Practica 4:

Construcción de árboles de sintaxis abstracta

Grupo 11:

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1. Conjunto de funciones constructoras

Prog: LDs **x** LIs → Prog

LD_simp: String **x** String → D

LD_comp: String **x** String **x** LDs → LDs

LI_simp: String **x** Exp → I

LI_comp: String **x** Exp **x** LIs → LIs

Mas: Exp **x** Exp → Exp

Menos: Exp **x** Exp → Exp

And: Exp **x** Exp → Exp

Or: Exp **x** Exp → Exp

Distinto: Exp **x** Exp → Exp

Igual: Exp **x** Exp → Exp

Menor_que: Exp **x** Exp → Exp

Menor_igual_que: Exp **x** Exp → Exp

Mayor_que: Exp **x** Exp → Exp

Mayor_igual_que: Exp **x** Exp → Exp

Mul: Exp **x** Exp → Exp

Div: Exp **x** Exp → Exp

Not: Exp → Exp

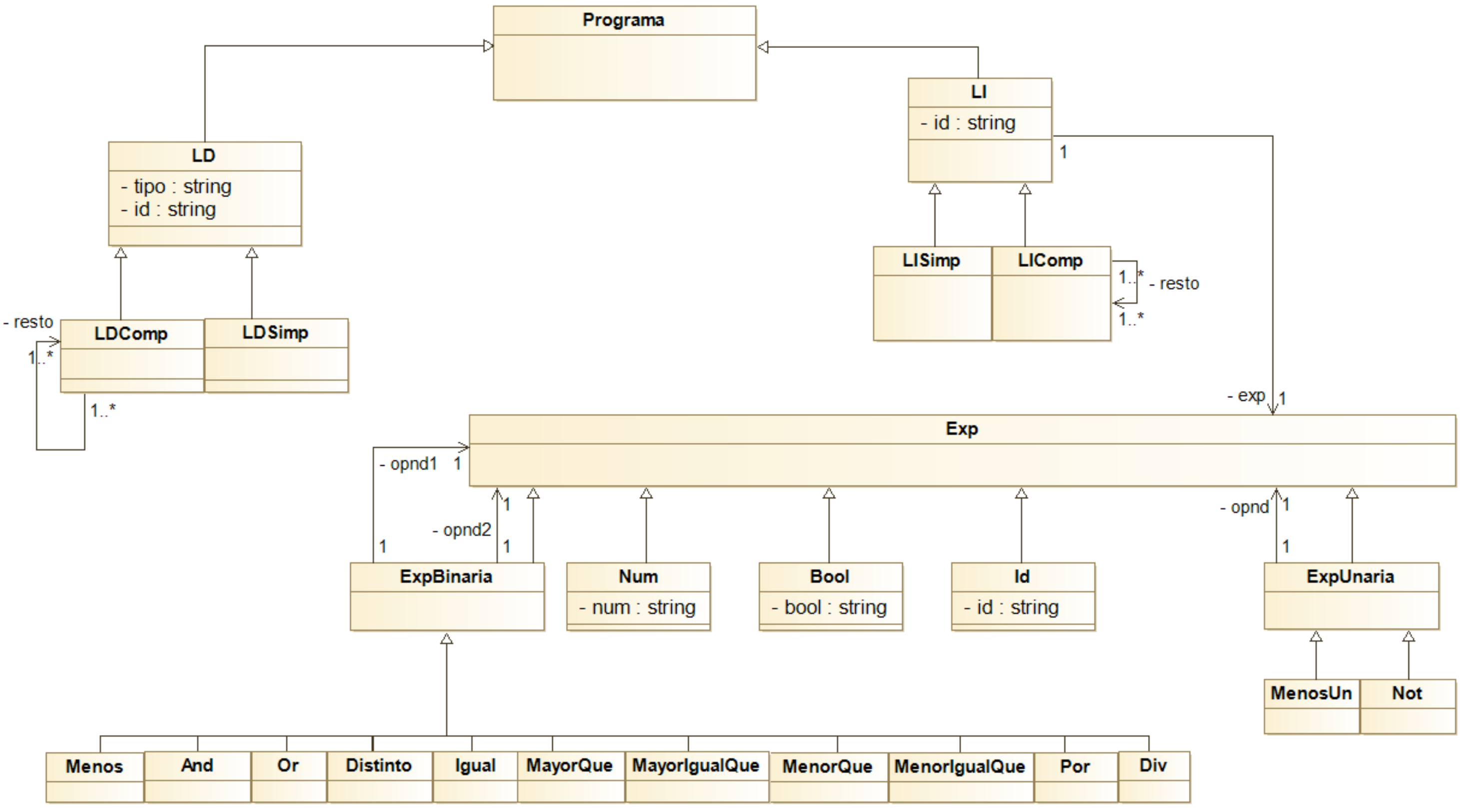
Menos_unario: Exp → Exp

Num: String → Exp

Bool: String → Exp

Id: String → Exp

2. Diagrama de clases



3. Gramática de atributos

Prog → LDs && LIs

Prog.a = prog(LDs.a, LIs.a)

LDs → LDs; D

LDs_0.a = ldCompuesta(D.tipo, D.id, LDs_1.a)

LDs → D

LDs.a = ldSimple(D.tipo, D.id)

LIs → LIs; I

LIs_0.a = liCompuesta(I.id, I.exp, LIs_1.a)

LIs → I

LIs.a = liSimple(I.id, I.exp)

D → tipo identificador

D.tipo = tipo.lex

D.id = identificador.lex

I → identificador = Exp0

I.id = identificador.lex

I.exp = Exp0.a

Exp0 → Exp0 Op0 Exp1

$Exp0_0$.a = mkexp(Op0.op, $Exp0_1$.a, Exp1.a)

Exp0 → Exp1

Exp0.a = Exp1.a

Exp1 → Exp2 and Exp1

$Exp1_0$.a = and(Exp2.a, $Exp1_1$.a)

Exp1 → Exp2 or Exp2

Exp1.a = or($Exp2_0$.a, $Exp2_1$.a)

Exp1 → Exp2

Exp1.a = Exp2.a

Exp2 → Exp3 Op2 Exp3

Exp2.a = mkexp(Op2.op, $Exp3_0$.a, $Exp3_1$.a)

Exp2 → Exp3

Exp2.a = Exp3.a

Exp3 → Exp3 Op3 Exp4

$Exp3_0$.a = mkexp(Op3.op, $Exp3_1$.a, Exp4.a)

Exp3 → Exp4

Exp3.a = Exp4.a

Exp4 → - Exp4

$Exp4_0$.a = menos_unario($Exp4_1$.a)

Exp4 → not Exp5

Exp4.a = not(Exp5.a)

Exp4 → Exp5

Exp4.a = Exp5.a

Exp5 → numero

Exp5.a = num(numero.lex)

Exp5 → booleano

Exp5.a = bool(booleano.lex)

Exp5 → identificador

Exp5.a = id(identificador.lex)

Exp5 → (Exp0)

Exp5.a = Exp0.a

Op0 → +

Op0.op = “+”

Op0 → -

Op0.op = “-”

Op2 → !=

Op2.op = “!=”

Op2 → ==

Op2.op = “==”

Op2 → <

Op2.op = “<”

Op2 → <=

Op2.op = “<=”

Op2 → >

Op2.op = “>”

Op2 → >=

Op2.op = “>=”

Op3 → *

Op3.op = “*”

Op3 → /

Op3.op = “/”

Definimos la función mkexp como sigue:

```
fun mkexp(op, opnd1,opnd2) {
	switch(op) {
		"+" => return suma(opnd1,opnd2)
		"-" => return resta(opnd1,opnd2)
		"!=" => return distinto(opnd1,opnd2)
		"==" => return igual(opnd1,opnd2)
		"<" => return menorQue(opnd1,opnd2)
		"<=" => return menorIgualQue(opnd1,opnd2)
		">" => return mayorQue(opnd1,opnd2)
		">=" => return mayorIgualQue(opnd1,opnd2)
		"*" => return mul(opnd1,opnd2)
		"/" => return div(opnd1,opnd2)
	}
}
```

4. Acondicionamiento para imp descendente

Prog → Sec_Dec && LIs

Prog.a = prog(LDs.a, LIs.a)

LDs → D PDec

PDec.ah = ldSimple(D.tipo, D.id)

LDs.a = PDec.a

PDec → ; D PDec

$PDec_1$.a = ldCompuesta($PDec_0$.ah, D.a)

$PDec_0$.a = $PDec_1$.a

PDec → ε

PDec.a = PDec.ah

LIs → I PIns

PIns.ah = liSimple(I.id, I.exp)

LIs.a = PIns.a

PIns → ; I PIns

$PIns_1$.a = liCompuesta($PIns_0$.ah, I.a)

$PIns_0$.a = $PIns_1$.a

PIns → ε

PIns.a = PIns.ah

D → tipo identificador

D.tipo = tipo.lex

D.id = identificador.lex

I → identificador = Exp0

I.id = identificador.lex

I.exp = Exp0.a

Exp0 → Exp1 RExp0

RExp0.ah = Exp1.v

Exp0.v = RExp0.v

RExp0 → Op0 Exp1 RExp0

$RExp0_1$.ah = mkexp(Op0.op, $RExp0_0$.ah, Exp1.v)

$RExp0_0$.a = $RExp0_1$.a

RExp0 → ε

RExp0.a = RExp0.ah

Exp1 → Exp2 RExp1

RExp1.ah = Exp2.a

Exp1.a = RExp1.a

RExp1 → and Exp1

RExp1.a = and(RExp.ah, Exp1.a)

RExp1 → or Exp2

RExp1.a = or(RExp.ah, Exp2.a)

RExp1 → ε

RExp1.a = RExp1.ah

Exp2 → Exp3 RExp2

RExp2.ah = Exp3.a

Exp2.a = RExp2.a

REExp2 → Op2 Exp3

REExp2.a = mkexp(Op2.op, RExp2.ah, Exp3.a)

RExp2 → ε

RExp2.a = RExp2.ah

Exp3 → Exp4 RExp3

RExp3.ah = Exp4.a

Exp3.a = RExp3.a

RExp3 → Op3 Exp4 RExp3

$RExp3_1$.ah = mkexp(Op3.op, $RExp3_0$.ah, Exp4.a)

$RExp3_0$.a = $RExp3_1$.a

RExp3 → ε

RExp3.a = RExp3.ah

Exp4 → - Exp4

$Exp4_0$.a = menos_unario($Exp4_1$.a)

Exp4 → not Exp5

Exp4.a = not(Exp5.a)

Exp4 → Exp5

Exp4.a = Exp5.a

Exp5 → numero

Exp5.a = num(numero.lex)

Exp5 → booleano

Exp5.a = bool(booleano.lex)

Exp5 → identificador

Exp5.a = id(identificador.lex)

Exp5 → (Exp0)

Exp5.a = Exp0.a

Op0 → +

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Op2.op = “!=”

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Op2.op = “<”

Op2 → <=

Op2.op = “<=”

Op2 → >

Op2.op = “>”

Op2 → >=

Op2.op = “>=”

Op3 → *

Op3.op = “*”

Op3 → /

Op3.op = “/”