

1. TAD REGISTRO

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igualdad observacional

$$\left(\begin{array}{l} (\forall r_1, r_2: \text{reg}) (r_1 =_{\text{obs}} r_2) \Leftrightarrow \left(\text{campos}(r_1) =_{\text{obs}} \text{campos}(r_2) \wedge_L \left((\forall c: \text{Campos}) \right. \right. \\ \left. \left. \left((c \in \text{campos}(r_1)) \Rightarrow_L ((\text{Nat} = \text{tipo}(c) \Rightarrow_L (\text{ValorEn}(r_1, c) =_{\text{obs}} \text{ValorEn}(r_2, c))) \wedge \right. \right. \right. \\ \left. \left. \left. (\neg \text{Nat} = \text{tipo}(c) \Rightarrow_L (\text{PalabraEn}(r_1, c) =_{\text{obs}} \text{PalabraEn}(r_2, c))) \right) \right) \right) \end{array} \right)$$

géneros reg

exporta reg, generadores, observadores, otras operaciones

usa NAT, STRING, CAMPO, TIPO, CONJUNTO(α)

observadores básicos

Campos : reg \rightarrow conj(Campo)

valorEn : reg \times campo \times c \rightarrow Nat

palabraEn : reg \times campo \times c \rightarrow String

$\{\text{Nat} = \text{tipo}(c) \wedge c \in \text{Campos}(r)\}$

$\{\text{String} = \text{tipo}(c) \wedge c \in \text{Campos}(r)\}$

generadores

NuevoRegistro : $\bullet \rightarrow$ reg

agValor : reg \times campo \times c \times nat \times n \rightarrow reg

agPalabra : reg \times campo \times c \times string \times s \rightarrow reg

$\{c \notin \text{campos}(r) \wedge \text{Nat} = \text{tipo}(c)\}$

$\{c \notin \text{campos}(r) \wedge \text{String} = \text{tipo}(c)\}$

otras operaciones

$\bullet = \bullet$: reg \times reg \rightarrow bool

Coincide? : conj(reg) \times rs \times reg \times campo \times c \rightarrow bool

$\{(\forall r_1 : \text{reg}) r_1 \in rs \Rightarrow (c \in \text{campos}(r_1))\}$

Combinar : reg \times reg \times reg \rightarrow reg

CombinarDeAcuerdoA : reg \times reg \times conj(campo) \times cs \rightarrow reg

ConMismoContenido : reg \times reg \times conj(campo) \times cs \rightarrow bool

$\{cs \subseteq (\text{campos}(r_1) \cap \text{campos}(r_2))\}$

DameCoincidente : conj(reg) \times rs \times reg \times campo \times c \rightarrow reg

$\{(\forall r_1 : \text{reg}) (r_1 \in rs \Rightarrow c \in \text{campos}(r_1)) \wedge_L (\text{Coincide?}(rs, r, c))\}$

DameCoincidentesVal : campo \times c \times nat \times n \times conj(reg) \times rs \rightarrow conj(reg)

$\{(\forall r: \text{reg}) (r \in rs \Rightarrow_L c \in \text{campos}(r)) \wedge_L \text{Nat} = \text{tipo}(c)\}$

DameCoincidentesPal : campo \times c \times string \times s \times conj(reg) \times rs \rightarrow conj(reg)

$\{(\forall r: \text{reg}) (r \in rs \Rightarrow_L c \in \text{campos}(r)) \wedge_L \text{String} = \text{tipo}(c)\}$

noRepiten : reg \times reg \times campo \times c \rightarrow bool

$\{c \in \text{campos}(r_1) \wedge c \in \text{campos}(r_2)\}$

AgYCompDefault : reg \times reg \times def \times conj(campo) \times cs \rightarrow reg

DameCamposCoinc : reg \times conj(campo) \times ci \rightarrow conj(reg)

$\{(\forall r : \text{reg}) r \in \Rightarrow_L ci \in \text{campos}(r)\}$

RearmarCoinci : reg \times conj(campo) \times ci \rightarrow reg

$\{ci \in \text{campos}(r)\}$

Busca : conj(campo) \times cs \times reg \times conj(reg) \times rs \times conj(campo) \times ci \rightarrow conj(reg)

$\{cs \subseteq \text{campos}(r) \wedge \neg (\emptyset?(cs)) \wedge ci \subseteq cs\}$

axiomas $\forall r_1, r_2: \text{reg}, \forall c_1, c_2: \text{campo}, \forall cs: \text{conj}(\text{campo}), \forall n: \text{nat}, \forall s: \text{string}$

$\text{campos}(\text{NuevoRegistro}) \equiv \emptyset$

$\text{campos}(\text{agValor}(r_1, c_1, n)) \equiv \text{Ag}(c_1, \text{campos}(r_1))$

$\text{campos}(\text{agPalabra}(r_1, c_1, s)) \equiv \text{Ag}(c_1, \text{campos}(r_1))$

$\text{valorEn}(\text{agValor}(r_1, c_1, n), c_2) \equiv \text{if } c_1 = c_2 \text{ then } n \text{ else } \text{valorEn}(r_1, c_2) \text{ fi}$

$\text{valorEn}(\text{agPalabra}(r_1, c_1, s), c_2) \equiv \text{valorEn}(r_1, c_2)$

$\text{palabraEn}(\text{agValor}(r_1, c_1, n), c_2) \equiv \text{palabraEn}(r_1, c_2)$

$\text{palabraEn}(\text{agPalabra}(r_1, c_1, s), c_2) \equiv \text{if } c_1 = c_2 \text{ then } s \text{ else } \text{palabraEn}(r_1, c_2) \text{ fi}$

$r_1 = r_2 \equiv \text{campos}(r_1) = \text{campos}(r_2) \wedge_L \text{ConMismoContenido}(r_1, r_2, \text{campos}(r_1))$

$\text{ConMismoContenido}(r_1, r_2, cs) \equiv \text{if } \emptyset?(cs) \text{ then}$
 true
 else
 $\neg \text{noRepiten}(r_1, r_2, \text{DameUno}(cs)) \wedge \text{ConMismoContenido}(r_1, r_2, \text{SinUno}(cs))$
 fi

$\text{Coincide?}(rs, r, c) \equiv \text{if } \emptyset?(rs) \text{ then}$
 false
 else
 $\neg \text{NoRepiten}(\text{DameUno}(rs), r, c) \vee \text{Coincide?}(\text{SinUno}(rs), r, c)$
 fi

$\text{DameCoincidente}(rs, r, c) \equiv \text{if } \text{noRepiten}(\text{DameUno}(rs), r, c) \text{ then}$
 $\text{DameCoincidente}(\text{SinUno}(rs), r, c)$
 else
 $\text{DameUno}(rs)$
 fi

$\text{Combinar}(r_1, r_2) \equiv \text{CombinarDeAcuerdoA}(r_1, c_1, \text{campos}(c_2))$

$\text{CombinarDeAcuerdoA}(r_1, r_2, cs) \equiv \text{if } \emptyset?(cs) \text{ then}$
 r_1
 else
 if $\text{DameUno}(cs) \in \text{campos}(r_1)$ then
 $\text{CombinarDeAcuerdoA}(r_1, r_2, \text{SinUno}(cs))$
 else
 if $\text{Nat} = \text{tipo}(\text{DameUno}(cs))$ then
 $\text{agValor}(\text{CombinarDeAcuerdoA}(r_1, r_2, \text{SinUno}(cs)), \text{DameUno}(cs),$
 $\text{valorEn}(r_2, \text{DameUno}(cs)))$
 else
 $\text{agPalabra}(\text{CombinarDeAcuerdoA}(r_1, r_2, \text{SinUno}(cs)),$
 $\text{DameUno}(cs), \text{palabraEn}(r_2, \text{DameUno}(cs)))$
 fi
 fi
 fi

$\text{noRepiten}(r_1, r_2, c) \equiv \text{Nat} = \text{tipo}(c) \wedge_{\text{L}} \neg (\text{valorEn}(r_1, c) = \text{valorEn}(r_2, c)) \vee$
 $(\text{String} = \text{tipo}(c) \wedge_{\text{L}} \neg (\text{palabraEn}(r_1, c) = \text{palabraEn}(r_2, c)))$

$\text{DameCoincidentesVal}(c, n, rs) \equiv \text{if } \emptyset?(rs) \text{ then}$
 \emptyset
 else
 if $\text{ValorEn}(\text{DameUno}(rs), c) = n$ then
 $\text{Ag}(\text{DameUno}(rs), \text{DameCoincidentesVal}(c, n, \text{SinUno}(rs)))$
 else
 $\text{DameCoincidentesVal}(c, n, \text{SinUno}(rs))$
 fi
 fi

$\text{DameCoincidentesPal}(c, s, rs) \equiv \text{if } \emptyset?(rs) \text{ then}$
 \emptyset
 else
 if $\text{PalabraEn}(\text{DameUno}(rs), c) = s$ then
 $\text{Ag}(\text{DameUno}(rs), \text{DameCoincidentesPal}(c, s, \text{SinUno}(rs)))$
 else
 $\text{DameCoincidentesPal}(c, s, \text{SinUno}(rs))$
 fi
 fi

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AgYCompDefault(r, def, cs)  $\equiv$  if  $\emptyset?(cs)$  then
    NuevoRegistro
else
    if DameUno(cs)  $\in$  campos(r) then
        if Nat = tipo(DameUno(cs)) then
            AgValor(AgYCompDefault(r, def, SinUno(cs)), DameUno(cs),
                ValorEn(r, DameUno(cs)))
        else
            AgPalabra(AgYCompDefault(r, def, SinUno(cs)), DameUno(cs),
                PalabraEn(r, DameUno(cs)))
        fi
    else
        if Nat = tipo(DameUno(cs)) then
            AgValor(AgYCompDefault(r, def, SinUno(cs)), DameUno(cs),
                ValorEn(def, DameUno(cs)))
        else
            AgPalabra(AgYCompDefault(r, def, SinUno(cs)), DameUno(cs),
                PalabraEn(def, DameUno(cs)))
        fi
    fi
fi

DameCamposCoinci(r, ci)  $\equiv$  if  $\emptyset?(ci)$  then
     $\emptyset$ 
else
    Ag(RearmarCoinci(DameUno(cs), ci), DameCamposCoinci(SinUno(rs), ci))
fi

RearmarCoinci(r, ci)  $\equiv$  if  $\emptyset?(ci)$  then
    NuevoRegistro
else
    if tipo(DameUno(ci)) = Nat then
        AgValor(RearmarCoinci(r, SinUno(ci)), DameUno(ci), valorEn(r, DameUno(ci)))
    else
        AgPalabra(RearmarCoinci(r, SinUno(ci)), DameUno(ci), palabraEn(r, DameUno(ci)))
    fi
fi

Busca(cs, r, rs, ci)  $\equiv$  if  $\emptyset?(SinUno(cs))$  then
    if tipo(DameUno(cs)) = Nat then
        DameCoincidentesVal(DameUno(cs), valorEn(r, DameUno(cs)), rs)
    else
        DameCoincidentesPal(DameUno(cs), valorEn(r, DameUno(cs)), rs)
    fi
else
    if tipo(DameUno(cs)) = Nat then
        DameCoincidentesVal(DameUno(cs), valorEn(r, DameUno(cs)), Busca(SinUno(cs), r, rs))
    else
        DameCoincidentesPal(DameUno(cs), valorEn(r, DameUno(cs)), Busca(SinUno(cs), r, rs))
    fi
fi

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Fin TAD