MODULE *Assumes*

EXTENDS *Integers*, *Sequences*

You can run this as a model using "No behavior spec" mode
Single line comment

ASSUME
$\land$ TRUE = TRUE
$\land$ $\neg$FALSE = TRUE

$Jason \triangleq$ "jason"
ASSUME
$Jason =$ "jason"

$record \triangleq [name \mapsto$ "jason", $age \mapsto 37]$
ASSUME
$\land$ $record.name =$ "jason"
$\land$ $record.name \neq$ "foo"

ASSUME
$\forall F \in \{\text{TRUE}\} : F = F$

ASSUME
$\forall F \in \{\text{FALSE}\} : F = F$

ASSUME $\Rightarrow$ means "implies", as in $A \Rightarrow B$ is "(*not* A) OR B"
FALSE $\Rightarrow$ TRUE = TRUE

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FALSE $\Rightarrow$ FALSE = TRUE

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ASSUME $\Rightarrow$ means "implies", as in $A \Rightarrow B$ is "(*not* A) OR B"
TRUE $\Rightarrow$ FALSE = FALSE

ASSUME
TRUE $\equiv$ TRUE

ASSUME
FALSE $\equiv$ FALSE

ASSUME
$\forall F, G \in \{\text{TRUE, FALSE}\} : (F \Rightarrow G) \equiv \neg F \lor G$

ASSUME
$\{1, 2, 2, 2, 3\} = \{1, 2, 3\}$

ASSUME
$\{1, 2, 3, 3, 4, 4\} \setminus \{4\} = \{1, 2, 3\}$

ASSUME
$\exists\, x \in \{3, 4, 5\} : x = 5$

ASSUME
$\{1, 3\} \subseteq \{3, 2, 1\}$

$IsPrime(x) \triangleq x > 1 \land \neg\exists\, d \in 2 \,..\, (x-1) : x\%d = 0$

For all y in S such that y is not prime or y is less than or equal to x

$LargestPrime(S) \triangleq$ CHOOSE $x \in S :$
$\land\ IsPrime(x)$
$\land\ \forall\, y \in S :$
$IsPrime(y) \Rightarrow y \leq x$
or $y > x \Rightarrow \neg IsPrime(y)$

ASSUME
$LargestPrime(\{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}) = 7$

$IsEven(x) \triangleq x\%2 = 0$

$LargetEven(S) \triangleq$ CHOOSE $x \in S :$
$\land\ IsEven(x)$
$\land\ \forall\, y \in S :$
$IsEven(y) \Rightarrow y \leq x$

ASSUME
$LargetEven(\{1, 2, 3, 4, 5, 5, 5\}) = 4$

ASSUME
$\forall\, x \in \{\} :$ FALSE

ASSUME
$\forall\, x \in \{\} :$ TRUE

ASSUME
$\forall\, x \in \{\} : 7$

ASSUME
$\forall\, x \in \{\text{FALSE}\} :$ TRUE

ASSUME
$\forall\, x \in \{\text{TRUE}\} :$ TRUE

ASSUME
$(\forall\, x \in \{\text{FALSE}\} : \text{FALSE}) = \text{FALSE}$

$IsCommutative(Op(\_, \_),\, S) \triangleq \forall\, x \in S :$
$\qquad\qquad\qquad\qquad\qquad\qquad \forall\, y \in S : Op(x,\, y) = Op(y,\, x)$

$Add(x,\, y) \triangleq x + y$
$Divide(x,\, y) \triangleq x \div y$

ASSUME
$IsCommutative(Add,\, \{1,\, 2,\, 3\})$

ASSUME
$IsCommutative(Divide,\, \{1,\, 2,\, 3\}) = \text{FALSE}$

ASSUME
$IsCommutative(Divide,\, \{1,\, 2,\, 3\}) \Rightarrow \text{FALSE}$

ASSUME
$IsCommutative(Divide,\, \{1,\, 2,\, 3\}) \Rightarrow \text{TRUE}$

ASSUME
$\neg IsCommutative(Divide,\, \{1,\, 2,\, 3\})$

\ * Modification History
\ * Last modified Sun *Apr* 21 11:41:10 *PDT* 2019 by *jasondebolt*
\ * Created Sat *Apr* 20 20:01:34 *PDT* 2019 by *jasondebolt*