Lab Program - 16

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Write a C Program to Generate the Three address code representation for the given input statement.

**Code:**

#include <stdio.h>

#include <stdlib.h>

#include <string.h>

#include <ctype.h>

#define MAX 100

int tempVarCount = 1; // Temporary variable counter

// Function to generate TAC for an expression

void generateTAC(char expression[MAX]) {

char tokens[MAX][MAX]; // Token storage

int tokenCount = 0;

char \*token = strtok(expression, " "); // Tokenize input

// Tokenizing the input expression

while (token != NULL) {

strcpy(tokens[tokenCount++], token);

token = strtok(NULL, " ");

}

printf("\nGenerated Three-Address Code:\n");

char tempVars[MAX][MAX]; // Store temporary variables

int tempIndex = 0;

for (int i = 0; i < tokenCount; i++) {

if (strcmp(tokens[i], "\*") == 0 || strcmp(tokens[i], "/") == 0) {

// Multiplication and division have higher precedence

printf("t%d = %s %s %s\n", tempVarCount, tokens[i - 1], tokens[i], tokens[i + 1]);

sprintf(tempVars[tempIndex], "t%d", tempVarCount++);

strcpy(tokens[i - 1], tempVars[tempIndex]); // Replace left operand with temp var

for (int j = i; j < tokenCount - 2; j++) {

strcpy(tokens[j], tokens[j + 2]); // Shift remaining tokens left

}

tokenCount -= 2;

i--; // Re-evaluate at same position

}

}

for (int i = 0; i < tokenCount; i++) {

if (strcmp(tokens[i], "+") == 0 || strcmp(tokens[i], "-") == 0) {

// Addition and subtraction

printf("t%d = %s %s %s\n", tempVarCount, tokens[i - 1], tokens[i], tokens[i + 1]);

sprintf(tempVars[tempIndex], "t%d", tempVarCount++);

strcpy(tokens[i - 1], tempVars[tempIndex]); // Replace left operand with temp var

for (int j = i; j < tokenCount - 2; j++) {

strcpy(tokens[j], tokens[j + 2]); // Shift remaining tokens left

}

tokenCount -= 2;

i--; // Re-evaluate at same position

}

}

// Final assignment

printf("%s = t%d\n", tokens[0], tempVarCount - 1);

}

int main() {

char expression[MAX];

printf("Enter an arithmetic expression (use spaces between operators & operands):\n");

fgets(expression, MAX, stdin);

expression[strcspn(expression, "\n")] = 0; // Remove trailing newline

generateTAC(expression);

return 0;

}

**Screenshot for I/O:**

