

# Exercise 6: Three Address Code

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Assignment	6
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## 1 Lex

```
%{
#include<stdio.h>
#include<string.h>
#include "y.tab.h"
}%
term ([a-zA-Z\_][a-zA-Z\_0-9]*|[0-9]+)
relop ("<"|"<="|">"|>="|"=="|"!=")
op ("+"|"-"|"*"|"/"|"%")
%%
"while" { return WHILE; }
"do" { return DO; }
"switch" { return SWITCH; }
"case" { return CASE; }
"default" { return DEFAULT; }
"break" { return BREAK; }
{term} { yylval.str = strdup(yytext); return TERM; }
{relop} { yylval.str = strdup(yytext); return RELOP; }
{op} { yylval.str = strdup(yytext); return OP; }
[ \t\n]+ { }
. { return *yytext; }
```

## 2 YACC

```
%{
#include<stdio.h>
#include<stdlib.h>
#include<math.h>
int yylex(void);
#include "y.tab.h"
```

```

extern FILE *yyin;
int cc = 1, tc = 1, sc = 0, case_count = 1;
%}
%token TERM RELOP OP WHILE DO SWITCH CASE DEFAULT BREAK
%union
{
    int intval;
    float floatval;
    char *str;
}
%type<str> TERM RELOP OP
%%
line: /* empty */
    | TERM '=' TERM OP TERM ';' { printf("t%d := %s %s %s\n%s := t%d\n", tc, $3,
    | TERM '=' TERM RELOP TERM ';' { printf("t%d := %s %s %s\n%s := t%d\n", tc,
    | TERM '=' TERM ';' { printf("%s := %s\n", $1, $3); } line
    | WHILE TERM RELOP TERM DO '{' { printf("LABEL%d: if not %s %s %s goto FALSE\n",
    | WHILE TERM OP TERM DO '{' { printf("LABEL%d: if not %s %s %s goto FALSE%d\n",
    | WHILE TERM DO '{' { printf("LABEL%d: if not %s then FALSE%d\nTRUE%d: ", cc
    | SWITCH '(' TERM RELOP TERM ')' '{' { printf("t%d := %s %s %s\n", tc, $3, $
    | SWITCH '(' TERM OP TERM ')' '{' { printf("t%d := %s %s %s\n", tc, $3, $4,
    | SWITCH '(' TERM ')' '{' { printf("t%d := %s\n", tc, $3); sc = tc; tc++; }
    | BREAK ';' line { printf("goto NEXT%d\n", cc); }
cases: /* empty */
    | CASE TERM ':' { printf("CASE%d: if t%d != %s goto CASE%d\n", case_count,
    | DEFAULT{printf("CASE%d: ", case_count);} ':' line { printf("goto NEXT%d\n",
%%
int yyerror(char* s)
{
    fprintf(stderr, "%s\n", s);
    return 0;
}
int yywrap()
{
    return 1;
}
int main()
{
    char inputFile[100];
    printf("Enter the input file: ");
    scanf("%s", inputFile);
    yyin = fopen(inputFile, "r");
    yyparse();
    return 0;
}

```

### 3 Input File

in.txt

```
while i < 10 do {
    a = 0;
    i = i + 1;
}
switch(i + j) {
    case 1: x = y + z; break;
    case 2: u = v + w; break;
    default: p = q + r;
}
a = 5;
```

### 4 Sample I/O

```
ramkaushik@ram:~/Sem 6/Practical/CD/6$ lex TAC.l
ramkaushik@ram:~/Sem 6/Practical/CD/6$ yacc -d TAC.y
ramkaushik@ram:~/Sem 6/Practical/CD/6$ gcc y.tab.c lex.yy.c -o tac
ramkaushik@ram:~/Sem 6/Practical/CD/6$ ./tac
Enter the input file: in.txt
LABEL1: if not i < 10 goto FALSE1
TRUE1: a := 0
t1 := i + 1
i := t1
FALSE1: t2 := i + j
CASE1: if t2 != 1 goto CASE2
t3 := y + z
x := t3
goto NEXT2
CASE2: if t2 != 2 goto CASE3
t4 := v + w
u := t4
goto NEXT2
CASE3: t5 := q + r
p := t5
goto NEXT2
NEXT2: a := 5
ramkaushik@ram:~/Sem 6/Practical/CD/6$
```