

## Phase 11 a : Function Types

$[XDR, YDR, Z]$

Total functions (every element in domain has a mapping):

|  $totalF1 : XDR \rightarrow YDR$   
|  $totalF2 : \mathbb{N} \rightarrow \mathbb{N}$

Partial functions (some elements may not have a mapping):

|  $partialF : XDR \nrightarrow YDR$

Injections (one-to-one mappings):

|  $injTotal : XDR \rightarrowtail YDR$   
|  $injPartial : XDR \nrightarrow YDR$

Surjections (onto mappings):

|  $surjTotal : XDR \twoheadrightarrow YDR$   
|  $surjPartial : XDR \nrightarrow YDR$

Bijections (one-to-one and onto):

|  $bijection : XDR \rightleftarrows YDR$

Mixed operators (relations and function types work together):

|  $relationDR : XDR \leftrightarrow YDR$   
|  $function : XDR \rightarrow YDR$