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# Department of Computer Engineering

## BLG 242E Digital Circuits Laboratory Experiment Report

Experiment : 6 Latches and Flip-flops

Experiment Date : 12.04.2016

Group Number : 12

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# 1 INTRODUCTION

We made latches and flip flops at this experiment. We built 1 S-R latch with NOR gates and then another S-R latch with enable with NAND gates. Then we made D flip flop using D latches and necessary gates. Finally we connect shift register and observe their waves at oscilloscope.

## 2 REQUIREMENTS

### 2.1 TRUTH TABLES

Part 1.

S	R	Q	Q'
0	0	cover	cover
1	0	1	0
0	1	0	1
1	1	0	0

For the disallowed input S=1, R=1 the output Q=0, Q'=0 is observed.

Part 2.

E	S'	R'	Q	Q'
0	X	X	X	X
1	1	1	cover	cover
1	1	0	0	1
1	0	1	1	0
1	0	0	1	1

For disallowed inputs Q=1, Q'=1

Part 3.

D	Q	Q'
0	0	1
1	1	0

Part 4.

$\frac{1}{2}$  frequency  $\rightarrow$  input = 10101010

$\frac{1}{4}$  frequency  $\rightarrow$  input = 11001100

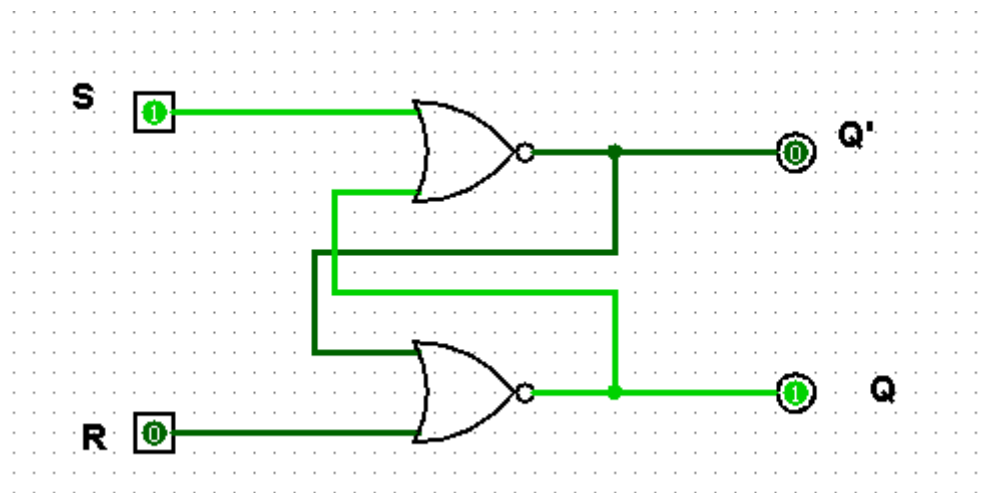
$\frac{1}{8}$  frequency  $\rightarrow$  input = 11110000

$\frac{1}{3}$  pulse-gap duration rate  $\rightarrow$  input = 10001000

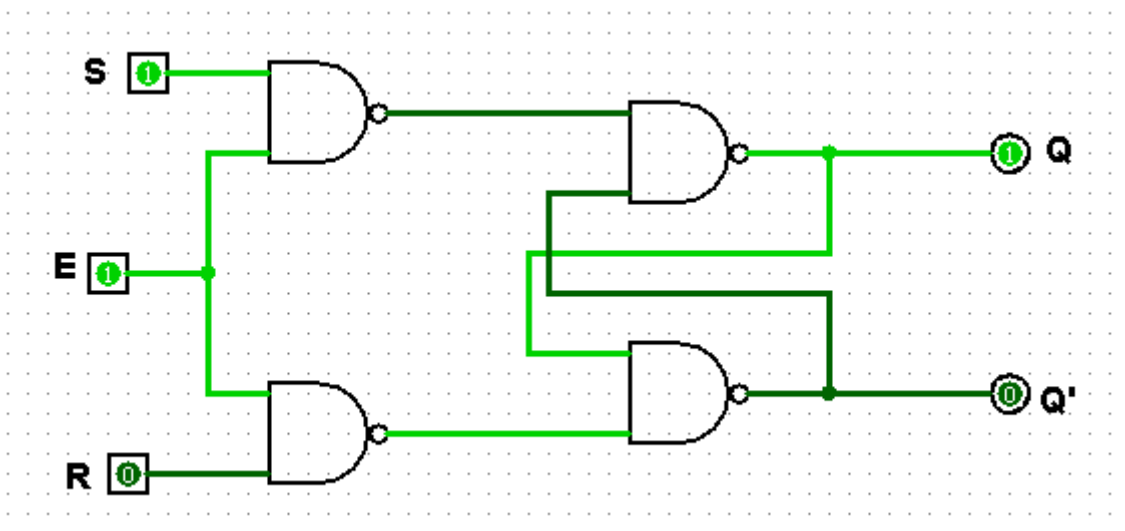
$\frac{1}{7}$  pulse-gap duration rate  $\rightarrow$  input = 10000000

## 2.2 CIRCUITS

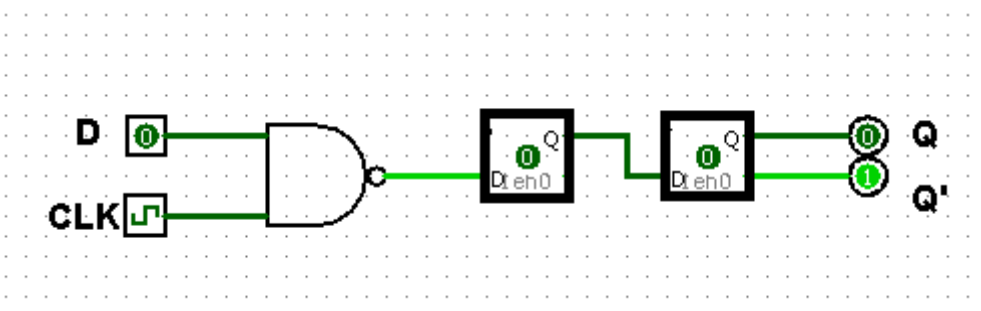
Part 1.



Part 2.



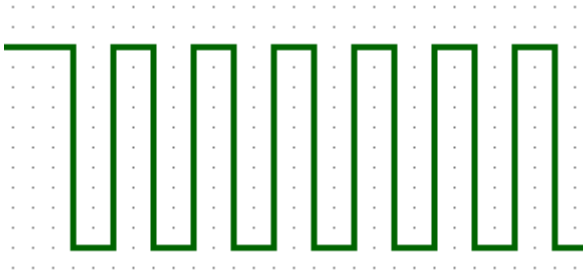
Part 3.



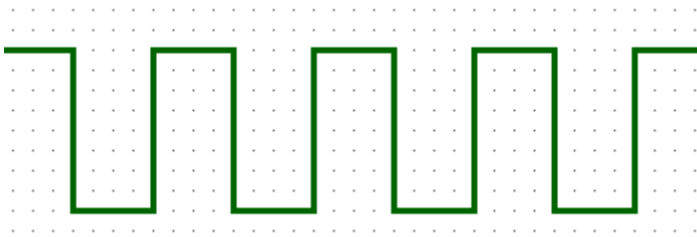
Part 4.

Waves

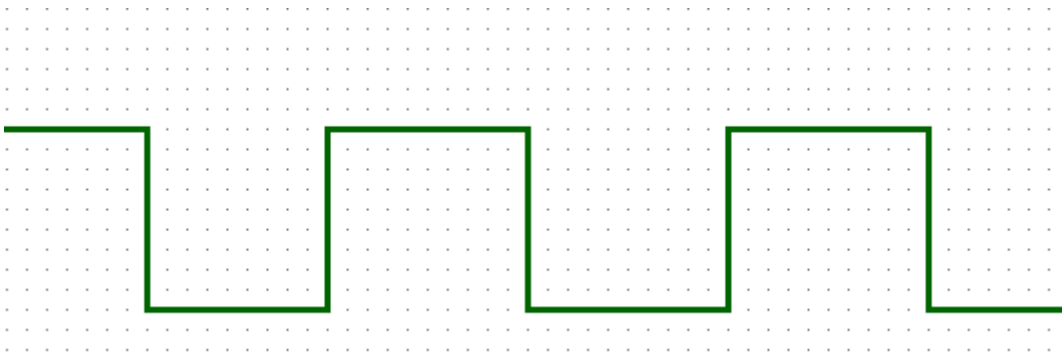
1/2



1/4



1/8



1/3 pulse-gap



1/7 pulse-gap



### **3 CONCLUSION**

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We learnt real life flip flops and we saw their clock waves.