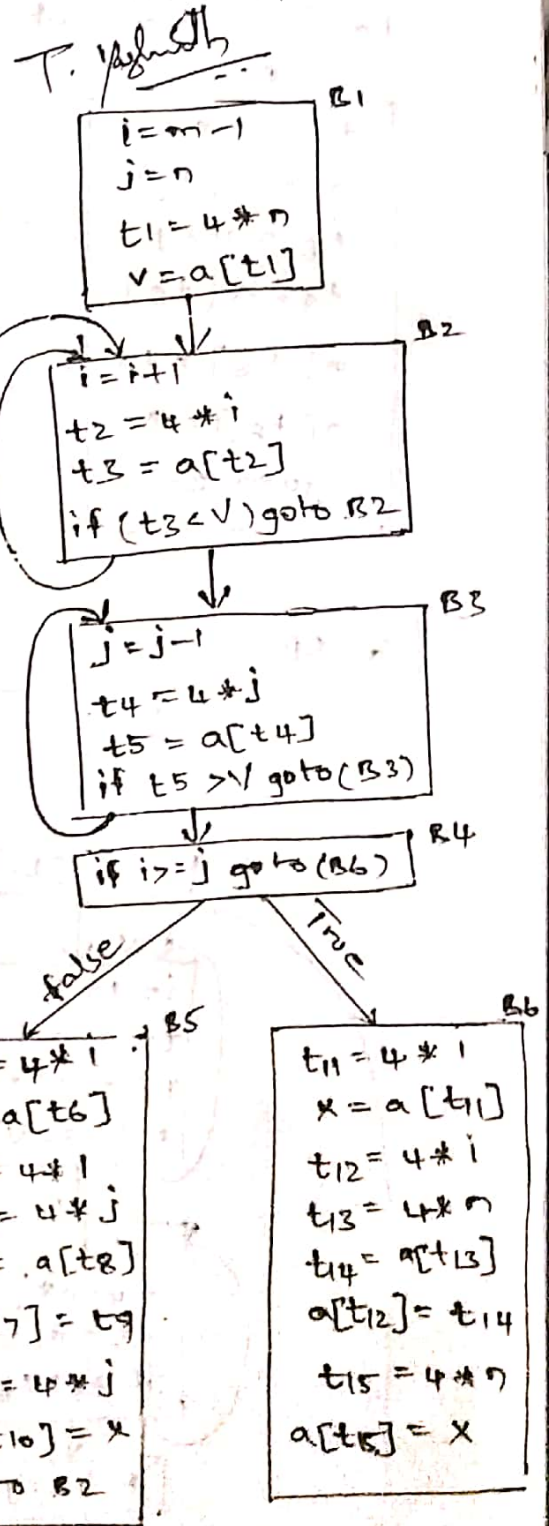
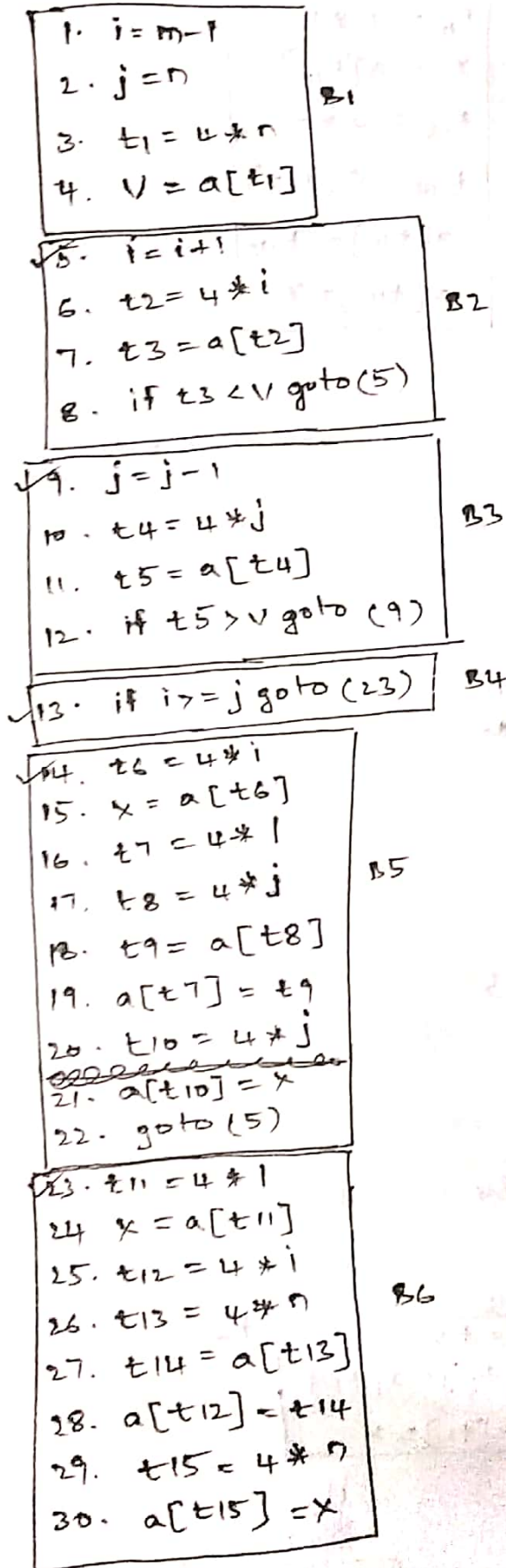


TUTORIAL - 6

T. YASHWANTH
CSE-D
AN.EN.U4CSE17340

Code1



Local Common Subexpression

T. Vasanth

B5

```

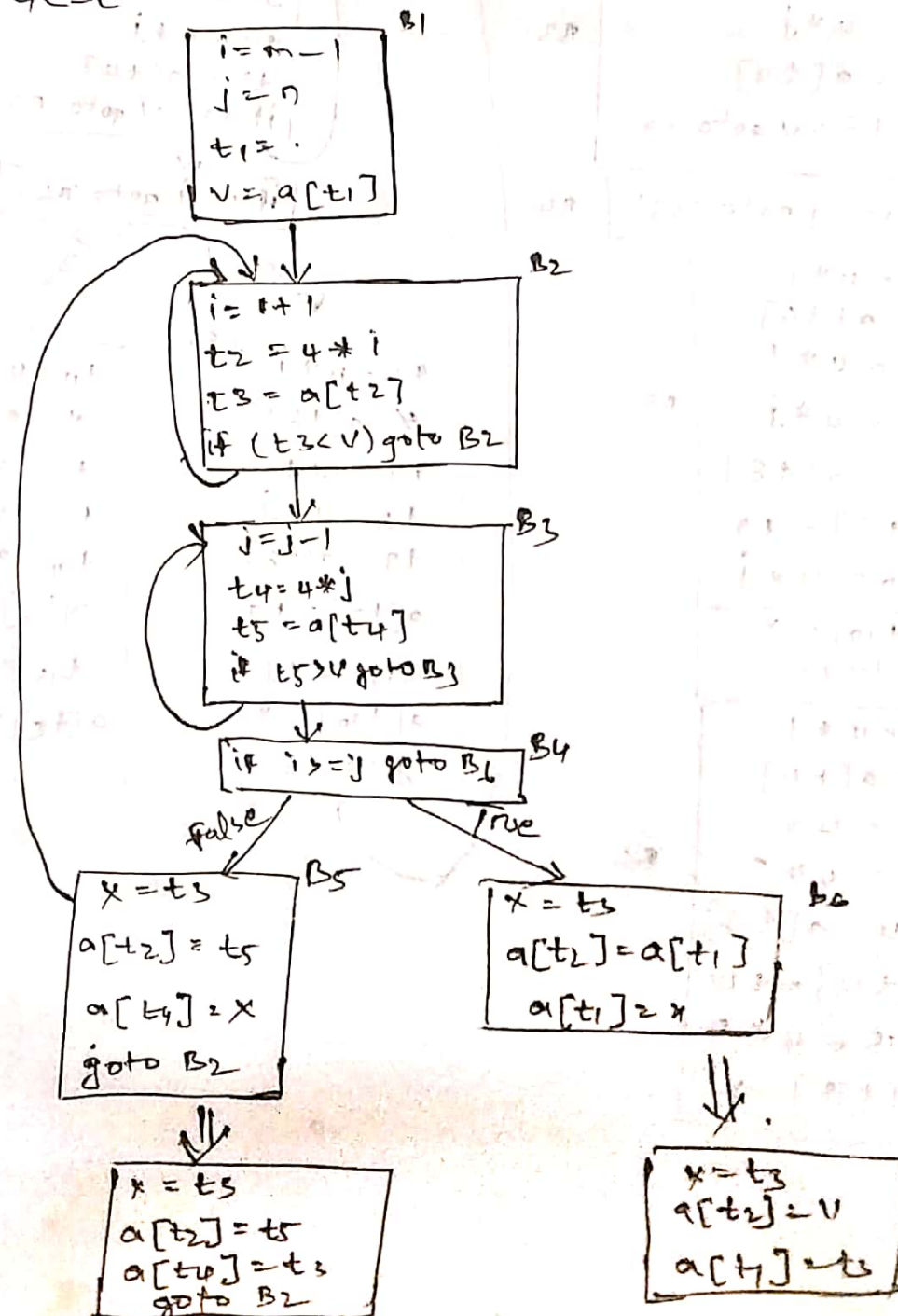
t6 = 4 * i
x = a[t6]
t8 = 4 * j
t9 = a[t8]
a[t6] = t9
a[t8] = x
goto B2
    
```

new

```

t11 = 4 * i
x = a[t11]
t13 = 4 * j
t14 = a[t13]
a[t11] = t14
a[t15] = x
    
```

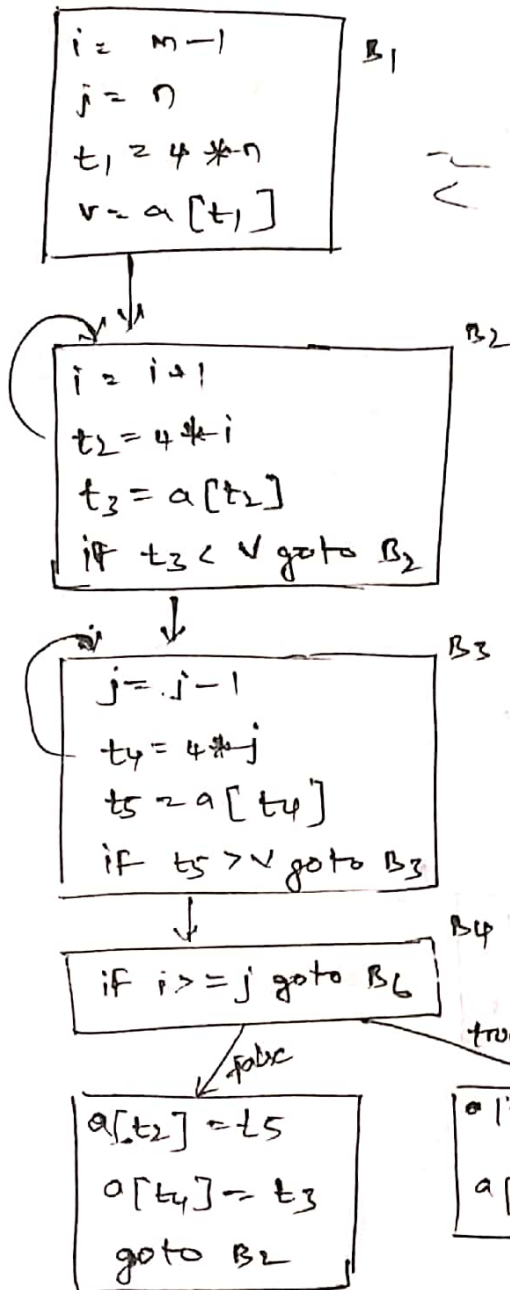
GCSE



Dead code

$B_5 \Rightarrow$ $\begin{cases} a[t_2] = t_5 \\ a[t_4] = t_3 \\ \text{goto } B_2 \end{cases}$

$B_6 \Rightarrow$ $\begin{cases} a[t_2] = V \\ a[t_1] = t_3 \end{cases}$



Code motion

loop in variant

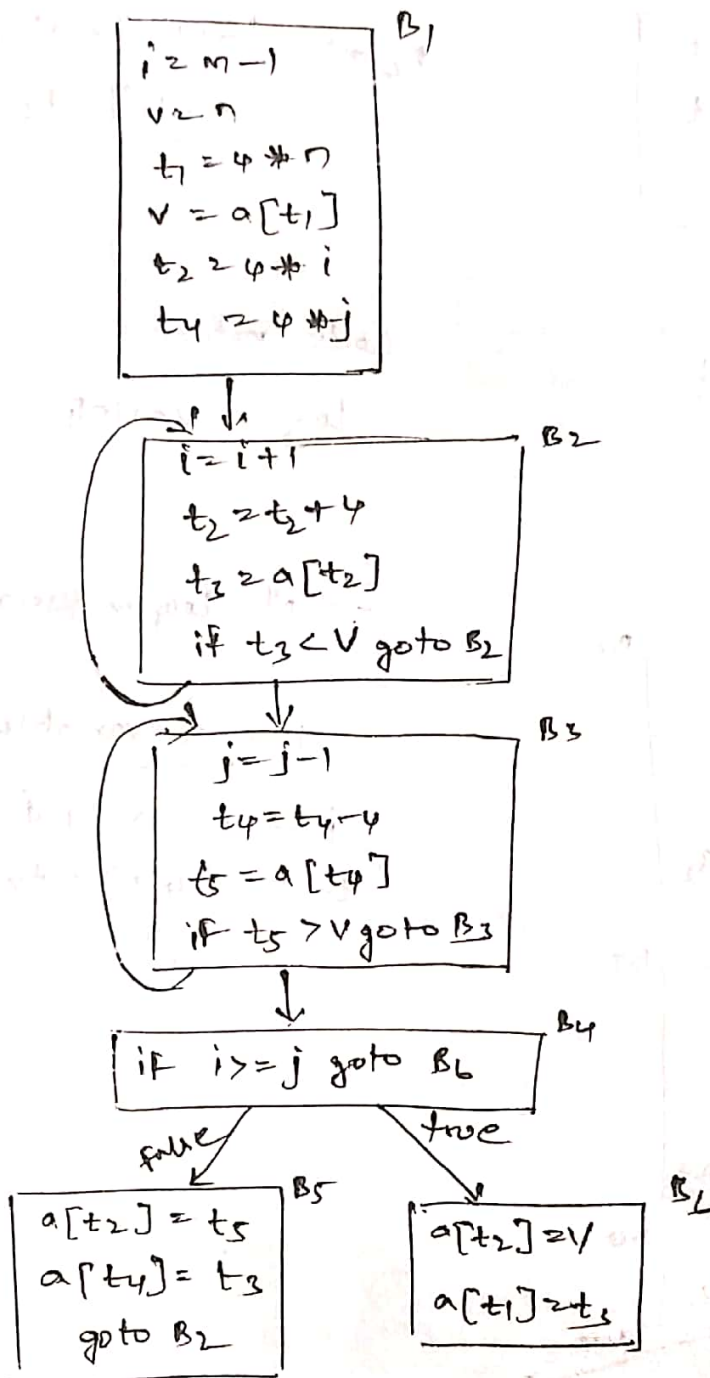
→ No loop in variants.

Induced variables

$i \rightarrow (i, 1, 1) \quad j \rightarrow (j, 1, 1)$
 $t_2 \rightarrow (i, 4, 0) \quad t_4 \rightarrow (j, 4, 0)$

Final code

T. Yashwanth

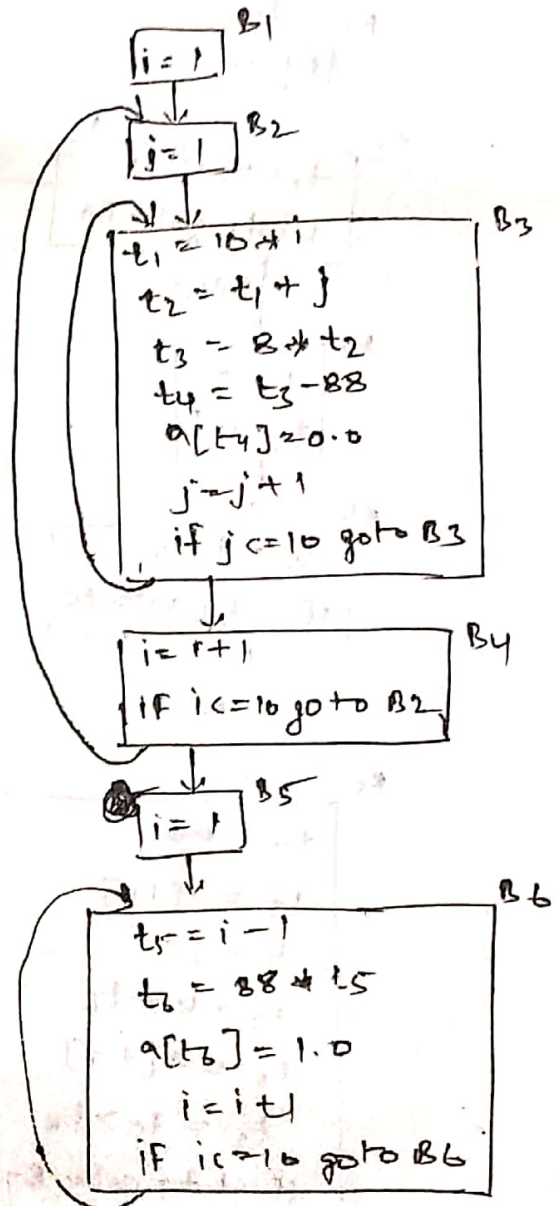


code 2

```

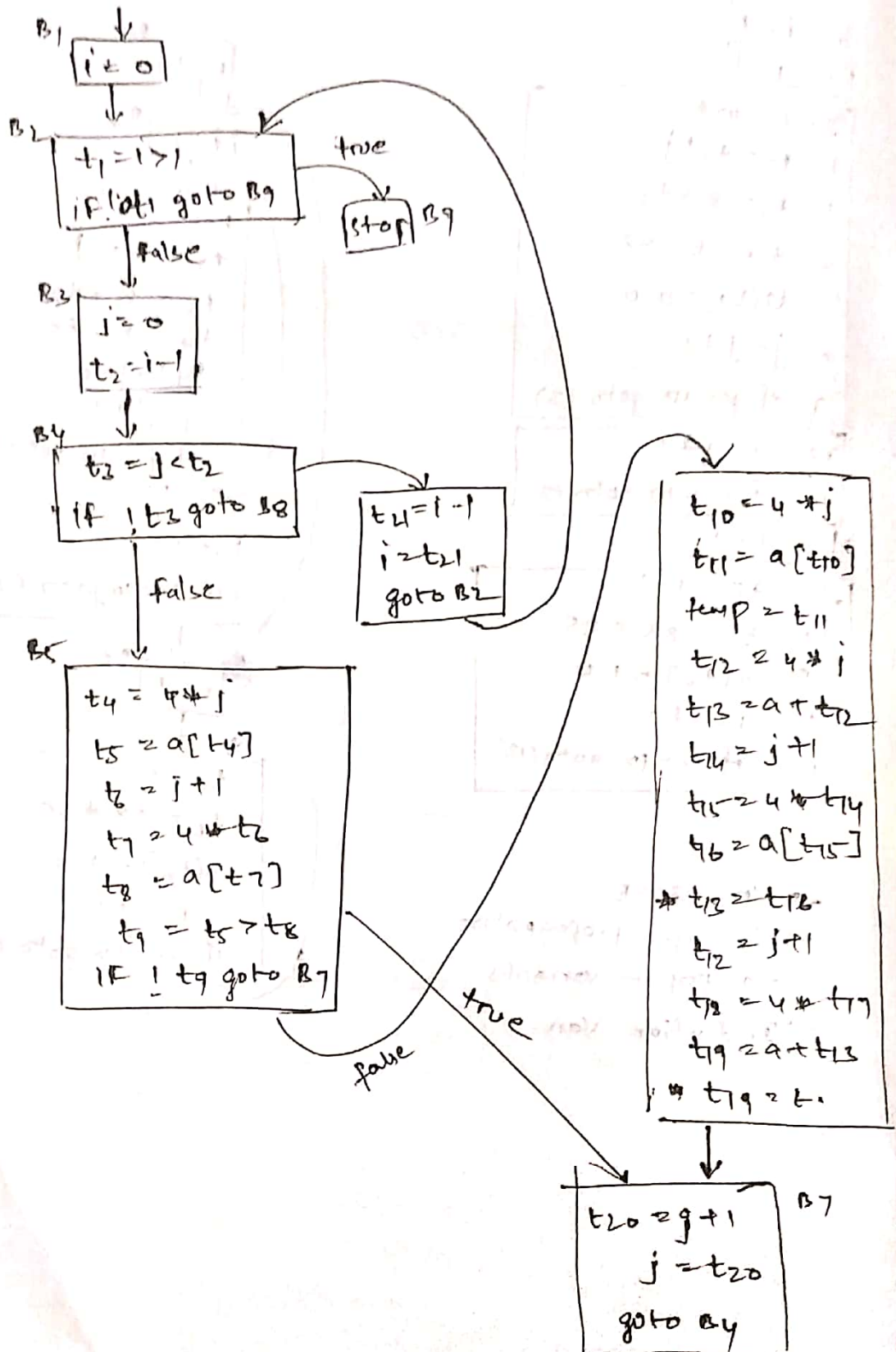
1. i = 1
2. j = 1
3. t1 = 10 * i
4. t2 = t1 + j
5. t3 = 8 * t2
6. t4 = t3 - 88
7. a[t4] = 0.0
8. j = j + 1
9. if j <= 10 goto (3)
10. i = i + 1
11. if i <= 10 goto (2)
12. l = 1
13. t5 = i - 1
14. t6 = 88 * t5
15. a[t6] = 1.0
16. i = i + 1
17. if i <= 10 goto (13)
    
```

- No GCSE
- No copy propagation
- No loop in variants
- Induction vars.



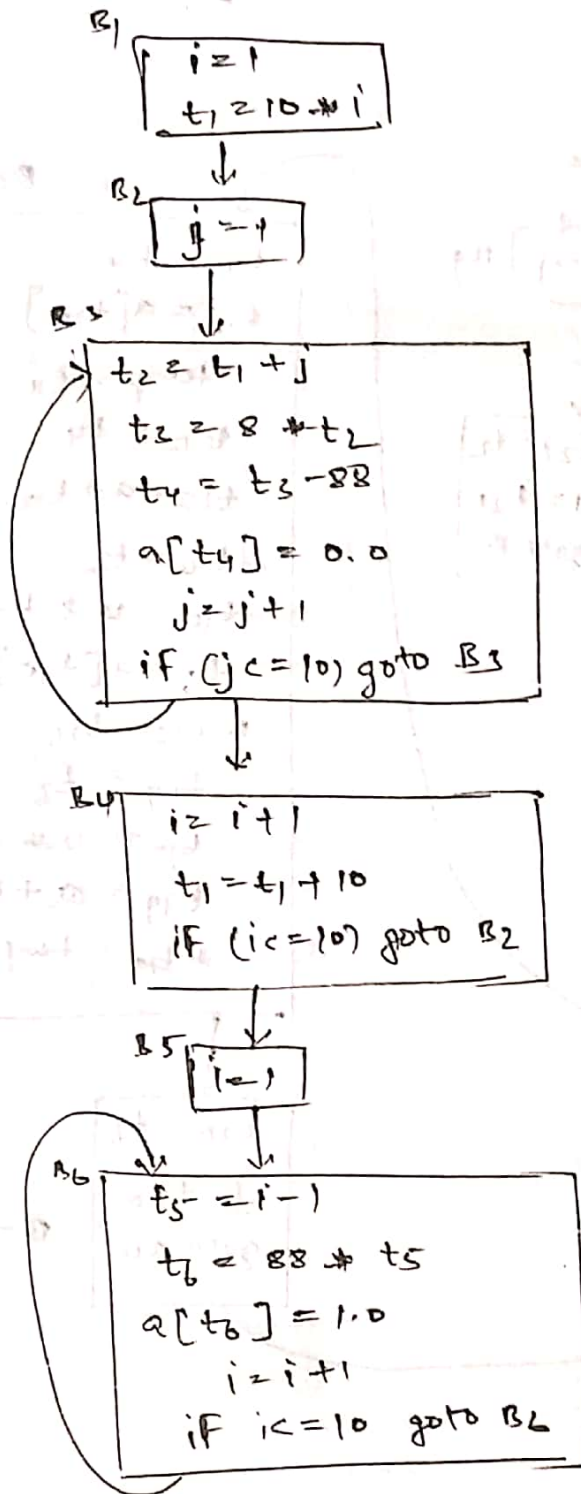
Code 3

T. Vashanth



Eliminating Induced vars

T. Yashwanth



Induced Vars

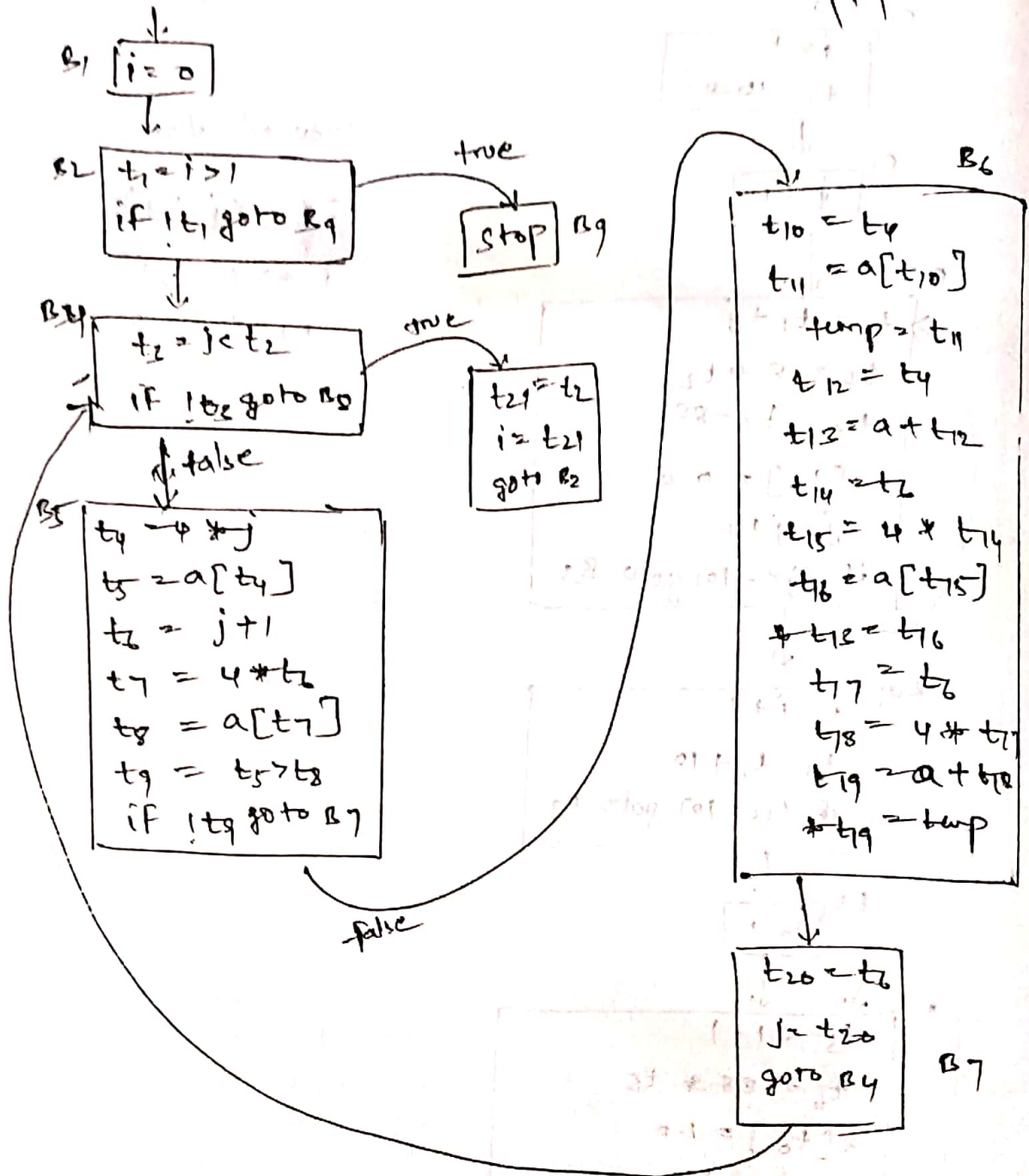
$j \rightarrow (j, 1, 1)$

$i \rightarrow (i, 1, 1)$

$t1 \rightarrow (i, 10, 0)$

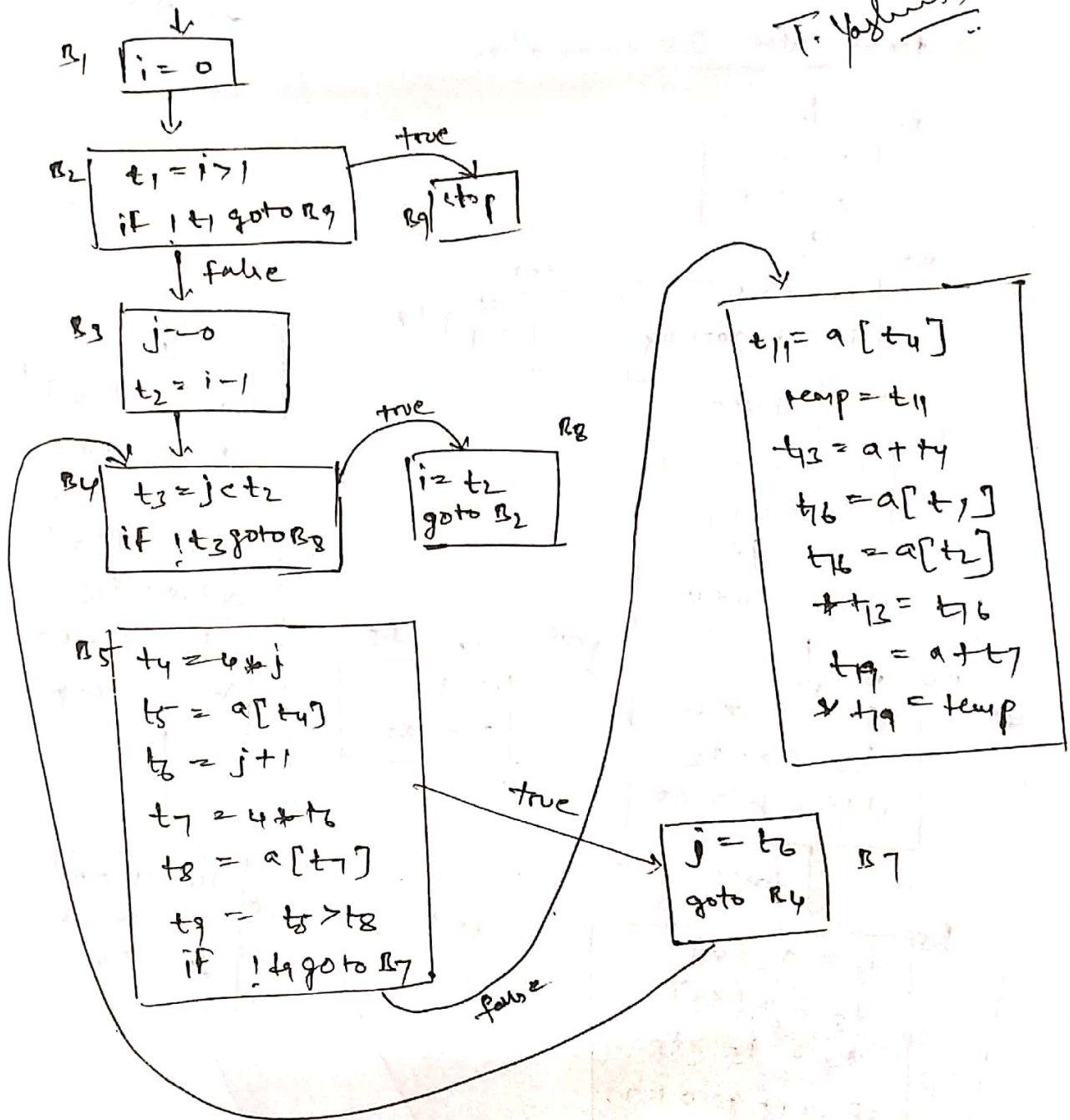
GCSE

T. Yousif



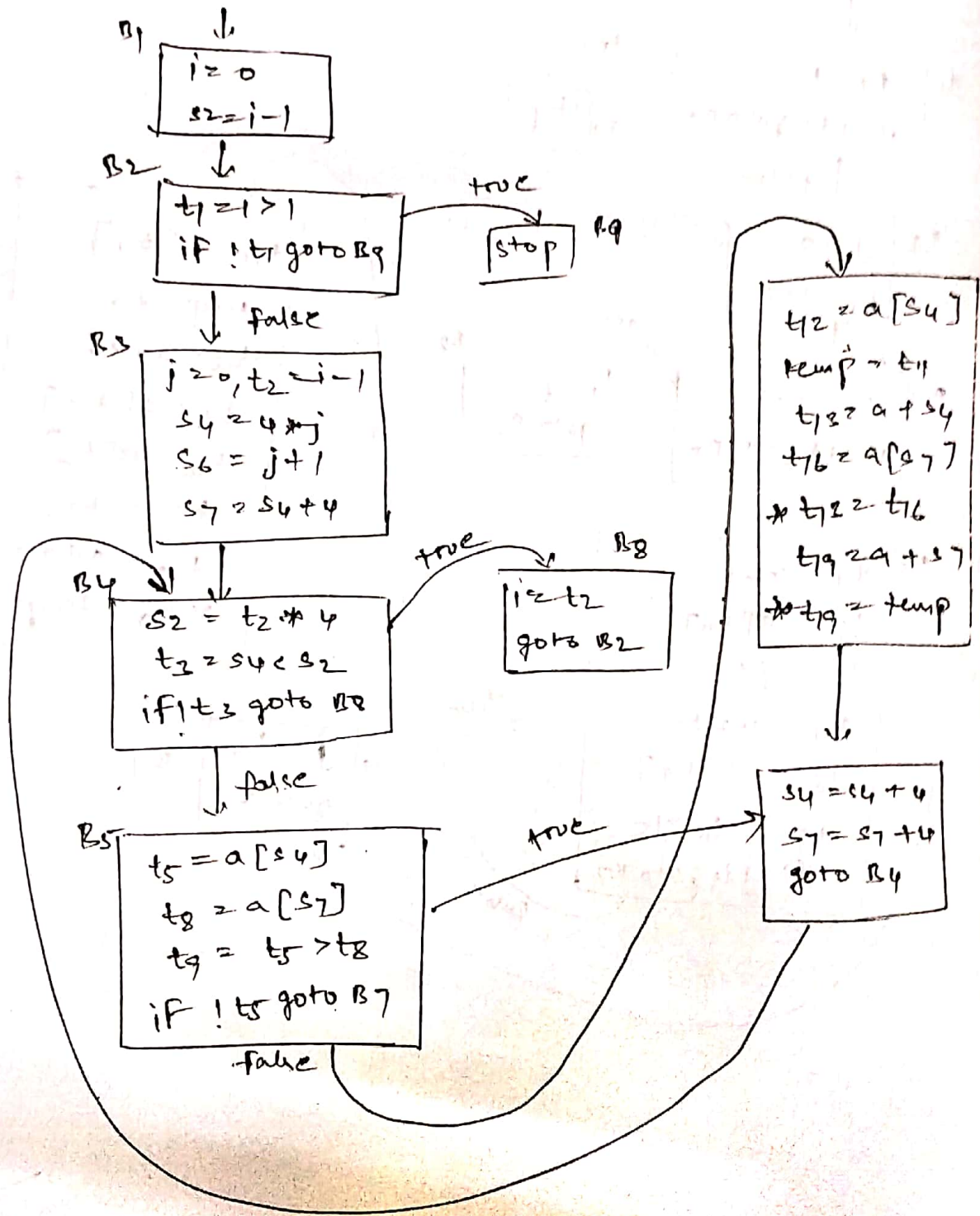
GCSE and Copy Propagation

T. Yashwanth



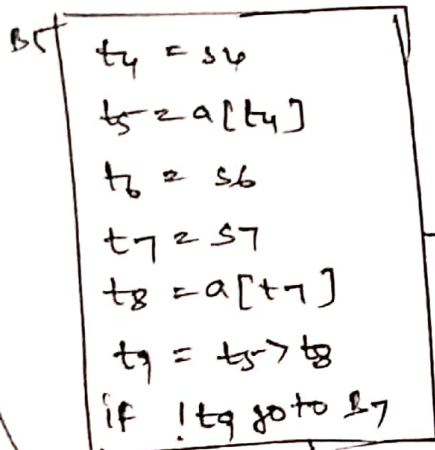
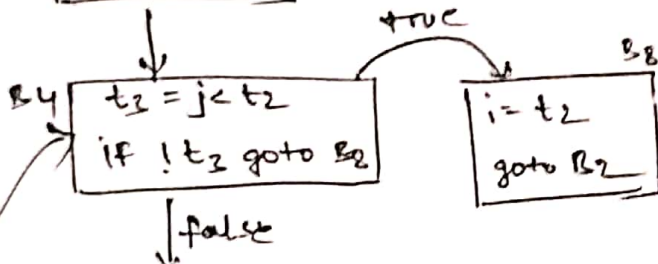
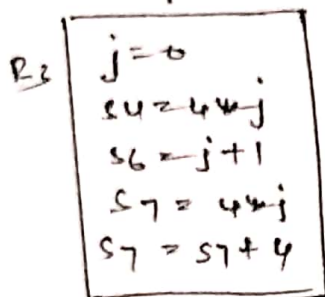
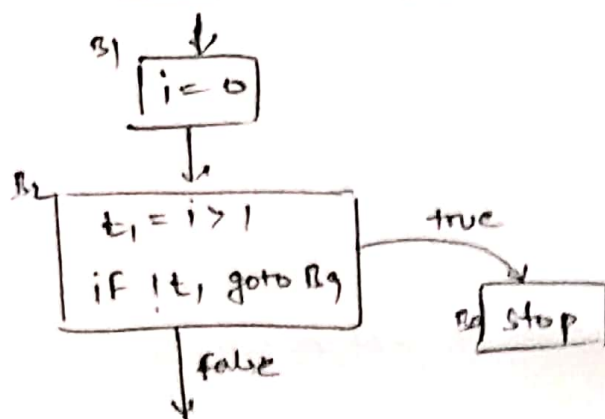
T. Yashwanth

final after 2V elimination



IV deletion + cat

T. yadav 15



triples for IV

$j = (j, 1, 0)$

$t4 = (j, 4, 0)$

$t2 = (j, 1, 1)$

$t7 = (j, 0, 0)$

