DEPARTAMENTO DE COMPUTACION

Facultad de Ciencias Exactas y Naturales - UBA

# TP de Especificación

**Sudoku**

1 de Abril de 2017 — Algoritmos y Estructuras de Datos I

**Grupo 10**


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# 1. Problemas

proc sudoku_esTableroValido (**in** t: $seq\langle seq\langle \mathbb{Z}\rangle\rangle$, **out result**: Bool) {
Pre {True}
Post $\{tableroValido(t) = result\}$
pred tableroValido (t: $seq\langle seq\langle \mathbb{Z}\rangle\rangle$) {
$esFilaValida(t) \wedge$ esColumnaValida(t)
}
pred esFilaValida (t: $seq\langle seq\langle \mathbb{Z}\rangle\rangle$) {
$(\forall i : \mathbb{Z})(\forall j : \mathbb{Z}) enRango(t, i) \wedge_L$
enRango(t[i],j) $\wedge_L$ length(t[i]) $= 9 \longrightarrow_L 0 \leq t[i][j] \leq 9$
}
pred esColumnaValida (t: $seq\langle seq\langle \mathbb{Z}\rangle\rangle$) {
$(\forall i : \mathbb{Z})(\forall j : \mathbb{Z}) length(t) = 9 \wedge$ enRango(t,i) $\wedge_L$
enRango(t[i],j) $\longrightarrow_L 0 \leq t[i][j] \leq 9$
}
}

proc sudoku_esCeldaVacia (**in** t: $seq\langle seq\langle \mathbb{Z}\rangle\rangle$, **in** f: $\mathbb{Z}$, **in** c: $\mathbb{Z}$, **out result**: Bool) {
Pre $\{tableroValido(t)\}$
Post {}
}

proc sudoku_nroDeCeldasVacias (**in** t: $seq\langle seq\langle \mathbb{Z}\rangle\rangle$, **out result** : $\mathbb{Z}$) {
Pre {True}
Post {}
}

proc sudoku_primeraCeldaVaciaFila (**in** t: $seq\langle seq\langle \mathbb{Z}\rangle\rangle$, **out result** : $\mathbb{Z}$) {
Pre {True}
Post {}
}

proc sudoku_primeraCeldaVaciaColumna (**in** t: $seq\langle seq\langle \mathbb{Z}\rangle\rangle$, **out result** : $\mathbb{Z}$) {
Pre {True}
Post {}
}

proc sudoku_valorEnCelda (**in** t: $seq\langle seq\langle \mathbb{Z}\rangle\rangle$, **in** f: $\mathbb{Z}$, **in** c: $\mathbb{Z}$, **out result**: Bool) {
Pre {True}
Post {}
}

proc sudoku_llenarCelda (**inout** t: $seq\langle seq\langle \mathbb{Z}\rangle\rangle$ **in** f: $\mathbb{Z}$, **in** c: $\mathbb{Z}$, **out result**: Bool) {
Pre {True}
Post {}
}

proc sudoku_vaciarCelda (**inout t:** $seq\langle seq\langle \mathbb{Z}\rangle\rangle$, **in** f: $\mathbb{Z}$, **in** c: $\mathbb{Z}$, **out result:** Bool) {
Pre {True}
Post {}
}

proc sudoku_esTableroParcialmenteResuelto (**in** t: $seq\langle seq\langle \mathbb{Z}\rangle\rangle$, **out result**: Bool) {
Pre {True}
Post {}
}

proc sudoku_esTableroTotalmenteResuelto (**in** t: $seq\langle seq\langle \mathbb{Z}\rangle\rangle$, **out result**: Bool) {
Pre {True}
Post {}
}

proc sudoku_esSubTablero (**in** $\mathbf{t}_0, t_1 : seq\langle seq\langle \mathbb{Z}\rangle\rangle$, **out result** : Bool){
Pre {True}
Post {}
}

proc sudoku_tieneSolucion (**in t**: $seq\langle seq\langle \mathbb{Z}\rangle\rangle$, **out tienesolucion**: Bool) {
Pre {True}
Post {}
}

proc sudoku_resolver (**inout t**: $seq\langle seq\langle \mathbb{Z}\rangle\rangle$, **out tienesolucion**: Bool) {
Pre {True}
Post {}
}

proc sudoku_copiarTablero (**in t**: $seq\langle seq\langle \mathbb{Z}\rangle\rangle$, **out target**: $seq\langle seq\langle \mathbb{Z}\rangle\rangle$) {
Pre {True}
Post {}
}

## 2. Predicados y Auxiliares generales

pred Nombre (t: $seq\langle seq\langle \mathbb{Z}\rangle\rangle$) {True}
pred PredLargo (t: $seq\langle seq\langle \mathbb{Z}\rangle\rangle$) {
$(\forall i : \mathbb{Z})(\forall j : \mathbb{Z})$True
}
fun Aux (i: $\mathbb{Z}$) : Bool = True;
pred enRango (t: $seq\langle t\rangle$, i:$\mathbb{Z}$) {
$0 \leq i < length(t)$
}
fun Resolver (t: $seq\langle seq\langle \mathbb{Z}\rangle\rangle$) : $seq\langle seq\langle \mathbb{Z}\rangle\rangle$ = if $esSub(t, x) \wedge_L$ tableroParcialmenteResuleto(x) then x else t fi ;

## 3. Decisiones tomadas