1. Consider the flow graph in Dragon book, Figure 9.10 (also given as follows).

(a) Compute Gen and Kill sets for each block in the flow graph.
(b) Perform reachability analysis.
(c) Perform common subexpression elimination.

2. Consider the following three address code in a basic block.

(1) \( t1 = j - 1 \)
(2) \( t2 = 4 * t1 \)
(3) \( \text{temp} = A[t2] \)
(4) \( t3 = j \)
(5) \( t4 = t3 + 1 \)
(6) \( t5 = 4 * t3 \)
(7) \( t6 = A[t5] \)
(8) \( t7 = j - 1 \)
(9) \( t8 = 4 * t7 \)
(10) \( A[t8] = t6 \)
(11) \( t9 = j \)
(12) \( t10 = t9 + 1 \)
(13) \( t11 = 4 * t9 \)
(14) \( A[t11] = \text{temp} \)

(a) Perform copy propagation.
(b) Perform liveliness analysis and dead code elimination based on the results from (a). Assume that after the basic block, array \( A[i] \), for all \( i \), are alive and no other variables are alive.
3. Consider the following flow graph. Perform constant propagation and folding using MFP.

\[ b = 3; \quad g = 6; \quad d = 10 \]
\[ c = b + 2 \]

\[ a = b * b \]
if \( f > 0 \)

\[ g = g + 24 \]
\[ c = c + 1 \]
\[ d = d - 1 \]

\[ f = c + d \]
\[ a = a + 3 \]
\[ h = g + a \]
if \( d < 0 \)

\[ g = g * c \]
\[ c = c + 2 \]
\[ d = d - 2 \]

print \( h \)