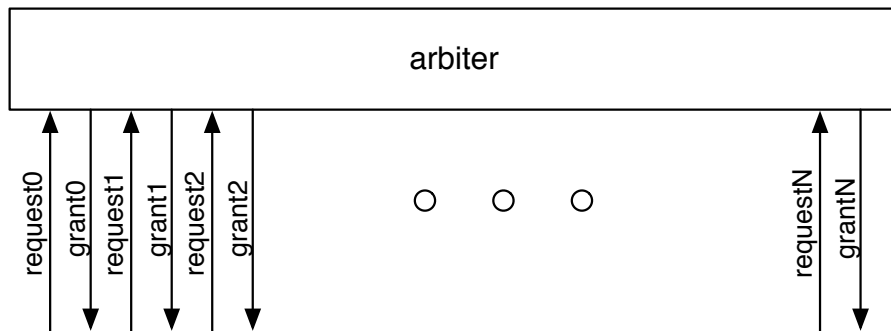


Due: Tuesday, Jan 12, beginning of class

1. Read the following pages of Rick Rudell's 1989 thesis on logic synthesis. Summarize in less than one page the history and the then state-of-the-art of logic synthesis, describe the difference between 2-level and multi-level synthesis and why are both important. Come up with one question you'd like to ask the author.

Web address: <http://www1.cs.columbia.edu/~cs6861/handouts/handout12.pdf>
Read pages 1-16. (Don't worry about all the details in chapter 2.)

2. Hardware systems generally comprise many different subsystems that might want to share a resource such as memory, disk drive, network interface, etc. An arbiter is a component that decides which subsystem gets to use the shared resource. Each subsystem has a **request** signal, which it sets to 1 when it wants to use the shared resource. The arbiter examines these request signals and decides which subsystem should win access using simple ordering for priority: the lowest numbered subsystem has priority over all higher numbered subsystems. The arbiter informs the winning subsystem by asserting the corresponding **grant** signal. That is, the highest priority request is given a grant=1, and all other requests are given a grant=0.



Design a circuit (by writing a Boolean equation) that performs this arbitration, starting with just 2 subsystems. You need 2 equations:

grant0 =

grant1 =

Draw the logic gates that compute these Boolean expressions.

Let's add a third sub-system – how does this change the grant0 and grant1 equations?

Now write the equation for grant2:

grant2 =

Can you write a general Boolean equation for grantN?