1.

if (T3 > 0)

halt

H = I

M = T3 – H

A = A + 1

T2=T1/C

if (T2 < W)

T1=A\*B

T3 = A + 1

I = A \* B

(a)

(b):

Compute the def, Nkill and avail set for each block:

Avail = {}

Def = {e1: A\*B}, NKilled={e1, e3, e4, e5, e6, e7}

T1=A\*B

Avail = {}

T2=T1/C

Def = {e2: T1/C}, NKilled={e1 - e7}

H = I

M = T3 – H

A = A + 1

T3 = A + 1

I = A \* B

True

False

Avail = {e2}

Def = {e3: A+1, e4: A\*B}, NKilled = {e1, e2, e3, e4, e7}

False

Avail = {e2}

Def = {e5: I, e6: T3 - H, e7: A + 1}, NKilled = {e3, e5}

halt

True

After calculating the avail set for each basic block, we cannot eliminating any duplicated expressions since the avail set of the blocks, if not empty, only contains e2.

2.

(a):

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 0 (enter) | 1 | 2 | 3 | 4 | 5 | 6 | 7 (exit) |
| Dom | 0 | 0, 1 | 0, 1, 2 | 0, 1, 2, 3 | 0, 1, 2, 4 | 0, 1, 2, 4, 5 | 0, 1, 2, 4, 6 | 0, 1, 2, 4, 7 |
| sDom |  | 0 | 0, 1 | 0, 1, 2 | 0, 1, 2 | 0, 1, 2, 4 | 0, 1, 2, 4 | 0, 1,2, 4 |
| iDom | 0 | 0 | 1 | 2 | 2.,, | 4 | 4 | 4 |

(b):

DF(B2) = {B2}, since B2 strictly dominates every one of its children nodes

DF(B3) = {B2}, since B3 dominates B2, which is a predecessor of B3, and doesn’t strictly dominates B3.

DF(B6) = {exit}, since B6 dominates B6, which is a predecessor of exit, and doesn’t stricly dominates exit