Compiler Design

Sai Ram.k

20181CSE0621

7-CSE-10

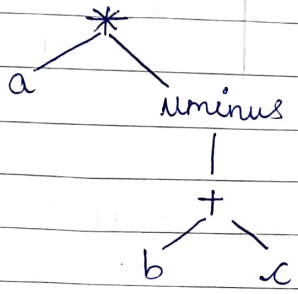
Assignment-1

Sai Ram. K
2018ICSE0621
7-CSE-10

ASSIGNMENT-2

Q.1] Expression: a * − (b + c)

a] Syntax tree:



b] Postfix Notation:

* a − + b c

c] Three address code:

$t_1 = b + c$
$t_2 = uminus\ t_1$
$t_3 = a * t_2$

Q.2] Expression: − (a+b) * (c+d) + (a+b+c)

↳ Three address code:

$t_1 = a + b$
$t_2 = c + d$
$t_3 = t_1 + c$
$t_4 = uminus\ t_1$
$t_5 = t_4 * t_2$
$t_6 = t_5 + t_3$

2018ICSE0621
Sai Ram

a] Quadruples:

	Operator	arg1	arg2	result
(0)	+	a	b	t_1
(1)	+	c	d	t_2
(2)	+	t_1	c	t_3
(3)	Uminus	t_1	-	t_4
(4)	*	t_4	t_2	t_5
(5)	+	t_5	t_3	t_6

b] Triples:

	Operator	arg1	arg2
(0)	+	a	b
(1)	+	c	d
(2)	+	(0)	c
(3)	Uminus	(0)	-
(4)	*	(3)	(1)
(5)	+	(4)	(5)

c] Indirect triples:

	Operator	arg1	arg2	stored
(0)	+	a	b	(00)
(1)	+	c	d	(01)
(2)	+	(00)	c	(02)
(3)	Uminus	(00)	-	(03)
(4)	*	(03)	(01)	(04)
(5)	+	(04)	(01)	(05)

2018ICSE0621
Sai Ram

classmate
Date
Page

Q.3] Given, i = 1

```
if (a > b[i])
    i = 5;
while (i < N-1)
{
    a = b[i] + c[i] * *p + d;
    j++;
    i++;
}
```

1) i = 1
2) if a > b[i] goto 4
3) goto 5
4) if i < N-1 goto 6
5) goto 12
6) $t_2 = *p + d$
7) $t_2 = c[i] * t_1$
8) $a = b[i] + t_2$
9) $j = j + 1$
10) $i = i + 1$
11) goto 4
12) exit

Q.4] Given,

```
i = 0;
if (a > b[i])
    i = 5;
if (a < b[i])
    i = 2;
else
    i = 3;
while (i < N-1) {
    a = *p + d - b[i];
    i++;
    if (a == 10) break;
} i = 0;
```

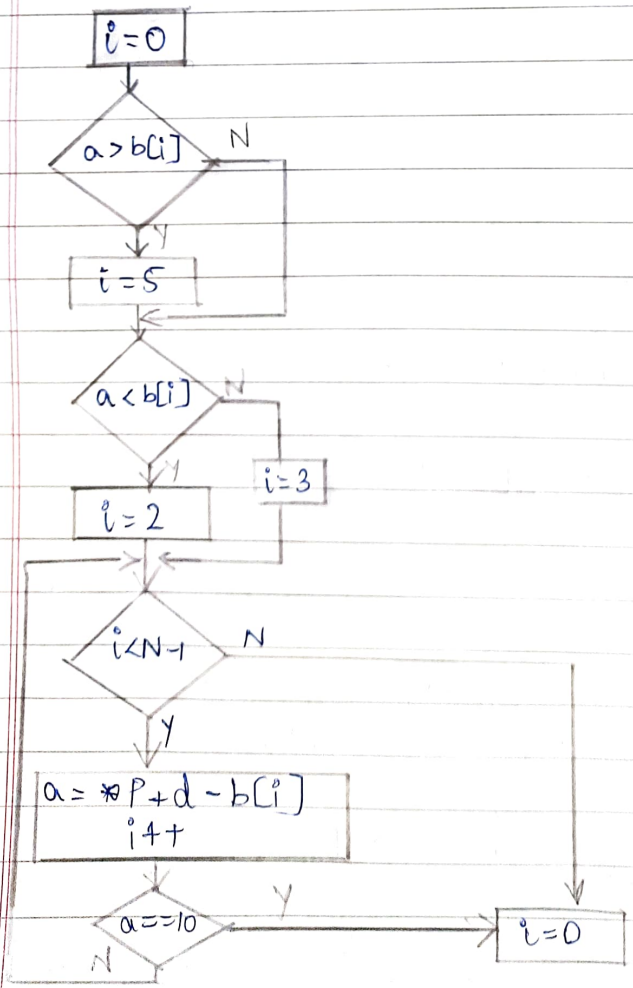
20181CSE0621
Sai Ram

```
1  i=0
2  if(a>b[i])
3  i=5;
4  if(a<b[i])
5  i=2
6  else
7  i=3
8  while(i<N-1)
9  {a=*p+d-b[i];
10 i++;
11 if(a==10)
12 break;
13 }
14 i=0;
```

BUILDING BLOCKS

Block 1 : 1, 2
Block 2 : 3, 4
Block 3 : 5
Block 4 : 7
Block 8 : 8
Block 6 : 9, 10, 11
Block 7 : 14

FLOW GRAPH:



2018ICSE0621
Sai Ram. K

Q.5] Expression, a>b or a<c and (a>b or a>c) and not a

--> Three Address Codes:

1. if a>b goto 4
2. $t_1 = 0$
3. goto 5
4. $t_1 = 1$
5. if c<d goto 8
6. $t_2 = 0$
7. goto 9
8. $t_2 = 1$
9. if a>c goto 12
10. $t_3 = 0$
11. goto 13
12. $t_3 = 1$
13. t_4 = not a
14. $t_5 = t_1$ or t_3
15. $t_6 = t_5$ and t_4
16. $t_7 = t_2$ and t_6
17. $t_8 = t_1$ or t_7