SSN COLLEGE OF ENGINEERING

DEPARTMENT OF COMPUTER SCIENCE

UCS1602 – COMPILER DESIGN

DATE: 27-04-2021

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CLASS AND SEC : CSE-B

ASSIGNMENT -7: THREE ADDRESS CODE GENERATOR

CODE:

Codegen.l:

```
%{
    #include<stdio.h>
    #include<stdlib.h>
    #include<string.h>
    #include "codegen.tab.h"

    int debug=0;
%}
term ([a-zA-Z_][a-zA-Z0-9_]*|-?[0-9]+)
relop ("<"|"<="|">"|">="|"=="|"!=")
op ("+"|"-"|"*"|"/"|"%")
```

```
bool_op ("!"|"&&"|"||")

%%

";" {return EOS;}

"if" {return IF;}

"else" {return ELSE;}

"while" { return WHILE; }

"do" { return DO; }

"switch" { return SWITCH; }

"case" { return CASE; }

"default" { return DEFAULT; }

"break" { return BREAK; }

{bool_op} {yylval.str = strdup(yytext);return BOOL_OP;}

"=" {yylval.str = strdup(yytext); return ASSIGN_OP;}

{term} { yylval.str = strdup(yytext); return TERM; }

{relop} { yylval.str = strdup(yytext); return REL_OP; }

{op} { yylval.str = strdup(yytext); return ARITH_OP; }

[ \t\n]+ { }

. { return *yytext; }

%%
```

Codegen.y:

```
%{

    #include <stdlib.h>

    #include <stdio.h>

    int yylex(void);

    extern FILE* yyin;

    #include "codegen.tab.h"

    int error = 0;

    /*extern int debug;*/

    int cc = 1, tc = 1, nc = 1, sc = 0;

%}

%token TERM ASSIGN_OP ARITH_OP REL_OP ID BOOL_OP EOS IF ELSE WHILE SWITCH
CASE DEFAULT BREAK DO

%union

{

    int intval;

    float floatval;

    char *str;

}

%type<str> TERM REL_OP ARITH_OP ASSIGN_OP

%%

line: /* empty */

    | TERM ASSIGN_OP TERM ARITH_OP TERM EOS { printf("t%d := %s %s %s\n%s
:= t%d\n", tc, $3, $4, $5, $1, tc); tc++; } line
```

```
    | TERM ASSIGN_OP TERM REL_OP TERM EOS { printf("t%d := %s %s %s\n%s := t%d\n", tc, $3, $4, $5, $1, tc); tc++; } line

    | TERM ASSIGN_OP TERM EOS { printf("%s := %s\n", $1, $3); } line

    | TERM ASSIGN_OP '-' TERM EOS {printf("t%d := -%s\n", tc, $4); } line

    | while_block

    | switch_block



while_block: WHILE TERM REL_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 ARITH_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_block: SWITCH '(' TERM REL_OP TERM ')' '{' { printf("t%d := %s %s %s\n", tc, $3, $4, $5); sc = tc; tc++; } cases_block '}' { printf("NEXT%d: ", cc); cc++; } line

    | SWITCH '(' TERM ARITH_OP TERM ')' '{' { printf("t%d := %s %s %s\n", tc, $3, $4, $5); sc = tc; tc++; } cases_block '}' { printf("NEXT%d: ", cc); cc++; } line

    | SWITCH '(' TERM ')' '{' { printf("t%d := %s\n", tc, $3); sc = tc; tc++; } cases_block '}' { printf("NEXT%d: ", cc); cc++; } line

    | BREAK EOS line { printf("goto NEXT%d\n", cc); }

cases_block: /* empty */

     | CASE TERM ':' { printf("CASE%d: if not t%d == %s goto CASE%d\n", nc, sc, $2, nc + 1); nc++; } line cases_block
```

```
     | DEFAULT { printf("CASE%d: ", nc); nc++; } ':' line { printf("goto
NEXT%d\n", cc); } cases_block

%%

int yyerror(char* s)

{

  fprintf(stderr, "%s\n", s);

  return 0;

}

int yywrap(){

    return 1;

}



int main(int argc, char **argv){

    /*yydebug = 1;*/

    if(argc != 2){

        fprintf(stderr, "Enter file name as argument!\n");

        return 1;

    }

    yyin = fopen(argv[1], "rt");

    if (!yyin){

        fprintf(stderr, "File not found!\n");

        return 2;

    }

    yyparse();
```

```
    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;
}
a = 5;
a = a + 6;
```

OUTPUT:

```
PS E:\SEM6\CD\CD lab\assignment 7> ./a 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: a := 5
t6 := a + 6
a := t6
PS E:\SEM6\CD\CD lab\assignment 7>
```