Problems 4: Liveness analysis

1. In the following code (a sequence of quadruples), show which variables are live after each quadruple. You can assume that no variables are live at the end.

```
    w = 0
    x = 1
    y = 2
L1: z = y + 3
    w = w + z
    y = x
    y = z + 4
    if (y < 10) goto L1
    write(w)
```

2. Show the interference graph for the program of Q1, explaining how you construct it.

3. Without coalescing nodes, use any graph colouring algorithm to colour the interference graph. Show how this can be used to allocate the program's variables to registers.