**ECEN 454 Lab 3**

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**Due Date: June 28, 2018**

**Inverter (Regular):**

Rising Delay: 498p

Falling Delay: 481p

**Inverter (Delay\_Table):**

|  |  |  |  |
| --- | --- | --- | --- |
| Capacitance | Rising Delay | Falling Delay | % Error |
| 1f | 45.2p | 27.1p |  |
| 10f | 101p | 85.8p |  |
| 20f | 144p | 131p |  |
| 30f | 188p | 175p |  |
| 40f | 232p | 219p |  |
| 50f | 277p | 262p |  |
| 60f | 321p | 306p |  |
| 70f | 368p | 351p |  |
| 80f | 410p | 393p |  |
| 90f | 451p | 439p |  |
| 100f | 498p | 481p |  |

**Inverter (Simcap):**

**Take 10-sample point and compute the sink capacitance of your**

**inverter by taking the mean.**

|  |  |  |
| --- | --- | --- |
| f | If | C = (If)/(2\*pi\*f) |
| 100MHz | 2.06u |  |
| 200 MHz | 4.11u |  |
| 300Mhz | 6.18u |  |
| 400 | 8.24u |  |
| 500 | 10.3u |  |
| 600 | 12.3u |  |
| 700 | 14.4u |  |
| 800 | 16.5u |  |
| 900 | 18.5u |  |
| 1GHz | 20.6u |  |

**NAND (Regular):**

Rising Delay: 701p

Falling Delay: 656p

**NAND (Delay\_Table):**

|  |  |  |  |
| --- | --- | --- | --- |
| Capacitance | Rising Delay | Falling Delay | % Error |
| 1f | 57.7p | 35.4p |  |
| 10f | 125p | 107p |  |
| 20f | 190p | 168p |  |
| 30f | 254p | 229p |  |
| 40f | 320 | 291 |  |
| 50f | 382 | 351 |  |
| 60f | 447 | 414 |  |
| 70f | 511 | 474 |  |
| 80f | 575 | 533 |  |
| 90f | 637 | 595 |  |
| 100f | 701p | 656p |  |

**NAND (Simcap):**

**Take 10-sample point and compute the sink capacitance of your**

**inverter by taking the mean.**

|  |  |  |
| --- | --- | --- |
| f | If | C = (If)/(2\*pi\*f) |
| 100MHz | 1.4u |  |
| 200 MHz | 2.81u |  |
| 300Mhz | 4.21u |  |
| 400 | 5.62u |  |
| 500 | 7.02u |  |
| 600 | 8.42u |  |
| 700 | 9.83u |  |
| 800 | 11.2u |  |
| 900 | 12.6u |  |
| 1GHz | 14u |  |

**XOR (Regular):**

Rising Delay: 696p

Falling Delay: 656p

**XOR (Delay\_Table):**

|  |  |  |  |
| --- | --- | --- | --- |
| Capacitance | Rising Delay | Falling Delay | % Error |
| 1f | 52.9p | 39.8p |  |
| 10f | 116p | 103p |  |
| 20f | 181p | 166p |  |
| 30f | 247p | 228p |  |
| 40f | 310p | 290p |  |
| 50f | 374p | 351p |  |
| 60f | 439p | 412p |  |
| 70f | 506p | 474p |  |
| 80f | 566p | 535p |  |
| 90f | 633p | 596p |  |
| 100f | 696p | 656p |  |

**XOR (Simcap):**

**Take 10-sample point and compute the sink capacitance of your**

**inverter by taking the mean.**

|  |  |  |
| --- | --- | --- |
| f | If | C = (If)/(2\*pi\*f) |
| 100MHz | 4.38u |  |
| 200 MHz | 8.74u |  |
| 300Mhz | 13.1u |  |
| 400 | 17.5u |  |
| 500 | 21.8u |  |
| 600 | 26.2u |  |
| 700 | 30.5u |  |
| 800 | 34.9u |  |
| 900 | 39.2u |  |
| 1GHz | 43.6u |  |