

# 1. TAD REGISTRO

## TAD REGISTRO

### 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( $\alpha$ )

### 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  $\times$  r<sub>1</sub>  $\times$  reg  $\times$  r<sub>2</sub>  $\rightarrow$  reg

CombinarDeAcuerdoA : reg  $\times$  r<sub>1</sub>  $\times$  reg  $\times$  r<sub>2</sub>  $\times$  conj(campo)  $\times$  cs  $\rightarrow$  reg

ConMismoContenido : reg  $\times$  r<sub>1</sub>  $\times$  reg  $\times$  r<sub>2</sub>  $\times$  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  $\times$  r<sub>1</sub>  $\times$  reg  $\times$  r<sub>2</sub>  $\times$  campo  $\times$  c  $\rightarrow$  bool

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

AgYCompDefault : reg  $\times$  r<sub>1</sub>  $\times$  reg  $\times$  def  $\times$  conj(campo)  $\times$  cs  $\rightarrow$  reg

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

CombinarDeAcuerdoA( $r_1, r_2, cs$ )  $\equiv$  if  $\emptyset?(cs)$  then
     $r_1$ 
else
    if  $\text{DameUno}(cs) \in \text{campos}(r_1)$  then
        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

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

DameCoincidentesVal( $c, n, rs$ )  $\equiv$  if  $\emptyset?(rs)$  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
        DameCoincidentesVal( $c, n, \text{SinUno}(rs)$ )
    fi
fi

DameCoincidentesPal( $c, s, rs$ )  $\equiv$  if  $\emptyset?(rs)$  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
        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(rs, ci)  $\equiv$  if  $\emptyset?(rs)$  then
     $\emptyset$ 
else
    Ag(RearmarCoinci(DameUno(rs), 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)  $\equiv$  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**