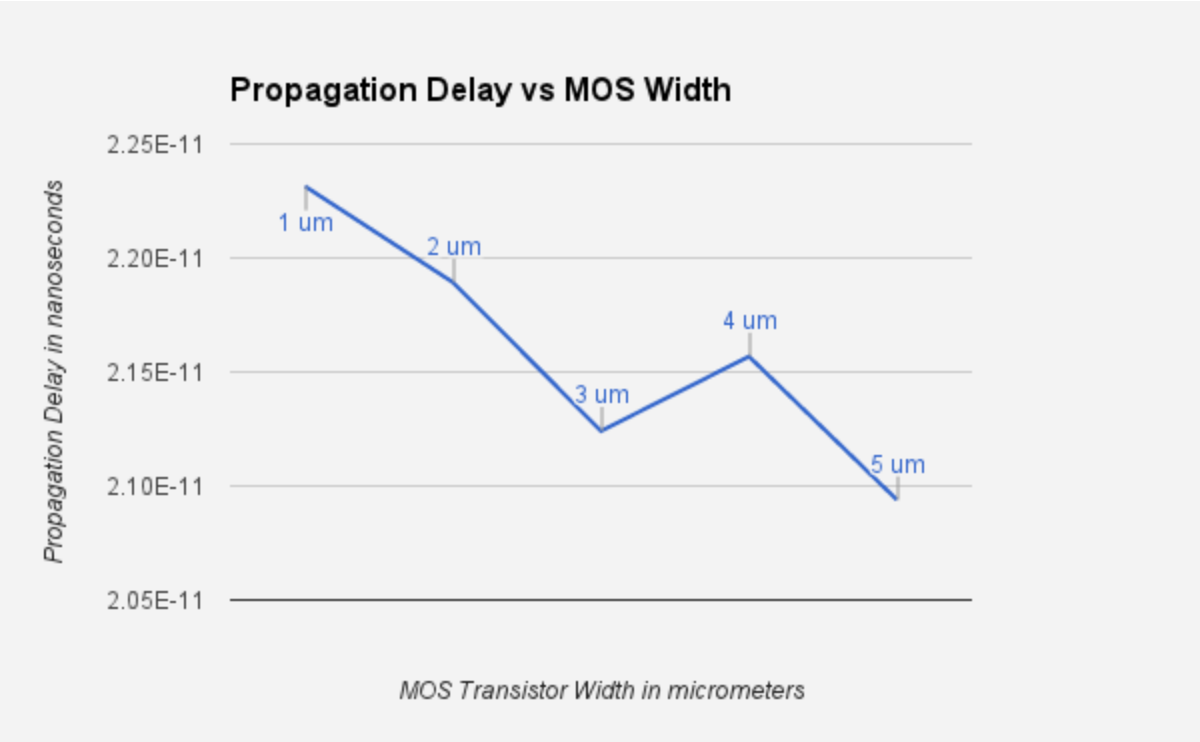
John Gangemi
U 6871-4612
Low-Power VLSI

Assignment 1

Q1.

A. Find rise and fall propagation delay of the middle inverter
   Ans: 2.23146e-011 nanoseconds as shown in the error log

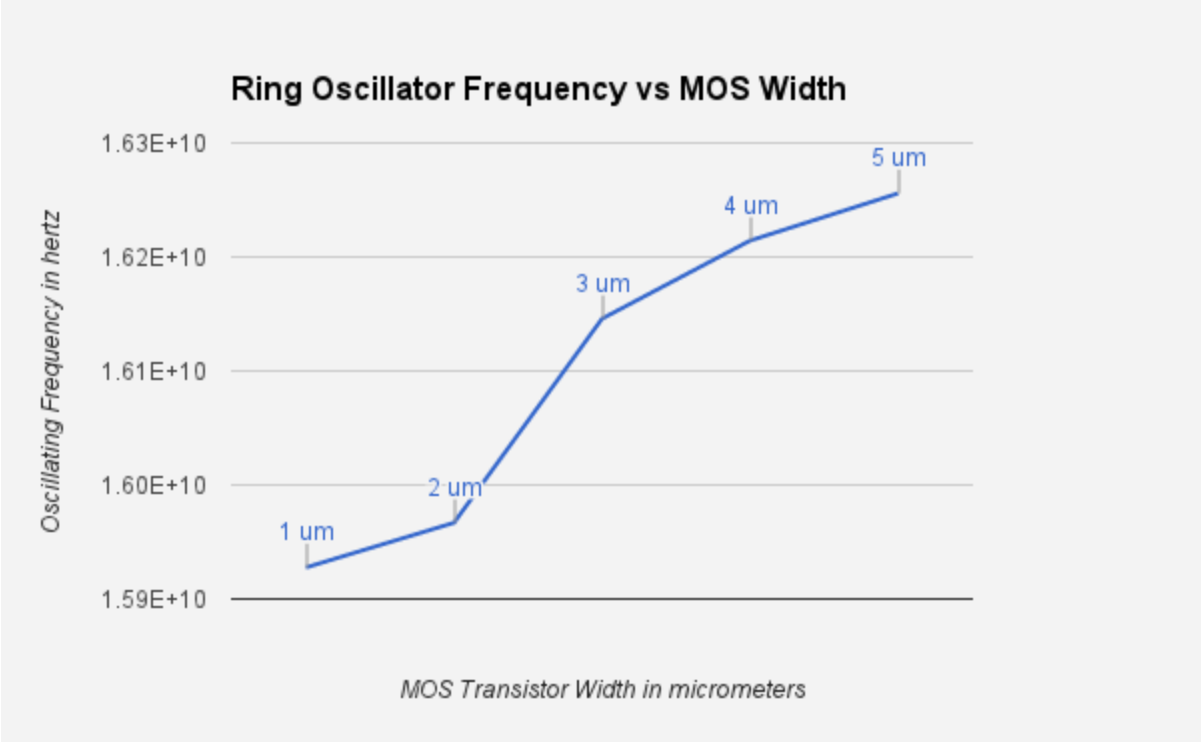
B. Plot propagation delay vs width



This graph shows a decrease in propagation delay as the transistor width increases, possibly due to the increase of current in the circuit.

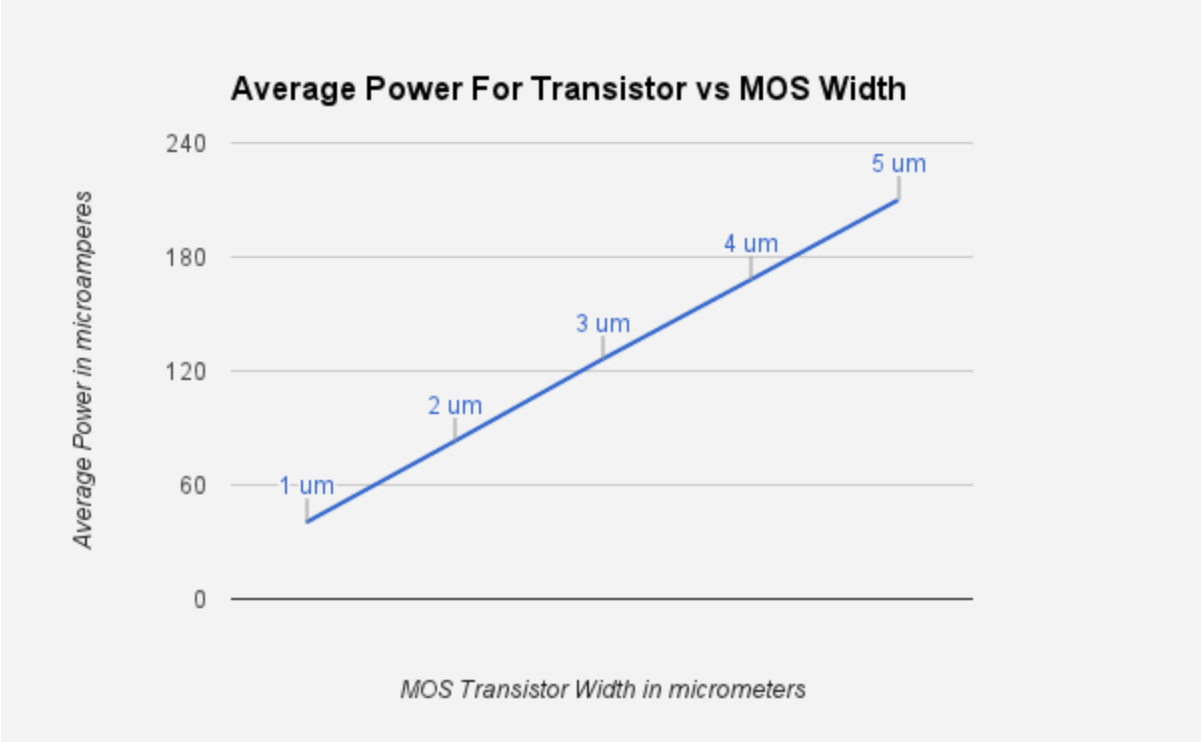
Q2.

A. Frequency of oscillations vs width

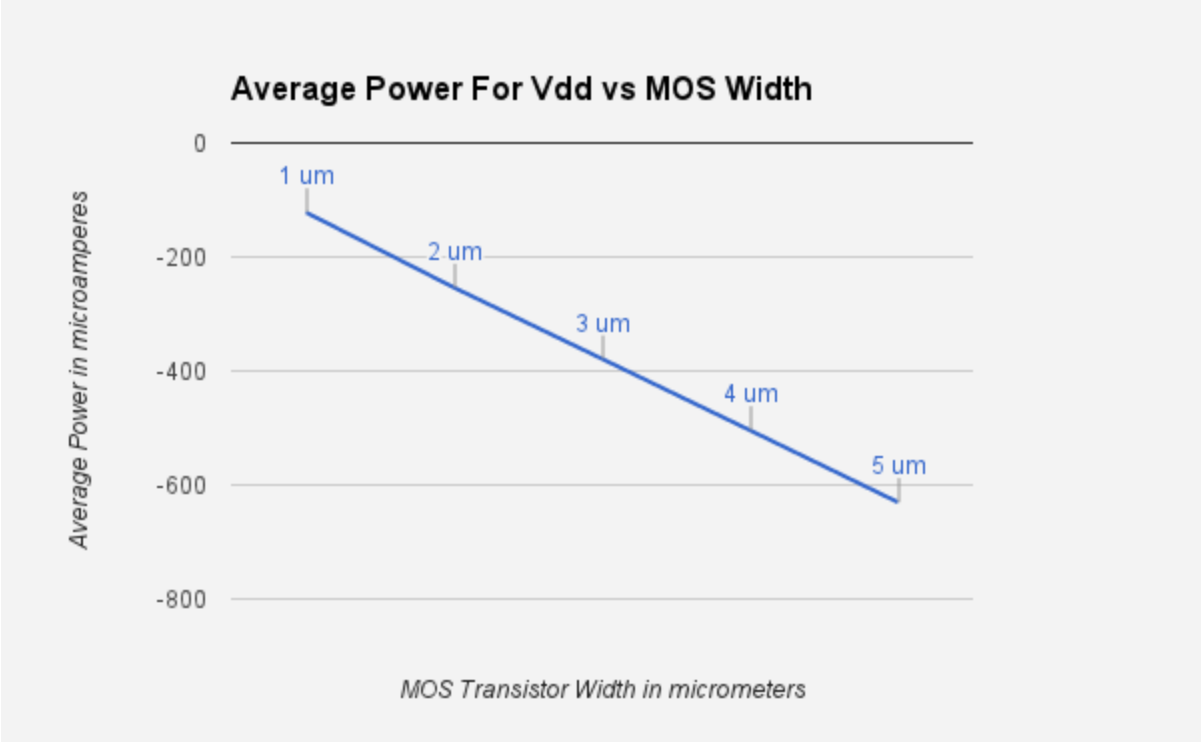


This graph shows an increase in oscillating frequency as transistor width increases. It is caused by the decrease in propagation delay as transistor width increases therefore effectively shortening the amount of time it takes to populate from the first stage inverter to the last stage inverter.

B. Average power vs width



This graph shows the average power for a MOSfet transistor as transistor width increases. As more current is being sourced as you increase transistor width it will also increase your average power consumption.



This graph shows the average power consumption by the voltage source as transistor width increases. This negative slope for the line is the inverse of the positive slope for the average power consumption for the MOSfet transistor in this circuit.