CS 503/591c: Quiz 1
Solution Set

November 7, 2003

Question 1: Logic Components

Give the logic table for a 2-input mux (multiplexer).
A 2-input mux has two data inputs and one control input.

D0	D1	S	Output
0	0	0	0
1	0	0	1
0	1	0	0
1	1	0	1
0	0	1	0
1	0	1	0
0	1	1	1
1	1	1	1

What is the importance of a tristate logic gate?
With a tristate gate, we can drive a line high, low, or not at all. This type of device is useful for situations such as multiple devices that may drive a common bus (but at different times).

Question 2: Capacitors

Give the equation for current flow across a capacitor. Give the

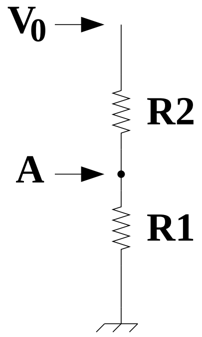
units for each of the quantities in this equation.

$I = C\frac{dV}{dt}$

I is current and is measured in Amps.
C is capacitance.
V is electrical potential and is measured in voltage.
t is time and is measured in seconds.

Question 3: Resistive Circuits

Consider the following circuit:



Assume $V_0 = 5V$**,** $R1 = 100\Omega$ **and** $R2 = 100\Omega$**. What is the effective resistance of the pair?**

$R = R1 + R2 = 200\Omega$

What is the total current through R1?

$I = \Delta V/R = 5/200 = 25mA$

Through R2?

The same as R1.

How much work is performed by R1 and R2 (don't forget the units)?

$\Delta V * I = 2.5 * .025 = 62.5mW$ for each resistor.

In what form is this work?
Heat