

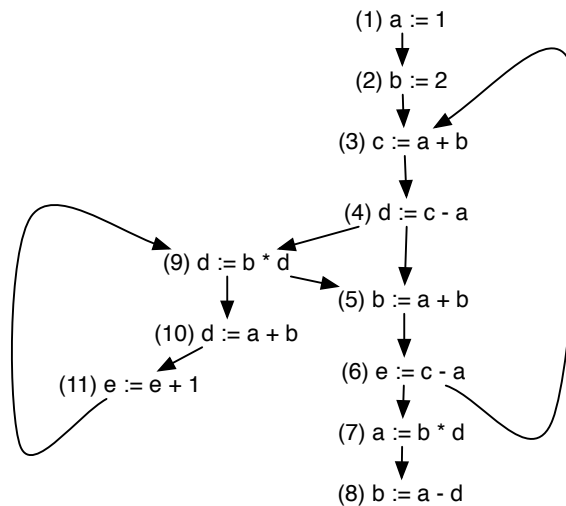
Practice Problems – Data Flow Analysis

This short problem set will help you review your understanding of data flow analysis.

1. Translate the following program into three-address code and draw the control-flow graph for the program. For this problem, the nodes of the control-flow graph should be (maximally large) basic blocks.

```
dx = x1-x0
dy = y1-y0
d = 2*dy - dx
y = y0
for (x = x0+1; x < x1; x++) {
  if (d > 0) {
    y++
    d += 2*dy-2*dx
  }
  else
    d += 2*dy
}
```

2. Consider the following control-flow graph:



Write down the following:

- (a) For each statement, the set of definitions that reach the end of the statement.
- (b) For each statement, the set of expressions that are available at the end of the statement.
- (c) For each statement, the set of variables that are live at the beginning of the statement.
- (d) For each statement, the set of expressions that are very busy at the beginning of the statement.