Project 2

Eng/ Kareem Waseem

By:

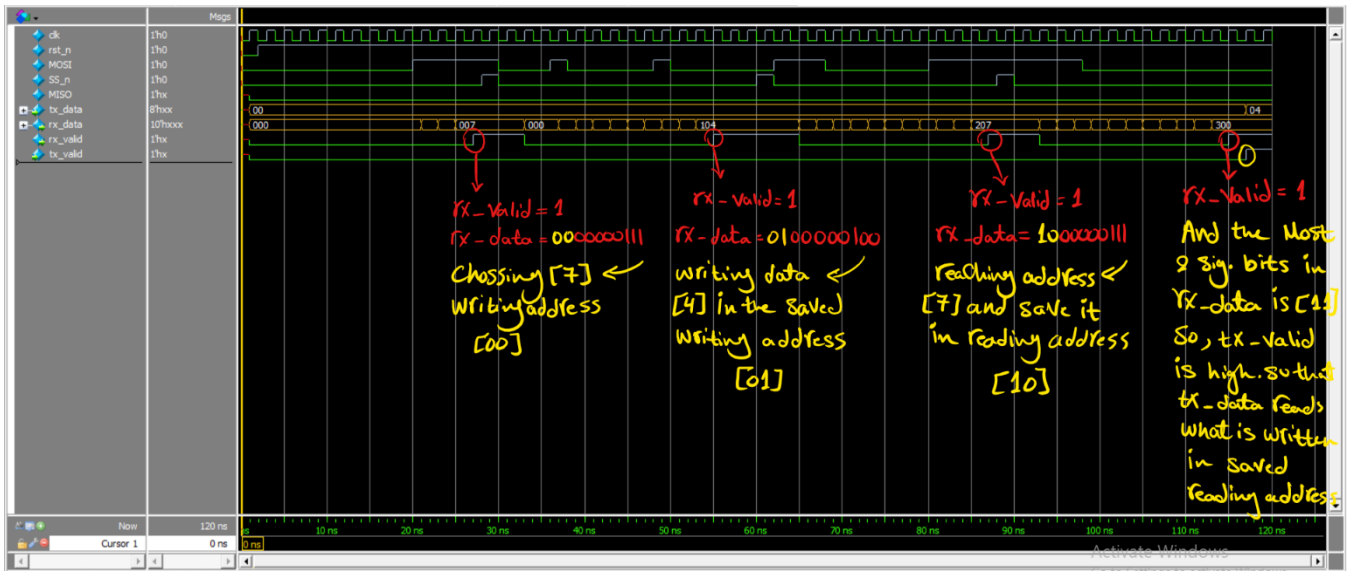
Omar Ahmed Fouad

Naira Ahmed Ali

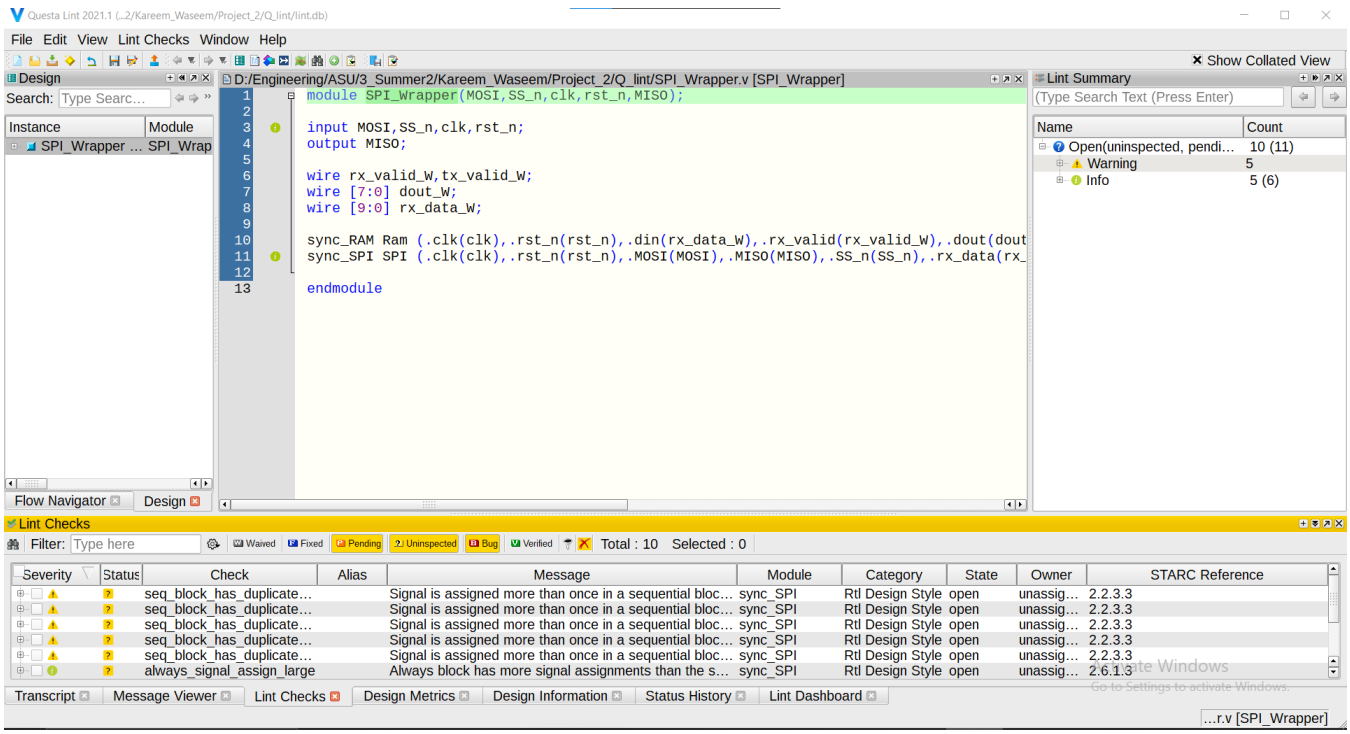
“Team : ON”

Contents

1-QuestaSim Snippets



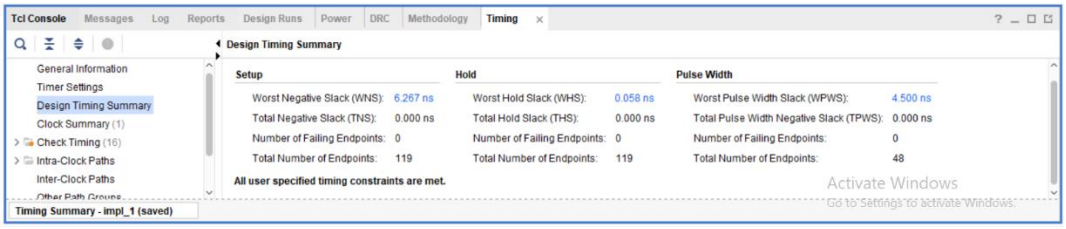
2-QuestaLint Snippets



3-Choosing the best encoding

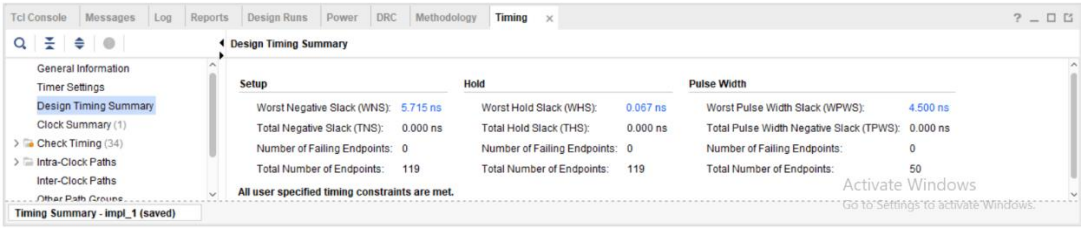
3.1 – gray encoding

```
95  ----------------------------------------------------------------------------------------------------
96  |                  State |                     New Encoding |                Previous Encoding
97  ----------------------------------------------------------------------------------------------------
98  |                   IDLE |                              000 |                               000
99  |                CHK_CMD |                              001 |                               001
100 |                  WRITE |                              011 |                               011
101 |              READ_DATA |                              010 |                               100
102 |               READ_ADD |                              111 |                               010
103 ----------------------------------------------------------------------------------------------------
104 INFO: [Synth 8-3354] encoded FSM with state register 'cs_reg' using encoding 'gray' in module 'sync_SPI'
```



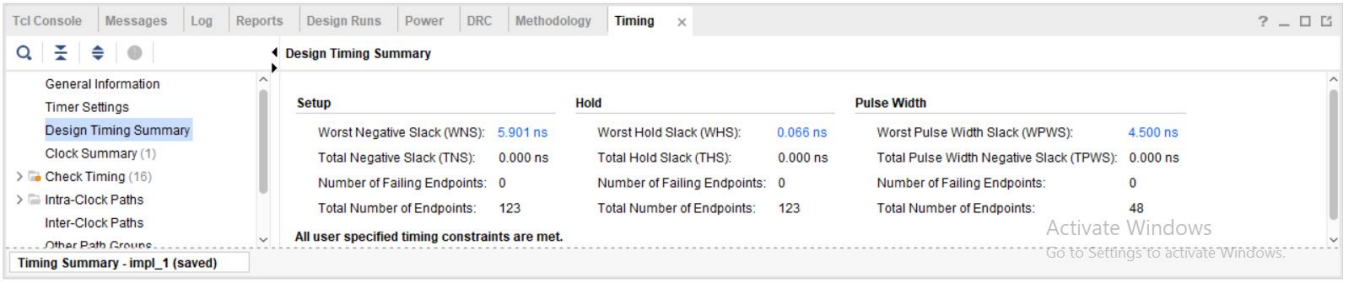
3.2 -one_hot

```
95  ----------------------------------------------------------------------------------------------------
96  |                  State |                     New Encoding |                Previous Encoding
97  ----------------------------------------------------------------------------------------------------
98  |                   IDLE |                            00001 |                               000
99  |                CHK_CMD |                            00010 |                               001
100 |                  WRITE |                            00100 |                               011
101 |              READ_DATA |                            01000 |                               100
102 |               READ_ADD |                            10000 |                               010
103 ----------------------------------------------------------------------------------------------------
104 INFO: [Synth 8-3354] encoded FSM with state register 'cs_reg' using encoding 'one-hot' in module 'sync_SPI'
```



3.3 - seq

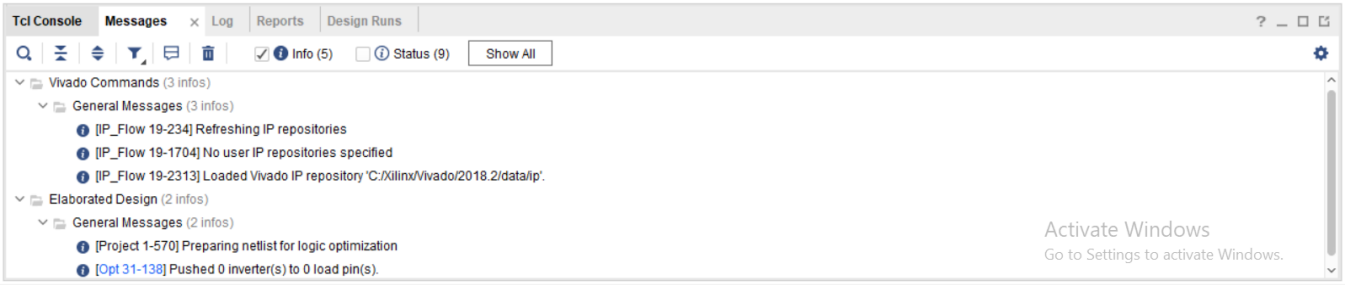
```
99  ----------------------------------------------------------------------------------------------------
100 |                  State |                     New Encoding |                Previous Encoding
101 ----------------------------------------------------------------------------------------------------
102 |                   IDLE |                              000 |                               000
103 |                CHK_CMD |                              001 |                               001
104 |                  WRITE |                              010 |                               011
105 |              READ_DATA |                              011 |                               100
106 |               READ_ADD |                              100 |                               010
107 ----------------------------------------------------------------------------------------------------
108 INFO: [Synth 8-3354] encoded FSM with state register 'cs_reg' using encoding 'sequential' in module 'sync_SPI'
```



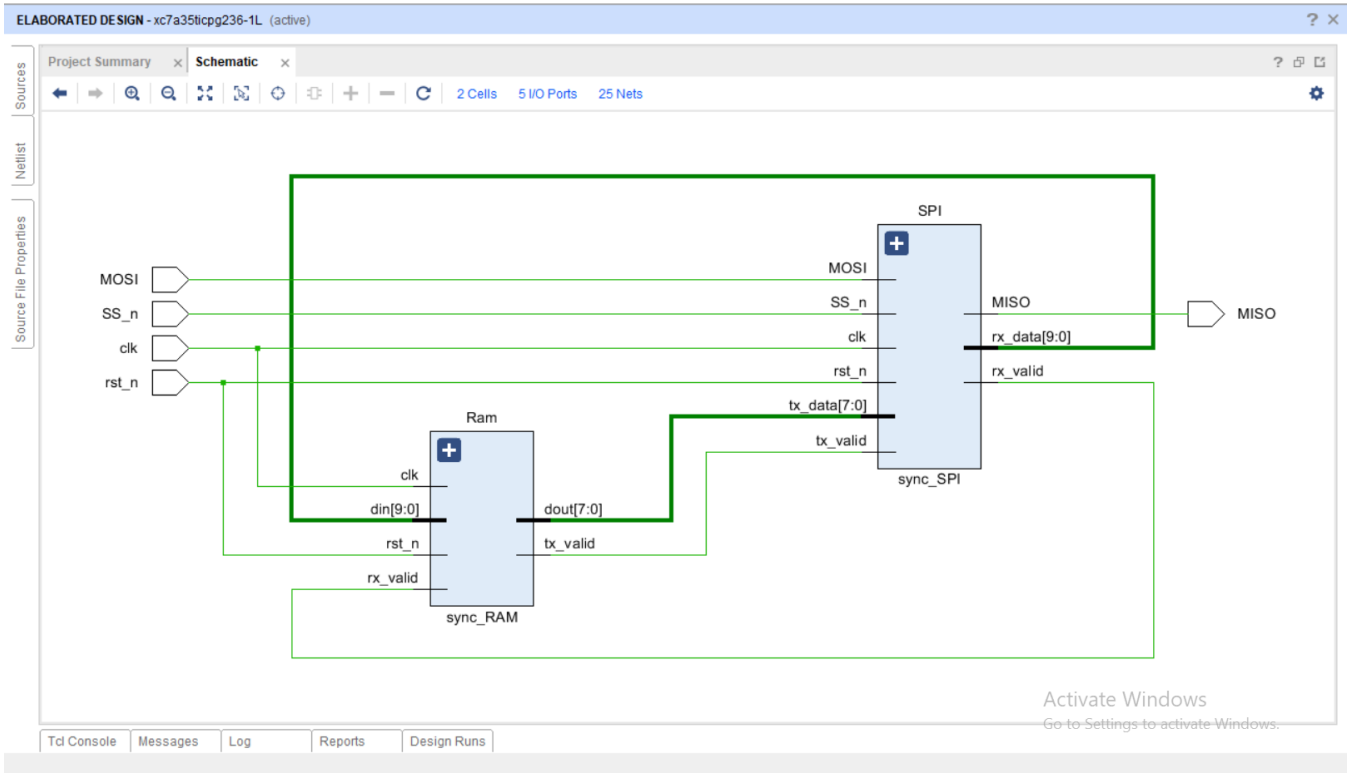
Gray encoding was selected as it provides the highest setup slack of 6.267 ns, which allows for the highest operating frequency.

4-Elaboration snippets after choosing the encoding

3.1 – Massage



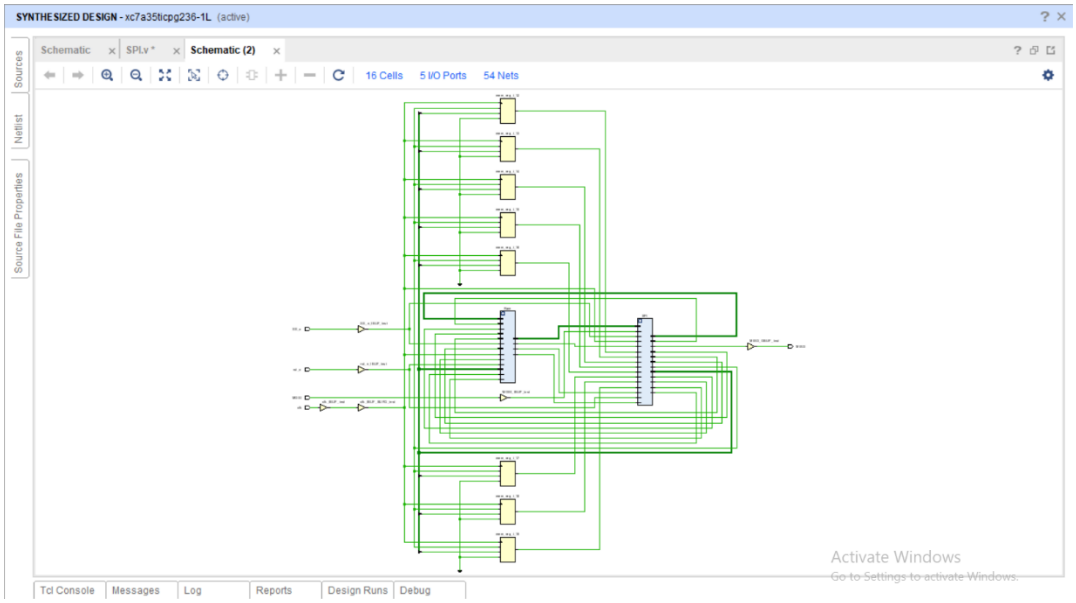
3.2 – Schematic



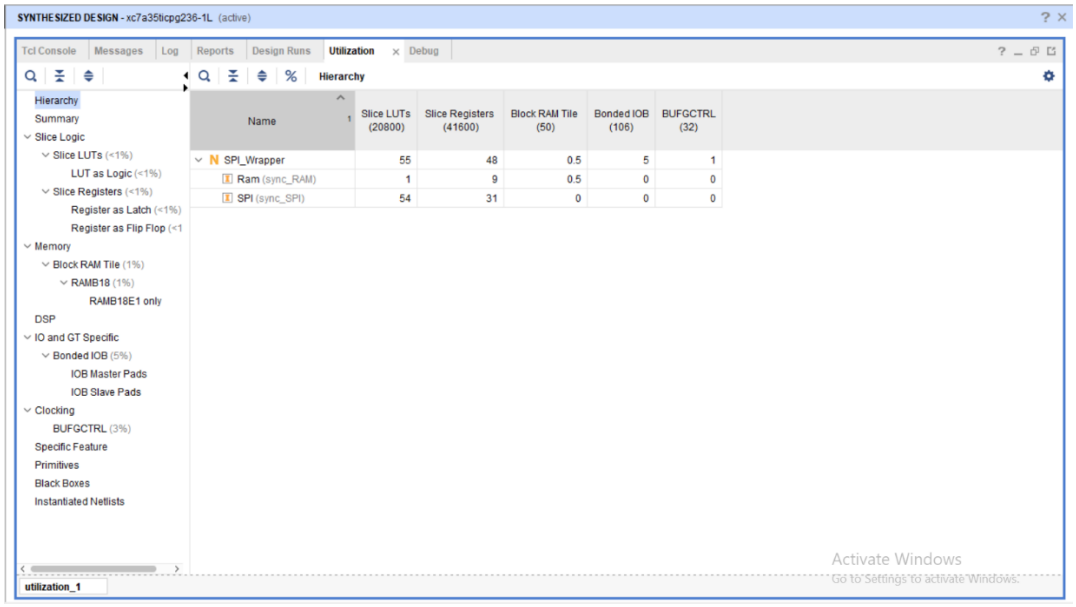
4- Synthesis snippets after choosing the encoding

3.1 – Massage

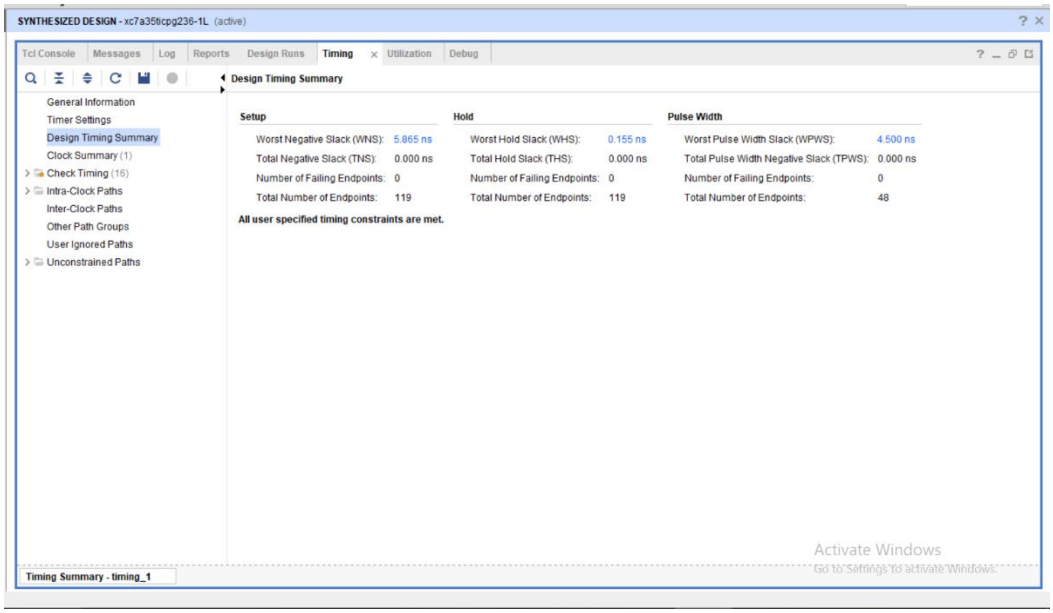
3.2 – Schematic



3.2 – Utilization

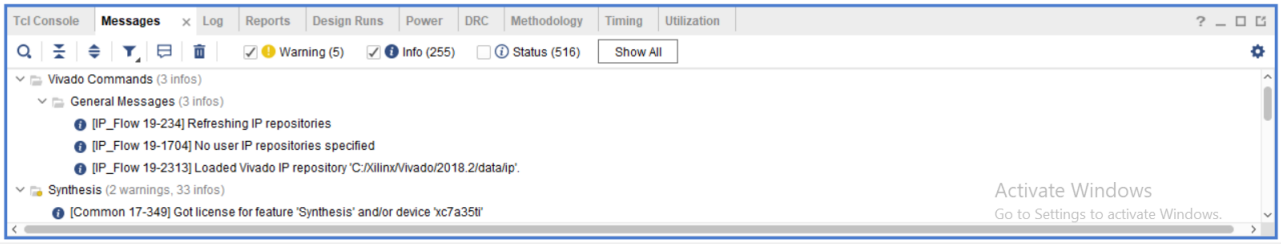


3.2 – Timming

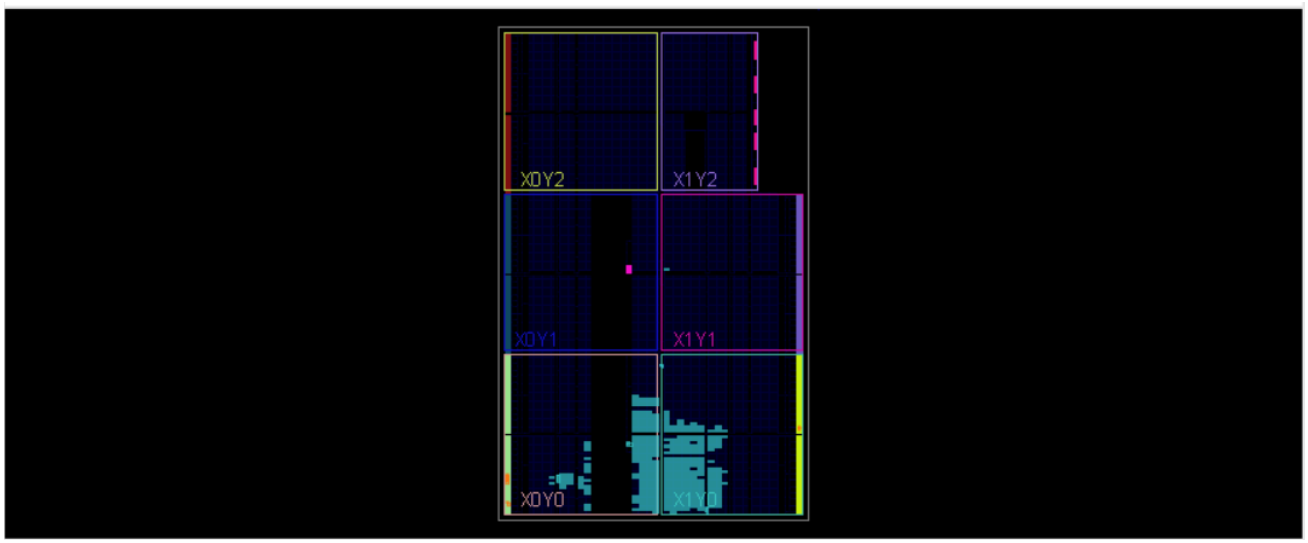


5- Implementation snippets after choosing the encoding

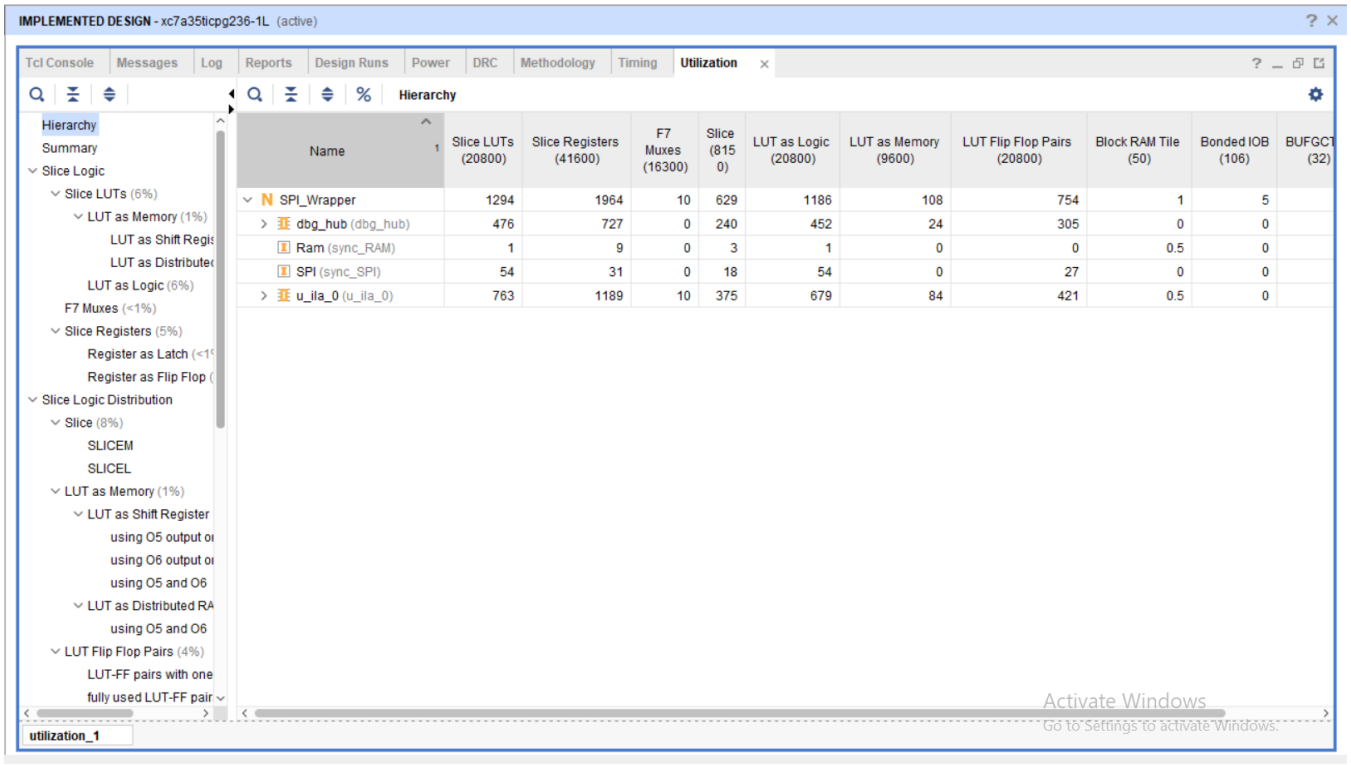
3.1 – Massage



3.2 – Device



3.2 – Utilization



3.2 – Timming