

TRANSLATION SCHEME FOR BOOLEAN EXPRESSION

Boolean expression is having two primary purposes

1. used to compute logical values
2. used in conditional expression that alter the flow of control

Boolean operators – and, or, not

or and and are left associative

or has lowest precedence, then and, then not.

Example

a or b and not c is translated into three address code like the below

t1 = not c
t2 = b and t1
t3 = a or t2

Relational expression such as $a < b$ is equivalent to the conditional statement if $a < b$ then 1 else 0 which can be translated into three address code sequence

```
100: if a<b goto 103
101: t1=0
102: goto 104
103: t1=1
104:
```

emit – places three address code statements into an output file

nextstat – gives the index of the next three address statement in the output sequence

SNo	Productions	Semantic action
1	$E \rightarrow E1 \text{ or } E2$	$E.place = \text{newtemp}$ $\text{emit}(E.place = E1.place \text{ or } E2.place)$
2	$E \rightarrow E1 \text{ and } E2$	$E.place = \text{newtemp}$ $\text{emit}(E.place = E1.place \text{ and } E2.place)$
3	$E \rightarrow \text{not } E1$	$E.place = \text{newtemp}$ $\text{emit}(E.place = \text{not } E1.place)$
4	$E \rightarrow (E)$	$E.place = E1.place$
5	$E \rightarrow id1 \text{ relop } id2$	$E.place = \text{newtemp}$ $\text{emit}(\text{if } id1.place \text{ relop.op } id2.place \text{ goto } \text{nextstat})$

		nextstat+3) emit(E.place=0) emit(goto nextstat+2) emit(E.place=1)
6	E->true	E.place=newtemp emit(E.place=1)
7	E->false	E.place=newtemp emit(E.place=0)

Example

a<b or c<b and e<f

is translated into

```

100: if a<b goto 103
101: t1=0
102: goto 104
103: t1=1
104: if c<d goto 107
105: t2=0
106: goto 108
107: t2=1
108: if e<f goto 111
109: t3=0
110: goto 112
111: t3=1
112: t4 = t2 and t3
113: t5 = t1 or t4

```