Assignment VI

Aayush Nirwan 1601001 Nilesh Agarwal 1601037 Praveen Kumar 1601041

I. Introduction

The requirement of this assignment was to analyse the whole source code and determine the number of temporaries required prior preparing the three address code. For this we have identified the instructions for which we need a temporary. For each line where we need a temporary, we have written the three address code for the same and wrote them in a temporary file. Along with this proper algorithms for individual controls to generate a three address code has been written.

II. Implementation

A. Important Points

- Formation of labels is done through branch prediction so multi pass is required.
- In first pass, we collect whether any scope has if or pair if,else.
- In second pass we did the labelling according to the information received from above point.
- How labelling is done - Use of stack + postfix expression + bodmass.

B. Structure Used

- Stack (char) - To keep track of scope.
- Quadruple structure (struct) - (Temp, op, opnd1, opnd2)

III. Code Analysis

A. Robustness

The code is robust in nature, changing the input following the format will not produce unexpected results. It will be able to handle them.

B. Correctness

Almost all corner cases have been covered properly, hence it's expected that the code will generate correct output everytime.

C. Time Complexity

$T_{words} = t_1$
$T_{lines} = t_2$
$T_{char} = t_3$
Asymptotic Bound Of the entire code

$$t_2 \leq t_1 \leq t_3$$

D. Space Complexity

Structures used to carry out various tasks.

- Stack<string> s
- Array of Strings
- Structures

Overall Space complexity $\leq$ $O(no\_of\_words)$

E. Optimisation

- We used bodmass, so that expression is evaluated correctly.
- Tempories are stored in structure, so we have O(1) access to the tempories.