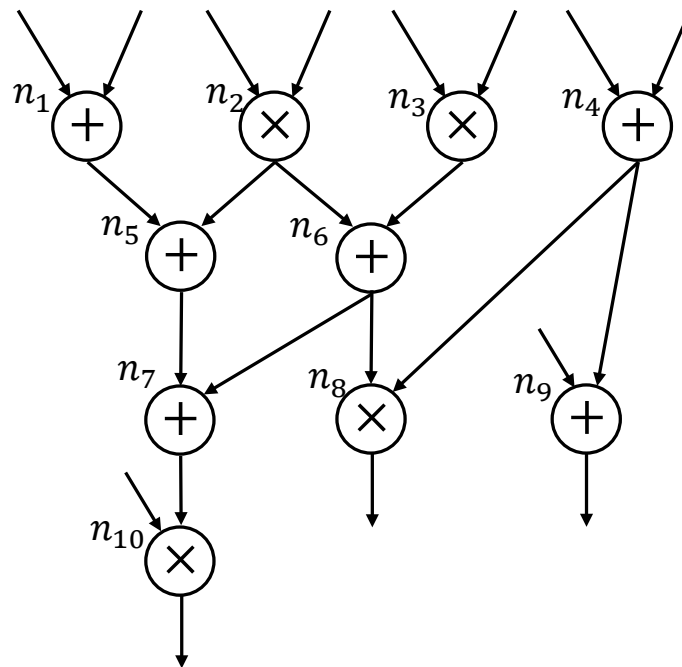


Homework 2

Due: Monday, February 7, 2022

1. (60 points) **List Scheduling.** Perform list scheduling on the following data-flow graph. Assume there are *two* adders and *one* multiplier. An adder needs *one* clock cycle and a multiplier needs *two* clock cycles to complete one operation. Show the detailed steps in your work, including ASAP schedule (10 pts), ALAP schedule (10 pts), mobility (or slack) of nodes (10 pts), the values of $U_{l,k}$ and $T_{l,k}$ in the scheduling process (20 pts), and final scheduling result (10 pts).



2. (40 points) **ILP Scheduling.** In the following DFG, both adder and multiplier take *one* clock cycle to complete one operation. There is one multiplier and two adders available. We would like to find out whether a schedule with latency of 3 clock cycles would be feasible through ILP.

- (a) (30 points) Define binary variable x_{il} as explained in the lecture, and then write out all the constraints involved in the ILP.
- (b) (10 points) What objective function (how to choose c) would minimize the overall latency and why? (hint: dummy sink)

(Note: you don't need to actually solve the formulated ILP problem)

