Layout of CMOS Logic Gates – Lab Number 4

Attach signoffs and review old labs for feedback

Author : Brian Landy

Lab Instructor : Sayed Ashraf Mamun

TA : Andrew Fountain

TA : Sabrina Ly

Lab Section : Lab #4

Submission Date : 10/11/2019

Table of Contents

[ABSTRACT 3](#_Toc21627832)

[DESIGN METHODOLOGY 3](#_Toc21627833)

[RESULTS & ANALYSIS 3](#_Toc21627834)

[CONCLUSIONS 3](#_Toc21627835)

[QUESTIONS 3](#_Toc21627836)

# ABSTRACT

Complementary metal-oxide semiconductor (CMOS) devices are extremely valuable circuit components as they allow for small digital logic circuits to be placed in an extremely small amount of area on a chip. These circuits are fast and complex tools can synthesize designs, but the way to get the fasted and most highly customized circuits are to design these circuits with layout tools. In this lab exercise, layout tools were used to design a CMOS inverter circuit. The results of timing and simulation were compared to the generated version of the circuit. This lab successfully showed the importance of custom layouts and that a speed benefit can come from custom layouts. Pyxis layout was used. Various design rule checks were adhered to in this procedure as the layout needs to be able to be fabricated. That is what design rules are for. The timing results were also recorded so important metrics could be calculated like through put maximum and input maximum frequencies. When looking at the worst-case results of the schematic method and the layout method, the maximum throughput and input frequencies were 16.4GHz and 8.3GHz for the layout. For the schematic the results were 27.7GHz and 10.3GHz for throughput and input frequencies respectively. The schematic method was faster, and this is probably due to intense optimizations for the tool and the fact that this is a trivial circuit. Nontrivial circuits will likely show a better performance increase with a custom design.

# DESIGN METHODOLOGY

# RESULTS & ANALYSIS

# CONCLUSIONS

# QUESTIONS

1. Each question should be numbered and the text repeated, i.e. what you are reading right now should be the question that was in the lab.

And this text should be your answer.