1. TAD REGISTRO

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    igualdad observacional

$$\left(\begin{array}{l} (\forall\ r_1,r_2\text{:reg})\ (r_1 =_{\text{obs}} r_2) \Leftrightarrow \left(\ \text{campos}(r_1) =_{\text{obs}} \text{campos}(r_2) \wedge_{\text{L}} \left((\forall\ \text{c:Campos})\right.\right. \\[2mm] \left.\left((\text{c} \in \text{campos}(r_1))\right) \Rightarrow_{\text{L}} ((\text{Nat} = \text{tipo(c)} \Rightarrow_{\text{L}} (\text{ValorEn}(r_1,\ \text{c}) =_{\text{obs}} \text{ValorEn}(r_2,\ \text{c}))) \wedge \right. \\[2mm] \left.\left.\left.(\neg\text{Nat} = \text{tipo(c)} \Rightarrow_{\text{L}} (\text{PalabraEn}(r_1,\ \text{c}) =_{\text{obs}} \text{PalabraEn}(r_2,\ \text{c})))\right)\right)\right) \end{array}\right)$$

    géneros   reg

    exporta   reg, generadores, observadores, otras operaciones

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

    observadores básicos
       Campos : reg $\longrightarrow$ conj(Campo)
       valorEn : reg r $\times$ campo c $\longrightarrow$ Nat $\{\text{Nat} = \text{tipo(c)} \wedge \text{c} \in \text{Campos(r)}\}$
       palabraEn : reg r $\times$ campo c $\longrightarrow$ String $\{\text{String} = \text{tipo(c)} \wedge \text{c} \in \text{Campos(r)}\}$

    generadores
       NuevoRegistro : $\bullet$ $\longrightarrow$ reg
       agValor : reg r $\times$ campo c $\times$ nat n $\longrightarrow$ reg $\{\text{c} \notin \text{campos(r)} \wedge \text{Nat} = \text{tipo(c)}\}$
       agPalabra : reg r $\times$ campo c $\times$ string s $\longrightarrow$ reg $\{\text{c} \notin \text{campos(r)} \wedge \text{String} = \text{tipo(c)}\}$

    otras operaciones
       $\bullet = \bullet$: reg $\times$ reg $\longrightarrow$ bool
       Coincide? : conj(reg) rs $\times$ reg r $\times$ campo c $\longrightarrow$ bool $\{(\forall\ r_1 : \text{reg})\ r_1 \in rs \Rightarrow (\text{c} \in \text{campos}(r_1))\}$
       Combinar : reg r_1 $\times$ reg r_2 $\longrightarrow$ reg
       CombinarDeAcuerdoA : reg r_1 $\times$ reg r_2 $\times$ conj(campo) cs $\longrightarrow$ reg
       ConMismoContenido : reg r_1 $\times$ reg r_2 $\times$ conj(campo) cs $\longrightarrow$ bool
                                               $\{cs \subseteq (\text{campos}(r_1) \cap \text{campos}(r_2))\}$
       DameCoincidente : conj(reg) rs $\times$ reg r $\times$ campo c $\longrightarrow$ reg
                                $\{(\forall\ r_1 : \text{reg})\ (r_1 \in rs \Rightarrow \text{c} \in \text{campos}(r_1)) \wedge_{\text{L}} (\text{Coincide?}(rs, r, c))\}$
       DameCoincidentesVal : campo c $\times$ nat n $\times$ conj(reg) rs $\longrightarrow$ conj(reg)
                                    $\{(\forall\ \text{r:reg})(r \in rs \Rightarrow_{\text{L}} c \in \text{campos(r)}) \wedge_{\text{L}} \text{Nat} = \text{tipo}(c)\}$
       DameCoincidentesPal : campo c $\times$ string s $\times$ conj(reg) rs $\longrightarrow$ conj(reg)
                                    $\{(\forall\ \text{r:reg})(r \in rs \Rightarrow_{\text{L}} c \in \text{campos(r)}) \wedge_{\text{L}} \text{String} = \text{tipo}(c)\}$
       noRepiten : reg r_1 $\times$ reg r_2 $\times$ campo c $\longrightarrow$ bool $\{c \in \text{campos}(r_1) \wedge \text{c} \in \text{campos}(r_2)\}$
       AgYCompDefault : reg r_1 $\times$ reg def $\times$ conj(campo) cs $\longrightarrow$ reg

    axiomas $\forall r_1, r_2$: reg, $\forall c_1, c_2$: campo, $\forall cs$: conj(campo), $\forall n$: nat, $\forall s$: string
    campos(NuevoRegistro) $\equiv \emptyset$
    campos(agValor(r_1,c_1,n) $\equiv$ Ag(c_1,campos(r_1))
    campos(agPalabra(r_1,c_1,s)) $\equiv$ Ag(c_1,campos(r_1))

    valorEn(agValor(r_1,c_1,n), c_2) $\equiv$ **if** $c_1 = c_2$ **then** n **else** valorEn($r_1,\ c_2$) **fi**
    valorEn(agPalabra(r_1,c_1,s),c_2) $\equiv$ valorEn(r_1,c_2)

    palabraEn(agValor($r_1,\ c_1$,n), c_2) $\equiv$ palabraEn($r_1,\ c_2$)
    palabraEn(agPalabra(r_1,c_1,s), c_2) $\equiv$ **if** $c_1 = c_2$ **then** s **else** palabraEn($r_1,\ c_2$) **fi**

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

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

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

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

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

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

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

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

$\text{AgYCompDefault(r, def, cs)} \equiv$ **if** $\emptyset?(\text{cs})$ **then**

NuevoRegistro

else

  if $\text{DameUno(cs)} \in \text{campos(r)}$ **then**

    if $\text{Nat} = \text{tipo(DameUno(cs))}$ **then**

      $\text{AgValor}\Big(\text{AgYCompDefault}\big(\text{r, def, SinUno(cs)}\big),\text{DameUno(cs)},$

      $\text{ValorEn(r,DameUno(cs))}\Big)$

    else

      $\text{AgPalabra}\Big(\text{AgYCompDefault}\big(\text{r, def, SinUno(cs)}\big),\text{DameUno(cs)},$

      $\text{PalabraEn(r,DameUno(cs))}\Big)$

    fi

  else

    if $\text{Nat} = \text{tipo(DameUno(cs))}$ **then**

      $\text{AgValor}\Big(\text{AgYCompDefault}\big(\text{r, def, SinUno(cs)}\big), \text{DameUno(cs)},$

      $\text{ValorEn(def, DameUno(cs))}\Big)$

    else

      $\text{AgPalabra}\Big(\text{AgYCompDefault}\big(\text{r, def, SinUno(cs)}\big), \text{DameUno(cs)},$

      $\text{PalabraEn(def, DameUno(cs))}\Big)$

    fi

  fi

fi

Fin TAD