# IN3170 V24 - Lab 3

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## Contents



# 1 Introduction

# 2 Theory

### 2.1

# 3 Materials and Methods

## 3.1 Equipment

| Component | Model | Quantity |
|---|---|---|
| Resistor | 100kΩ | 1 |
| Capacitor | 1 $\mu$F | 1 |
| IC with 6 transistors | CD4007UBE | 1 |
| Copper wires | - | 12 |
| Printed Circuit Board | - | 1 |
| Soldering iron | - | 1 |
| Soldering wire | - | 1 |
| Oscilloscope | HP54622 | 1 |
| Waveform generator | HP33120 | 1 |
| Voltage source | HPE3631 | 1 |
| Computer w/ "Cadence Virtuoso" | 6.1.7 | 1 |
| NMOSFET* | TSMC 65nm | 3 |
| Waveform generator* | - | 2 |
| Capacitor* | - | 2 |

Table 1: List of components used in the experiment. Components marked with * are simulated in Cadence Virtuoso.

### 3.2 Task 1a

### 3.3 Task 1b

### 3.4 Task 2

# 4 Results

## 4.1 Task 1

## 4.2 Task 2

# 5 Discussion

## 5.1 Inaccuracy in measurements

**Task 1a:**

**Task 1b:**

## 5.2 Assesment of values

**Task 1a:**

**Task 2:**

## 5.3 Comparing task 1 and task 2

# 6 Appendix

## 6.1 Calculations

# References


[1] Philipp Häfliger. (2024). *Microelectronics Essentials* (beta 0.10). Department of Informatics, University of Oslo.

[2] Philipp Häfliger (2018). *Excerpt of Sedra/Smith Chapter 15: Inverter Delay* [PDF]. Department of Informatics, University of Oslo. `https://www.uio.no/studier/emner/matnat/ifi/INF3410/h18/forelesningsfoiler/chapter15.pdf`

[3] Neureuther, A.R. (2001). Lecture 24: CMOS Capacitance and Circuit Delay [PDF]. University of California, Berkeley. `https://inst.eecs.berkeley.edu/~ee42/fa01/LectNotes/42_24.pdf`