

arr[i] = 4

three address code representation for the given code portion:

$$t_1 = 4$$

$$\text{arr}[i] = t_1$$

- $x = \&y$ ;  $y$  এর address হলে তাকে  $x$  এর actual value.
- $x = *y$ ; pointer.
- $**x = y$ ; means the variable which is being pointed by  $x$ , that will be equal to  $y$ .

Three Address Code Representation:

- Quadruples
- Triples
- Indirect Triples

# '-' denotes unary minus

Quadruples:

- Quad means চার, four.
- Operator → অপারেটর operator এর জন্য creating a column.

Write the three address code for the following input string using quadruples representation.

$$a = b * -c + b * -c$$

$$\Rightarrow t_1 = -c \text{ or } t_1 = \text{unary minus } c \text{ or } t_1 = \text{minus } c.$$

Three Address Code.

$$\left\{ \begin{array}{l} t_1 = \text{minus } c. \\ t_2 = b * t_1 \\ t_3 = \text{minus } c \\ t_4 = b * t_3 \\ t_5 = t_2 + t_4 \\ a = t_5 \end{array} \right.$$

OP denotes operator

→ 0, 1, 2, 3, 4, 5

Quadruples representation number

	OP	arg 1	arg 2	result
0	minus	c		t1
1	*	b	t1	t2
2	minus	c		t3
3	*	b	t3	t4
4	+	t2	t4	t5
5	=	t5		a

assign করার সময় আরও just.

Triples.

- Triples = ৩ টি, three.
- Must use instruction number as there's no result column.
- mane basically instruction set এর denote করতে হবে.
- Assign operation's triple representation এর different.

	Op	arg 1	arg 2
0	minus	c	
1	*	b	(0)
2	minus	c	
3	*	b	(2)
4	+	(1)	(3)
5	=	a	(4)

instruction set no denote করে  
কিন্তু instruction number দিয়ে বলে.

কিন্তু value টি assign হবে তা arg 1  
এর value assign হবে তা বা তার  
instruction set no arg 2 এ.

Indirect Triples

- basically triples থেকে just তার instruction set memory এর  
তার memory address এ point করে আছে তার reference  
বলে.

	Op	arg 1	arg 2
0	minus	c	
1	*	b	(0)
2	minus	c	
3	*	b	(2)
4	+	(1)	(3)
5	=	a	(4)

pointer info

memory এর এই location এ আছে (0)

নতুন instruction set এর object  
reference store করা.

35	(0)
36	(1)
37	(2)
38	(3)
39	(4)
40	(5)

Question Type:

- input string এর syntax tree বোঝে representation draw করা.

## Static Single Assignment

### • Definition:

With the help of Static Single Assignment, we can understand whether a variable's value has already changed or not.

এক variable একা একা we করে

$t = \text{Uminus } c$   
 $t = b + t$   
 $t = \text{Uminus } c$   
 $t = b + t$   
 $t = t + t$   
 $a = t$

কিন্তু কতবার না। Whereas,

$t1 = \text{Uminus } c$   
 $t2 = b * t1$   
 $t3 = \text{Uminus } c$   
 $t4 = b * t3$   
 $t5 = t2 + t4$   
 $a = t5$

statistically  
singularity  
একটা সত্য

## Syntax Directed Definition for 3 Address Code

$S \rightarrow id = E ; \quad S.code = E.code \parallel \text{gen}(\text{top.get}(id.lexeme), '=', E.addr)$

$E \rightarrow E_1 + E_2 ; \quad E.addr = \text{new Temp}()$

$E.code = E_1.code \parallel E_2.code \parallel \text{gen}(E.addr, '=', E_1.addr, '+', E_2.addr)$

$\rightarrow - E_1 ; \quad E.addr = \text{new Temp}()$

$E.code = E_1.code \parallel \text{gen}(E.addr, '=', 'minus', E_1.addr)$

$\rightarrow (E_1) ; \quad E.addr = E_1.addr$

$E.code = E_1.code$

$\rightarrow id ; \quad E.code = ''$

•  $\parallel$  দিয়ে concat করা হয়.

$E_1.addr \parallel E_2.addr$

$\downarrow$                        $\downarrow$   
 $t_1$                        $t_2$   
 $t_1, t_2$

• gen function কিছু কাজে generate করে.

↳ Three address code generate করে.

• top stack থেকে id.lexeme get করতে.

$E.code = t1 = t2 + t3$

$x = t4$

• new Temp()  $\rightarrow E.addr = E_1$

↳ temp class object এর মাধ্যমে কাজে-কাজে করে temp val change হয়.