Name: Student ID:

Lab Section: Date:

1. Make a truth table of a 4-bit Ripple counter

| Counts | Q2 | Q1 | Q0 |
| --- | --- | --- | --- |
| 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 1 |
| 2 | 0 | 0 | 0 |
| 3 | 0 | 0 | 1 |
| 4 | 0 | 1 | 0 |
| 5 | 0 | 1 | 1 |
| 6 | 0 | 1 | 0 |
| 7 | 0 | 1 | 1 |
| 8 | 1 | 0 | 0 |
| 9 | 1 | 0 | 1 |
| 10 | 1 | 0 | 0 |
| 11 | 1 | 0 | 1 |
| 12 | 1 | 1 | 0 |
| 13 | 1 | 1 | 1 |
| 14 | 1 | 1 | 0 |
| 15 | 1 | 1 | 1 |

1. DFF truth table:

| Clock | SET | RESET | Qn |
| --- | --- | --- | --- |
| 0 | X | X | Qn-1 |
| 1 | 1 | 0 | 1 |
| 1 | 0 | 1 | 0 |

1. Make an input/output table for Counter with divide-by-2

| Clock | Qd | Qc | Qb | Qa |
| --- | --- | --- | --- | --- |
| 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 | 1 |
| 2 | 0 | 0 | 1 | 0 |
| 3 | 0 | 0 | 1 | 1 |
| 4 | 0 | 1 | 0 | 0 |
| 5 | 0 | 1 | 0 | 1 |
| 6 | 0 | 1 | 1 | 0 |
| 7 | 0 | 1 | 1 | 1 |
| 8 | 1 | 0 | 0 | 0 |
| 9 | 1 | 0 | 0 | 1 |
| 10 | 1 | 0 | 1 | 0 |
| 11 | 1 | 0 | 1 | 1 |
| 12 | 1 | 1 | 0 | 0 |
| 13 | 1 | 1 | 0 | 1 |
| 14 | 1 | 1 | 1 | 0 |
| 15 | 1 | 1 | 1 | 1 |