Theoretical Exercises 6
Optimizations

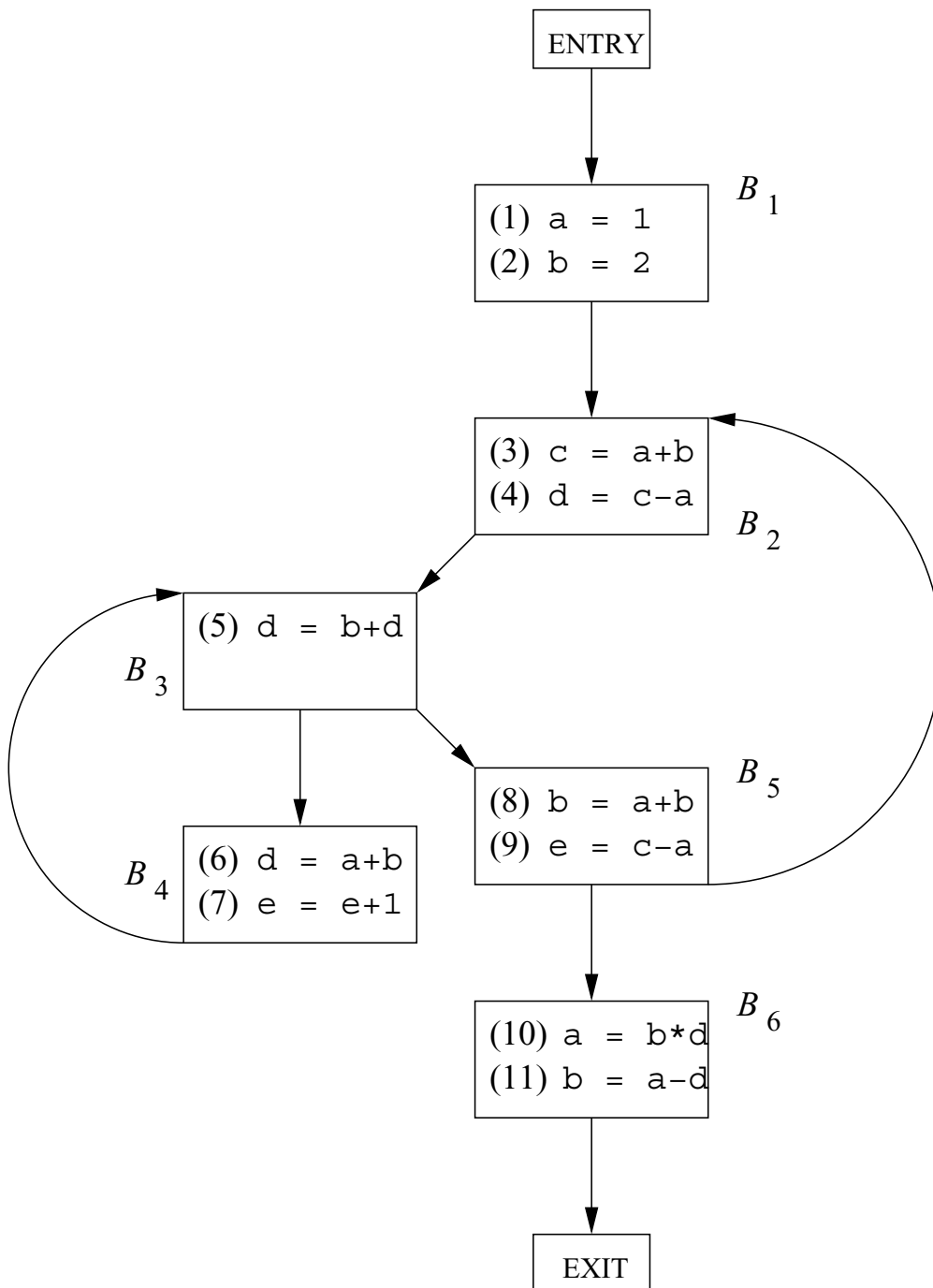**Please submit solutions on Blackboard by Friday, 16.04.2021 14:00h**

Figure 1: Flow graph

6.1   Flow graphs (6 points)

For the flow graph in fig. 1:

a. Identify the loops in the control-flow graph

b. Statements (1) and (2) in basic block B_1 are both copy statements which assign constant values to variables a and b, respectively. For which uses of a and b can copy propagation be performed and the uses of these variables replaced by a constent? Perform the optimization in the flow graph.

c. Identify any global common subexpressions for each loop

d. Identify any loop-invariant computations for each loop

6.2   Data-flow analyses (4 points)

For the flow graph in fig. 1, compute

a. The *gen* and *kill* sets for each block

b. The IN and OUT sets for each block