

## Tutorial 6

Optimize the following codes using all the known machine independent optimization techniques.

### Code 1

```
1)  i = m - 1
2)  j = n
3)  t1 = 4 * n
4)  v = a[t 1 ]
5)  i = i + 1
6)  t2 = 4 * i
7)  t 3 = a[t 2 ]
8)  if t 3 < v goto (5)
9)  j = j - 1
10) t4 = 4 * j
11) t5 = a[t 4 ]
12) if t 5 > v goto (9)
13) if i >= j goto (23)
14) t6 = 4 * i
15) x = a[t6 ]
16) t7 = 4 * i
17) t8 = 4 * j
18) t9 = a[t8 ]
19) a[t7 ] = t9
20) t10 = 4 * j
21) a[t10 ] = x
22) goto (5)
23) t 11 = 4 * i
24) x = a[t11 ]
25) t12 = 4 * i
26) t13 = 4 * n
27) t14 = a[t 13 ]
28) a[t12 ] = t 14
29) t15 = 4 * n
30) a[t15 ] = x
```

### Code 2

```
1) i = 1
2) j = 1
3) t1 = 10 * i
4) t2 = t1 + j    // element [i,j]
5) t3 = 8 * t2    // offset for a[i,j] (8 byte reals)
6) t4 = t3 - 88   // program array starts at [1,1] assembler at [0,0]
7) a[t4] = 0.0
8) j = j + 1
9) if j <= 10 goto (3)
10) i = i + 1
```

- 11) if  $i \leq 10$  goto (2)
- 12)  $i = 1$
- 13)  $t5 = i - 1$
- 14)  $t6 = 88 * t5$
- 15)  $a[t6] = 1.0$
- 16)  $i = i + 1$
- 17) if  $i \leq 10$  goto (13)

Optimize the given control flow graph using all the known machine independent optimization techniques.

