

Lab5

Submitted By:
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Q2

Without pipelining :

https://drive.google.com/open?id=0B9_UGp17Zsg0ZXFpRklyWXdTcEE

With pipelining :

https://drive.google.com/open?id=0B9_UGp17Zsg0LVlrZTFkbktVdmc

Without pipelining:

Setup	Hold	Pulse Width
Worst Negative Slack (WNS): 4.094 ns	Worst Hold Slack (WHS): 0.142 ns	Worst Pulse Width Slack (WPWS): 2.500 ns
Total Negative Slack (TNS): 0.000 ns	Total Hold Slack (THS): 0.000 ns	Total Pulse Width Negative Slack (TPWS): 0.000 ns
Number of Failing Endpoints: 0	Number of Failing Endpoints: 0	Number of Failing Endpoints: 0
Total Number of Endpoints: 6	Total Number of Endpoints: 6	Total Number of Endpoints: 13

With pipelining :

Setup	Hold	Pulse Width
Worst Negative Slack (WNS): 0.650 ns	Worst Hold Slack (WHS): 0.140 ns	Worst Pulse Width Slack (WPWS): 0.845 ns
Total Negative Slack (TNS): 0.000 ns	Total Hold Slack (THS): 0.000 ns	Total Pulse Width Negative Slack (TPWS): 0.000 ns
Number of Failing Endpoints: 0	Number of Failing Endpoints: 0	Number of Failing Endpoints: 0
Total Number of Endpoints: 6	Total Number of Endpoints: 6	Total Number of Endpoints: 16

We observe that the setup , hold and negative slack gets decreased due to pipelining . Also, the clock frequency increases on applying pipelining.

Q4:

https://drive.google.com/open?id=0B9_UGp17Zsg0eXNCQkkyNI9fMHc

Function performed : Shift Register

Q3:

https://drive.google.com/open?id=0B9_UGp17Zsg0Y254SS1taIFrb1E

https://drive.google.com/open?id=0B9_UGp17Zsg0U1RhCVk0bkVCV1E

https://drive.google.com/open?id=0B9_UGp17Zsg0Z253S3Blc05TTEE

Data flow:

Resource	Estimation	Available	Utilization %
LUT	12	53200	0.02
IO	38	200	19.00

Gate flow:

Resource	Estimation	Available	Utilization %
LUT	8	53200	0.02
IO	38	200	19.00

Behavioural:

Resource	Estimation	Available	Utilization %
LUT	8	53200	0.02
IO	38	200	19.00

We observe that the maximum resource utilization is in dataflow modelling . While gate-flow and behavioural uses nearly same number of look-up tables.