Experiment No:10

AIM: To convert given Source code into Three Address Code.
Write three address code for following expression

a=b+c*d

Theory:
Three address code is a type of intermediate code which is easy to generate and can be easily converted to machine code.It makes use of at most three addresses and one operator to represent an expression and the value computed at each instruction is stored in temporary variable generated by compiler. The compiler decides the order of operation given by three address code.

General representation –

a = b op c

Where a, b or c represents operands like names, constants or compiler generated temporaries and op represents the operator

Implementation of Three Address Code –
There are 3 representations of three address code namely

1. Quadruple
2. Triples
3. Indirect Triples

1. Quadruple –
It is structure with consist of 4 fields namely op, arg1, arg2 and result. op denotes the operator and arg1 and arg2 denotes the two operands and result is used to store the result of the expression.

Advantage –

- Easy to rearrange code for global optimization.
- One can quickly access value of temporary variables using symbol table.

Disadvantage –

- Contain lot of temporaries.
- Temporary variable creation increases time and space complexity.

ALGORITHM:

Step1: Begin the program
Step2 : The expression is read from the file using a file pointer

Step3 : Each string is read and the total no. of strings in the file is calculated.
Step4: Each string is compared with an operator; if any operator is seen then the previous string and next string are concatenated and stored in a first temporary value and the three address code expression is printed
Step5 : Suppose if another operand is seen then the first temporary value is concatenated to the next string using the operator and the expression is printed.
Step6 : The final temporary value is replaced to the left operand value.
Step7 : End the program.

COMPUTING ENVRONMENT
Platform: ubuntu
Programming Language: C /C++
Expected Output:
Enter the expression: a=b+c*d

A:= c*d B:= b+A C:= A + B

Coclusion: Thus the given expression is converted into Three Address code.

VIva Voce Questions:

1. Why it is called 3 address code?

Answer:The reason for the name "three address code" is that **each statement generally includes three addresses, two for the operands, and one for the result**. In the three-address code, atmost three addresses are define any statement. Two addresses for operand & one for the result. Hence, op is an operator.

2. What are the different forms of three address code?

Answer:The three address code can be represented in three forms: quadruples , triples and indirect.

3. What is three address code in compiler construction?

Answer: In computer science, three-address code (often abbreviated to TAC or 3AC) is an intermediate code used by optimizing compilers to aid in the implementation of code-improving transformations. Each TAC instruction has at most three operands and is typically a combination of assignment and a binary operator.