

### 1.5 Schema definition paragraph

$\text{Gear}$	
$\text{Wellgeared}$	
$\text{ingear} : \mathbb{N} \times \mathbb{N}$	
$\exists r, s : \mathbb{N} \mid \text{gears} = \text{Deraillleurs}(r, s) \bullet$	
$\text{First ingear} < r \wedge \text{Second ingear} < s$	

## 1.6 Generic schema definition paragraph

$Bicycle [G]$	
$gears : \mathbb{P} G$	

## 1.7 Axiomatic description paragraph

$numgears : gearing \rightarrow \mathbb{N}$
$\forall g : gearing \bullet$ $(g = Single \Rightarrow numgears\ g = 1) \wedge$ $(\exists x : \mathbb{N} \bullet g = Hub\ x \Rightarrow numgears\ g = x) \wedge$ $(\exists r, s : \mathbb{N} \bullet g = Derailleurs\ (r, s) \Rightarrow numgears\ g = r * s)$

## 1.8 Conjecture paragraph

Lemma1 ==

$$\vdash? numgears(Derailleurs(3, 7)) = 21$$