CSP-OZ Demo: One Very Simple Telephone

$\mathsf{telNums} : \mathbb{P}(\mathbb{N})$ [Declare the (fixed) set of valid phone numbers...]

$\mathsf{telNums} = \{1, 2, 3\}$ [... and specify a concrete set.]

SimplePhone

$\mathtt{chan}\ \mathsf{offHook}\quad \mathtt{chan}\ \mathsf{dial} : [\, n? : \mathsf{telNums}\,]\quad \mathtt{chan}\ \mathsf{onHook}$ [Input events.]

$\mathtt{chan}\ \mathsf{connect} : [\, n! : \mathsf{telNums}\,]\quad \mathtt{chan}\ \mathsf{disconnect}$ [Output events.]

$\mathtt{main} \;=\; \mathsf{offHook} \rightarrow \mathsf{dial} \rightarrow \mathsf{connect} \rightarrow \mathsf{onHook} \rightarrow \mathsf{disconnect} \rightarrow \mathtt{main}$

$\mathsf{dialledNum} : \mathbb{N}$ [Variable that remembers the last number dialled.]

$\mathsf{dialledNum} \in \{0, 1, 2, 3\}$ [An invariant constraint on it.]

Init

$\mathsf{dialledNum} = 0$

enable_dial

$n? : \mathsf{telNums}$

true

effect_dial

$n? : \mathsf{telNums}$

$\mathsf{dialledNum}' = n?$

enable_connect

$n! : \mathsf{telNums}$

$\mathsf{dialledNum} \in \{1, 2, 3\}$

effect_connect

$n! : \mathsf{telNums}$

$n! = \mathsf{dialledNum}$

CSP-OZ Class Inheritance for Incremental Constraints

BlackList

$\mathtt{chan}\ \mathsf{addBList} : [\, n? : \mathsf{telNums}\,]$ [Input event.]

$\mathsf{blackList} : \mathbb{P}(\{0, 1, 2, 3\})$ [Variable that keeps the set of undesired callers.]

Init

$\mathsf{blackList} = \{\}$

effect_addBList

$n? : \mathsf{telNums}$

$\mathsf{blackList}' = \mathsf{blackList} \cup \{n\}$

BlackListPhone

$\mathtt{inherit}$ SimplePhone BlackList [Combine these classes by conjunction.]

enable_connect

$n! : \mathsf{telNums}$

$\mathsf{dialledNum} \notin \mathsf{blackList}$ [Add a further constraint to this operation.]