Homework 6

CS 540
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1 Let $G = (V, E)$ be a flow graph.

a) Define a framework $(D, \leq, F)$ suitable for dominator analysis.

b) Show that the dominator framework $(D, \leq, F)$ defined in a) is distributive.

2 Let $(D, \leq, F)$ be the constant value framework defined on pp. 63–64 of the notes.

a) Show that $(D, \leq)$ is a partial order.

b) Let $\gamma, \delta \in D$. Show that $\gamma \wedge \delta$ exists.

c) What are the top element $\top$ and bottom element $\bot$ in $(D, \leq)$?

d) How many elements are in a longest chain of $(D, \leq)$?

3 Apply constant value analysis to the following flow graph. Define f_B for each block B. Show the values of IN$[B]$ and OUT$[B]$ after each complete iteration of the while-loop.