MODULE OT

EXTENDS $Naturals$

CONSTANTS
CH,
POS,
PR
LOP, * for test only
ROP * for test only

$OP \triangleq [type : \{\text{“ins”}, \text{“del”}\}, pos : POS, ch : CH, pr : PR]$
$NOP \triangleq$ CHOOSE $v : v \notin OP$

$XformII(lins, rins) \triangleq$ the left insertion transformed against the right insertion
IF $lins.pos < rins.pos$
THEN $lins$
ELSE IF $lins.pos > rins.pos$
THEN $[lins$ EXCEPT $!.pos = @ + 1]$
ELSE IF $lins.ch = rins.ch$
THEN NOP
ELSE IF $lins.pr > rins.pr$
THEN $[lins$ EXCEPT $!.pos = @ + 1]$
ELSE $lins$

$XformID(ins, del) \triangleq$ the left insertion transformed against the right deletion
IF $ins.pos < del.pos$
THEN ins
ELSE $[ins$ EXCEPT $!.pos = @ - 1]$

$XformDI(del, ins) \triangleq$ the first deletion transformed against the right insertion
IF $del.pos < ins.pos$
THEN del
ELSE $[del$ EXCEPT $!.pos = @ + 1]$

$XformDD(ldel, rdel) \triangleq$ the first deletion transformed against the right deletion
IF $ldel.pos < rdel.pos$
THEN $ldel$
ELSE IF $ldel.pos > rdel.pos$
THEN $[ldel$ EXCEPT $!.pos = @ - 1]$
ELSE NOP

$Xform(lop, rop) \triangleq$ the left operation is transformed against the right operation
CASE $lop.type = \text{“ins”} \land rop.type = \text{“ins”} \to XformII(lop, rop)$
$\square$ $lop.type = \text{“ins”} \land rop.type = \text{“del”} \to XformID(lop, rop)$
$\square$ $lop.type = \text{“del”} \land rop.type = \text{“ins”} \to XformDI(lop, rop)$
$\square$ $lop.type = \text{“del”} \land rop.type = \text{“del”} \to XformDD(lop, rop)$