# Physics 321: HW 11

Problems 11.1, 11.2, 11.7, 11.8, 11.10, 11.18 and 11.20 in Sprott.

Hints:

11.2 Show your work. Only the decimal one is hard.

11.7 You'll need to apply DeMorgan's theorem twice. Use our algorithm of change the operator and add three "not" bars.

11.8 To keep this to simplest possible case, assume the B event starts before the beginning of A and ends after.

11.10 More practice with DeMorgan's theorem . . .

11.18 This one is quite tricky! The obvious solutions make a very short reset pulse that probably won't reset all the flip/flops. It's much easier to do with a *synchronous* counter (which you can also make with JK flip-flops and a few gates) but we didn't cover those. If you want to do this with a simple "ripple counter", you'll need to use an additional flip-flop as a memory to make the reset pulse last a full half clock cycle (but it has to be gone before you want to count to "one" again!). Make a timing diagram that shows enough points in the circuit to illustrate how it works (make up names and show them on your schematic so you can label the timing diagram).

11.20 (not really hint, but an extra request): This one is easy, but show your circuit, then complete this timing diagram showing $Q$ and $\bar{Q}$ (assume Q starts at 0).