SSN COLLEGE OF ENGINEERING, KALAVAKKAM

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

UCS1602 - Compiler Design

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Program Code:

tac.l

```
%{
#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;}
```

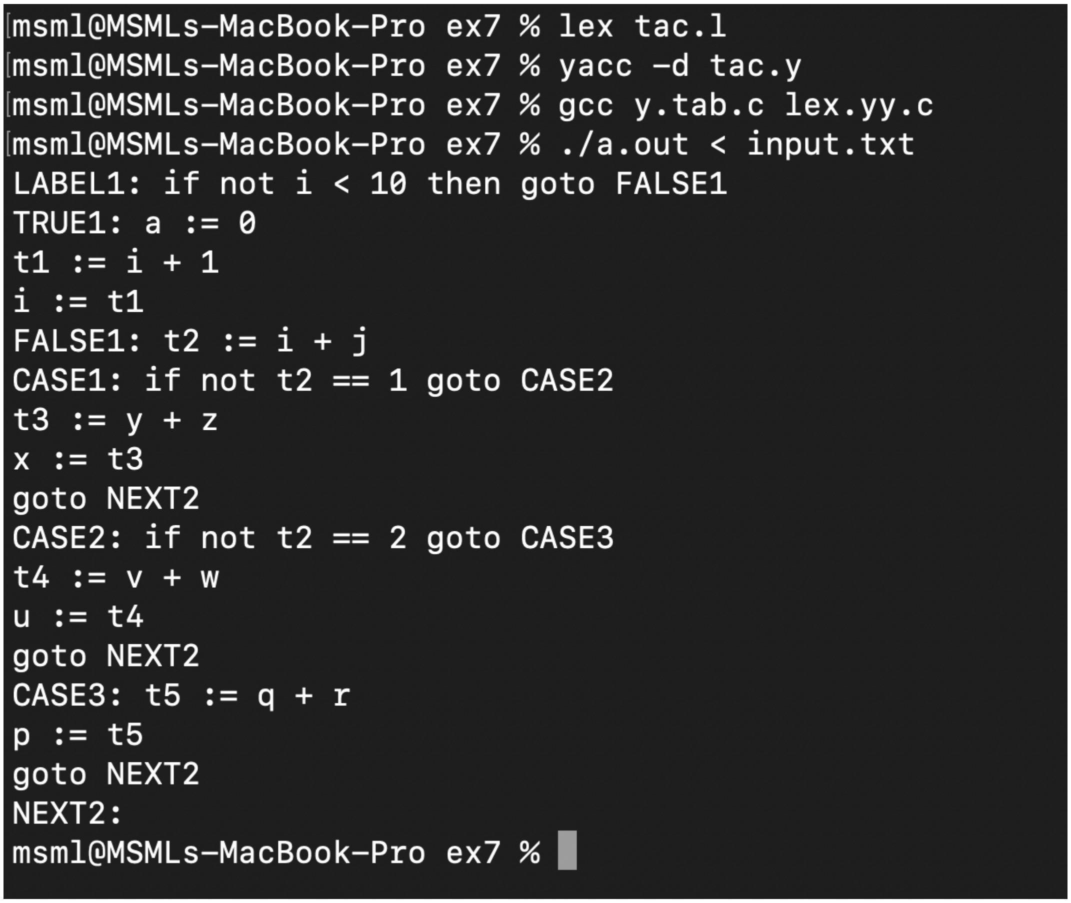
tac.y

```
%{
#include<stdio.h>
#include<stdlib.h>
#include<math.h>
int yylex(void);
int yyerror(char *);
#include "y.tab.h"
int cc = 1, tc = 1, nc = 1, sc = 0;
%}
%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, $4, $5, $1, tc); tc++; } line
    | TERM '=' TERM RELOP TERM ';' { printf("t%d := %s %s %s\n%s :=
t%d\n", tc, $3, $4, $5, $1, tc); tc++; } line
    | TERM '=' TERM ';' { printf("%s := %s\n", $1, $3); } line
    | WHILE TERM RELOP TERM DO '{' { printf("LABEL%d: if not %s %s %s then
goto FALSE%d\nTRUE%d: ", cc, $2, $3, $4, cc, cc); } line '}' {
printf("FALSE%d: ", cc); cc++; } line
    | WHILE TERM OP TERM DO '{' { printf("LABEL%d: if not %s %s %s then
goto FALSE%d\nTRUE%d: ", cc, $2, $3, $4, cc, cc); } line '}' {
printf("FALSE%d: ", cc); cc++; } line
    | WHILE TERM DO '{' { printf("LABEL%d: if not %s then goto
FALSE%d\nTRUE%d: ", cc, $2, cc, cc); } line '}' { printf("FALSE%d: ", cc);
cc++; } line
    | SWITCH '(' TERM RELOP TERM ')' '{' { printf("t%d := %s %s %s\n", tc,
$3, $4, $5); sc = tc; tc++; } cases '}' { printf("NEXT%d: ", cc); cc++; }
line
    | SWITCH '(' TERM OP TERM ')' '{' { printf("t%d := %s %s %s\n", tc,
$3, $4, $5); sc = tc; tc++; } cases '}' { printf("NEXT%d: ", cc); cc++; }
line
    | SWITCH '(' TERM ')' '{' { printf("t%d := %s\n", tc, $3); sc = tc;
tc++; } cases '}' { printf("NEXT%d: ", cc); cc++; } line
    | BREAK ';' line { printf("goto NEXT%d\n", cc); }
cases: /* empty */
     | CASE TERM ':' { printf("CASE%d: if not t%d == %s goto CASE%d\n",
nc, sc, $2, nc + 1); nc++; } line cases
     | DEFAULT { printf("CASE%d: ", nc); nc++; } ':' line { printf("goto
NEXT%d\n", cc); } cases
%%
int yyerror(char* s)
{
  fprintf(stderr, "%s\n", s);
  return 0;
}
int yywrap()
{
  return 1;}
int main()
{
  yyparse();
  printf("\n");
  return 0;
}
```

input.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;
}
```

Output Snapshots:



```
msml@MSMLs-MacBook-Pro ex7 % lex tac.l
msml@MSMLs-MacBook-Pro ex7 % yacc -d tac.y
msml@MSMLs-MacBook-Pro ex7 % gcc y.tab.c lex.yy.c
msml@MSMLs-MacBook-Pro ex7 % ./a.out < input.txt
LABEL1: if not i < 10 then goto FALSE1
TRUE1: a := 0
t1 := i + 1
i := t1
FALSE1: t2 := i + j
CASE1: if not t2 == 1 goto CASE2
t3 := y + z
x := t3
goto NEXT2
CASE2: if not t2 == 2 goto CASE3
t4 := v + w
u := t4
goto NEXT2
CASE3: t5 := q + r
p := t5
goto NEXT2
NEXT2:
msml@MSMLs-MacBook-Pro ex7 %
```