Learn Digital Design of Microcomputer Systems with Deeds

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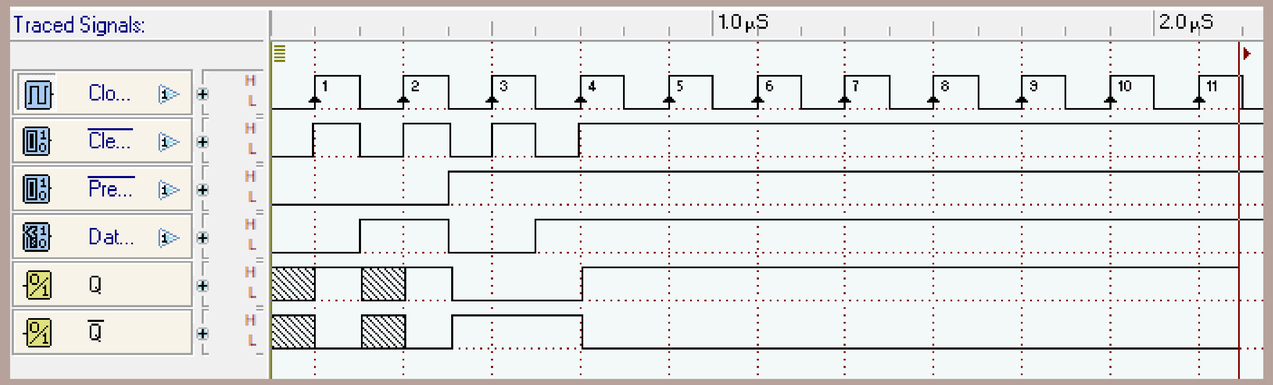

Diagram 1.

RESEARCH OBJECTIVE

Designing a programmable D-PET flip-flop component waveform generator is the aim of this lab. As the time cycle of Figure 1 progresses, it creates six cyclic signals: D, PR, CL, CK, Q, and NOT Q.

DESIGN OF A PERIODIC SEQUENCE PROGRAMMABLE GENERATOR

The preset and clear input are active-low, because there are an inverting bubble at that input lead on the block symbol, just like the negative edge-trigger clock inputs.When the preset input is activated, the flip-flop will be reset (Q=0, not-Q=1) regardless of any of the synchronous inputs or the clock. When the clear input is activated, the flip-flop will be set (Q=1, not-Q=0), regardless of any of the synchronous inputs or the clock. So, what happens if both preset and clear inputs are not activated (both of them 0) ? Surprise, surprise: we get an invalid state on the output, where Q and not-Q go to the same state. when both preset and clear inputs are activated then the flip flop will work normally **Diagram 2**. The flip flop is a basic building block of sequential logic circuits.

It is a circuit that has two stable states and can store one bit of state information.

The output changes state by signals applied to one or more control inputs.

The basic D Flip Flop has a D (data) input and a clock input and outputs Q and Q (the inverse of Q). Optionally it may also include the PR (Preset) and CLR (Clear) control inputs **Diagram 3.**

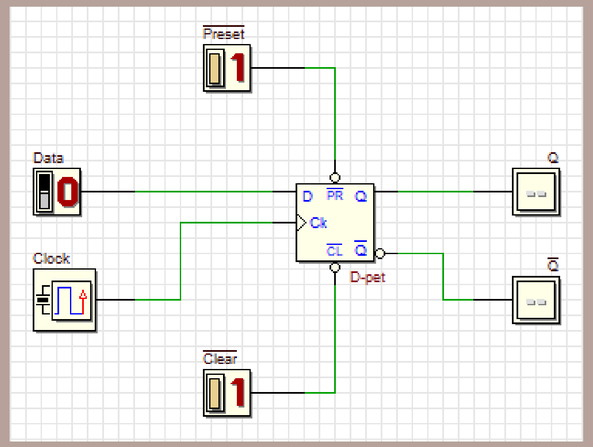

Diagram 3.

INPUTS				OUTPUTS	
$\overline{PR}$	$\overline{CLR}$	CLK	D	Q	$\overline{Q}$
0	1	X	X	1	0
1	0	X	X	0	1
0	0	X	X	X	X
1	1	↑	1	1	0
1	1	↑	0	0	1
1	1	0	X	Q_0	$\overline{Q}_0$

Diagram 2

REFERENCES

[1] S.Widyarto (Trns). Manual Pengguna, (2022). Aplikasi Pendidikan dan Reka Bentuk Elektronik Digital. International Community Forum (ICF).

[2] https://www.digitalelectronicsdeeds.com/learningmaterials/LM/T030/030160_Timing_Analysis_D_PET_FF_comp/Index.htm

instructables.com/D-Flip-Flop-With-Preset-and-Clear/

ICF

INTERNATIONAL COMMUNITY FORUM (ICF)

Deeds-DcS Digital Circuit Simulator

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