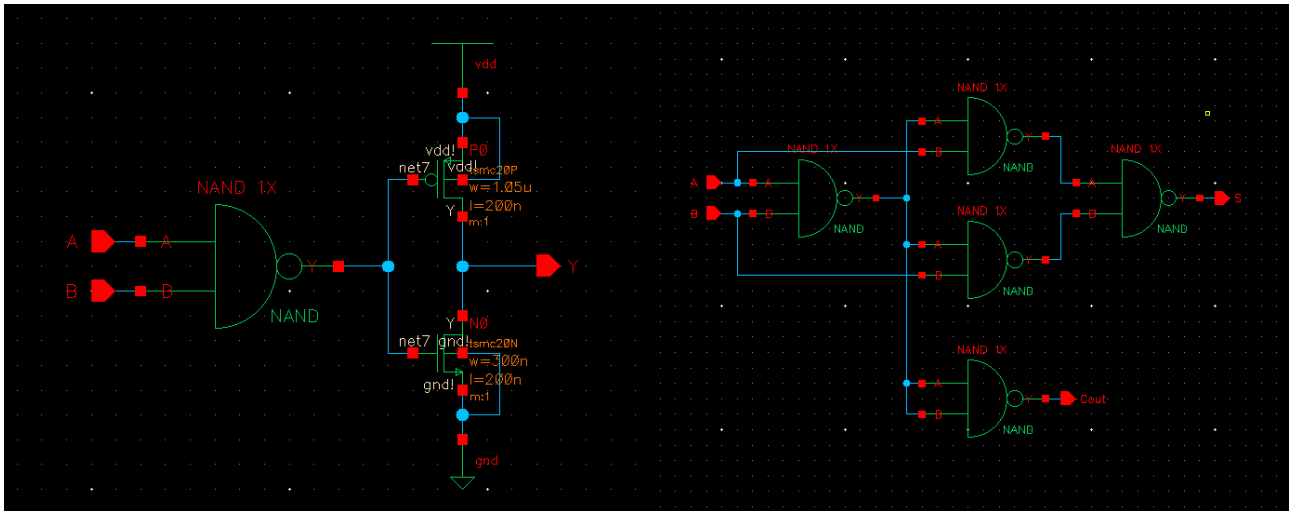


# EE 477- Spring 2021 VLSI CIRCUIT DESIGN

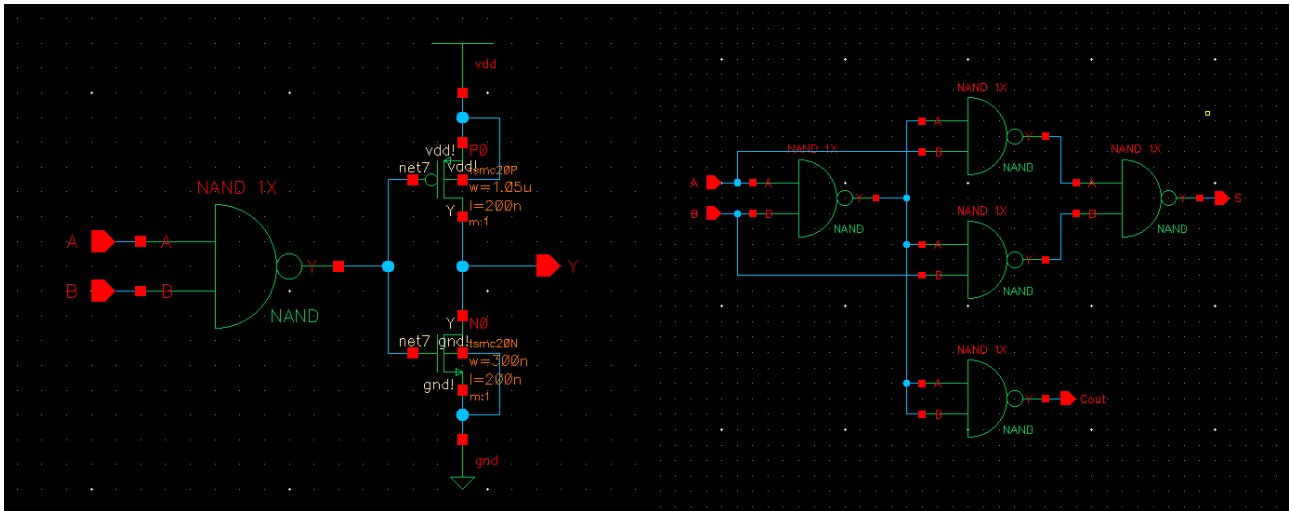
Lab4-1 Report  
16-bit Adder & 6x6-bit Multiplier Design

Ti-Shen Chueh  
tchueh@usc.edu  
3751474091

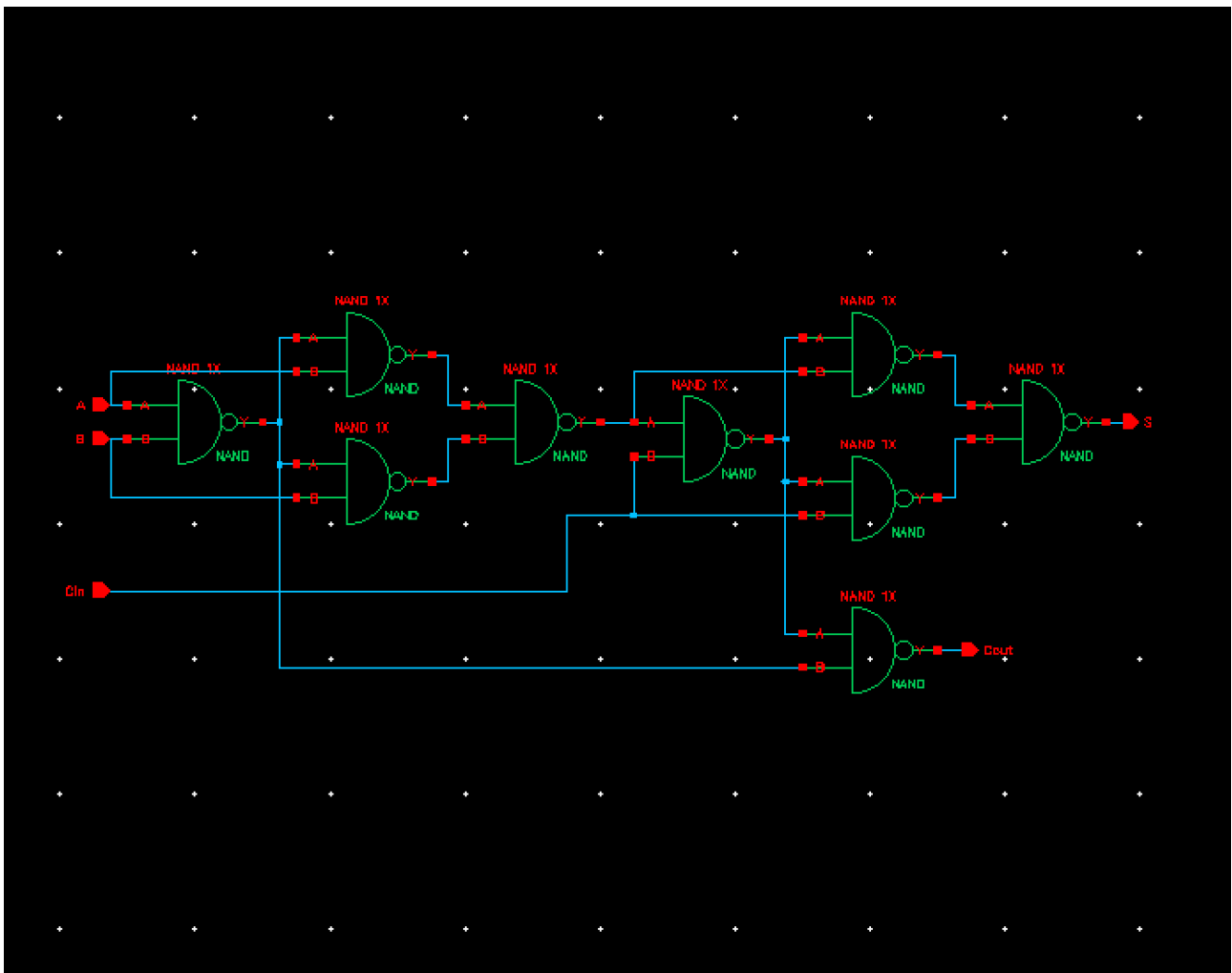
## AND



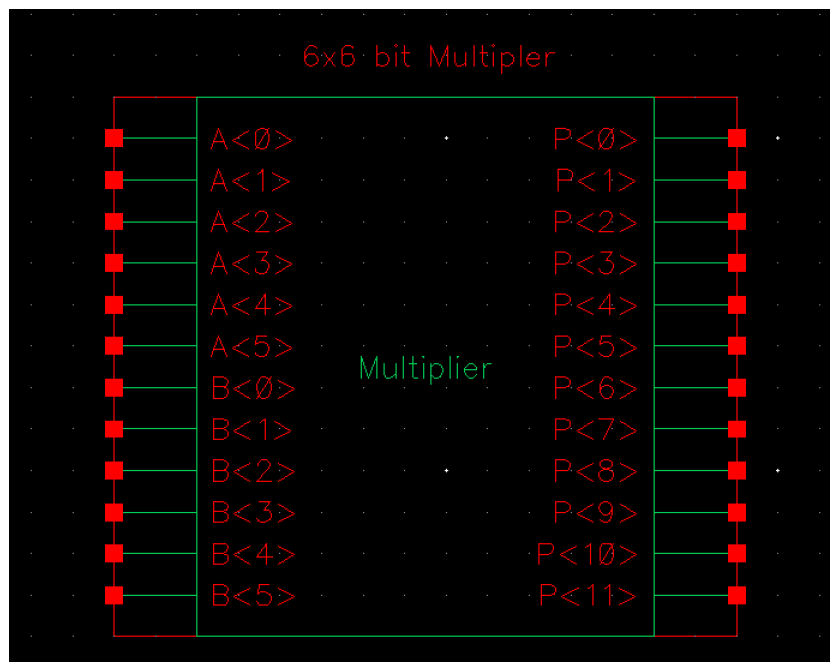
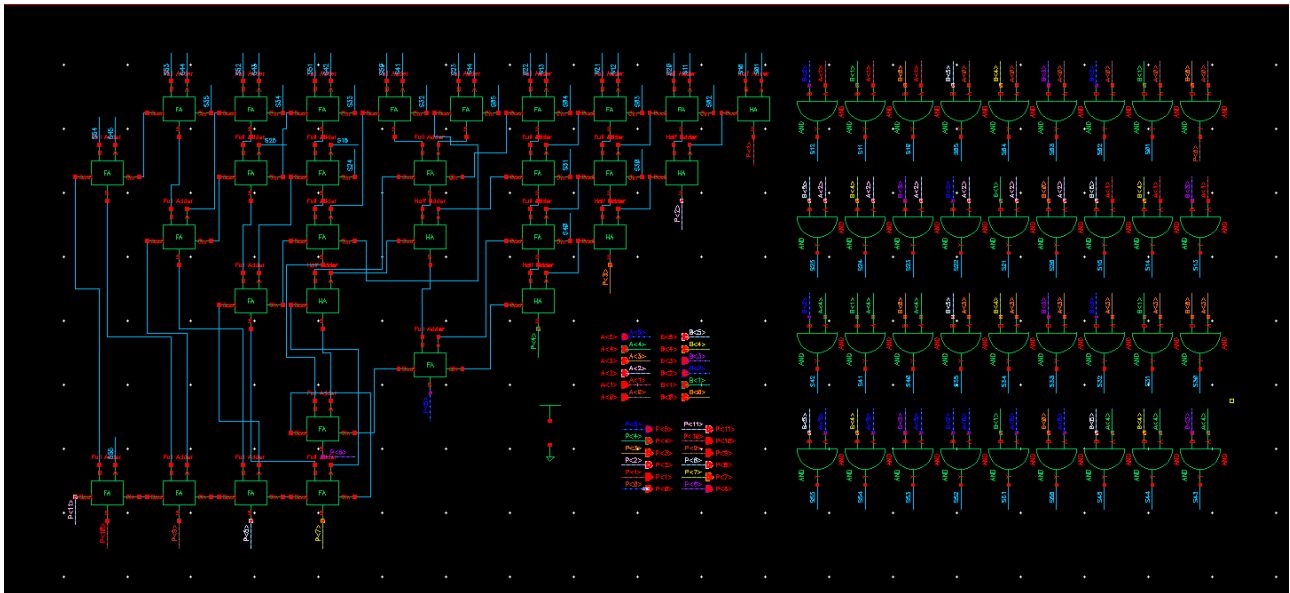
## Half adder



## Full Adder



# Wallace tree Multiplier



Virtuoso® 6.1.7-64b - Log: /home/viterbi/01/tchueh/CDS.log

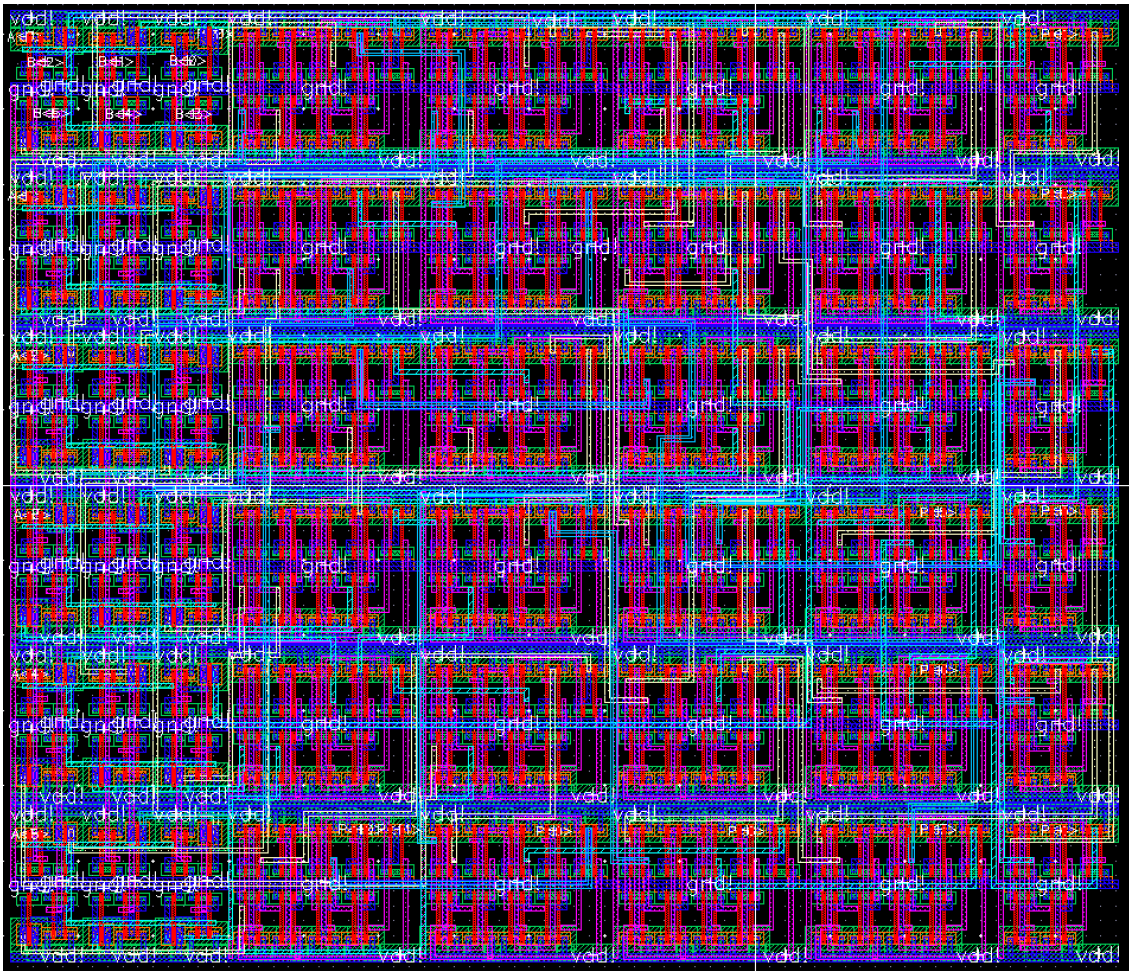
File Tools Options Help cadence

```

DRC started.....Thu Apr 8 14:56:42 2021
  completed ...Thu Apr 8 14:56:55 2021
  CPU TIME = 00:00:00 TOTAL TIME = 00:00:13
***** Summary of rule violations for cell "Multiplier layout" *****
  Total errors found: 0
    
```

mouse L: showClickInfo() M: setDRCForm() R: \_IxHiMousePopUp()

1 >



## Multiplier Layout

The screenshot displays the Cadence Artist LVS tool interface. On the left, the 'Layers' panel shows a list of layers with checkboxes for 'Used' and 'Routing'. The main window is titled 'Artist LVS' and contains the following configuration options:

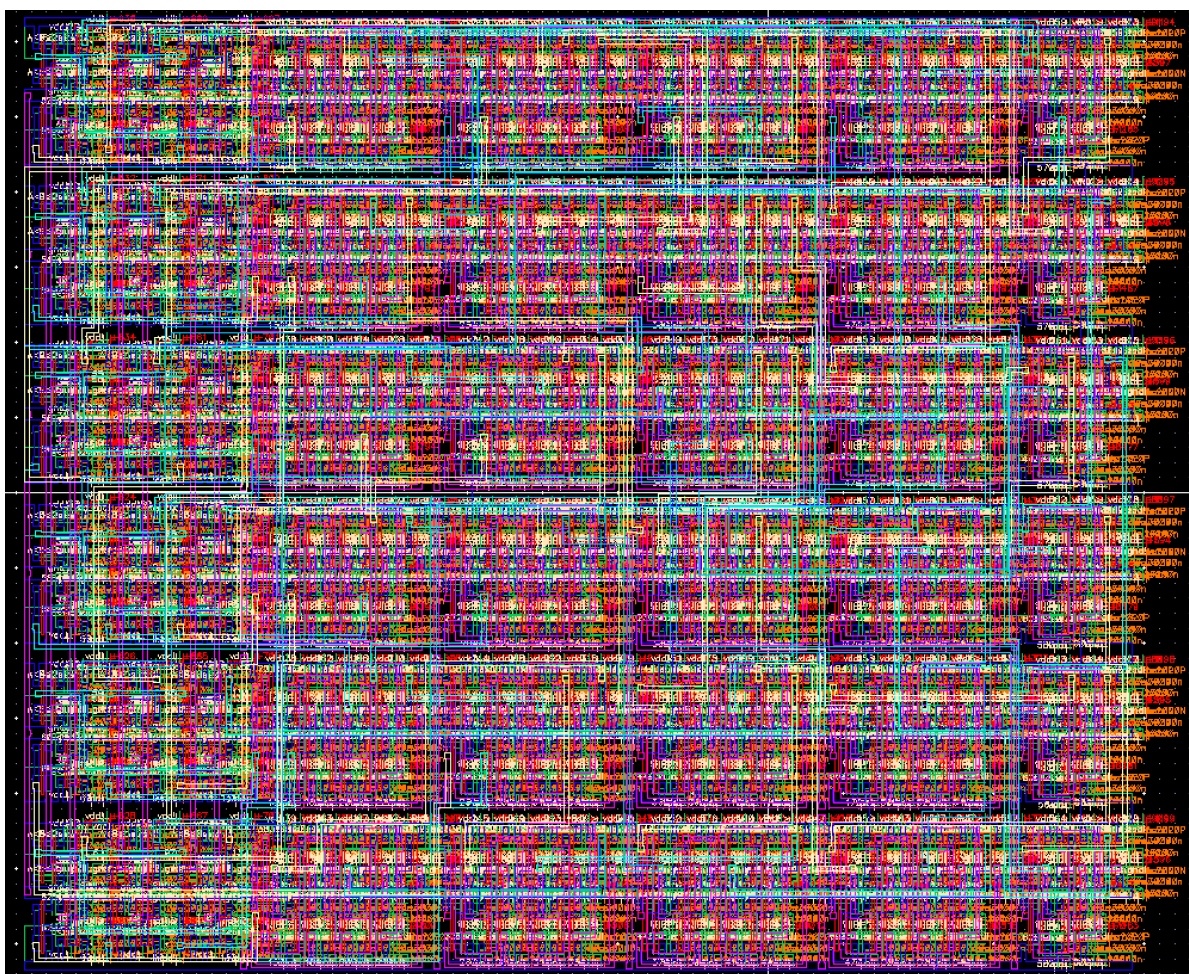
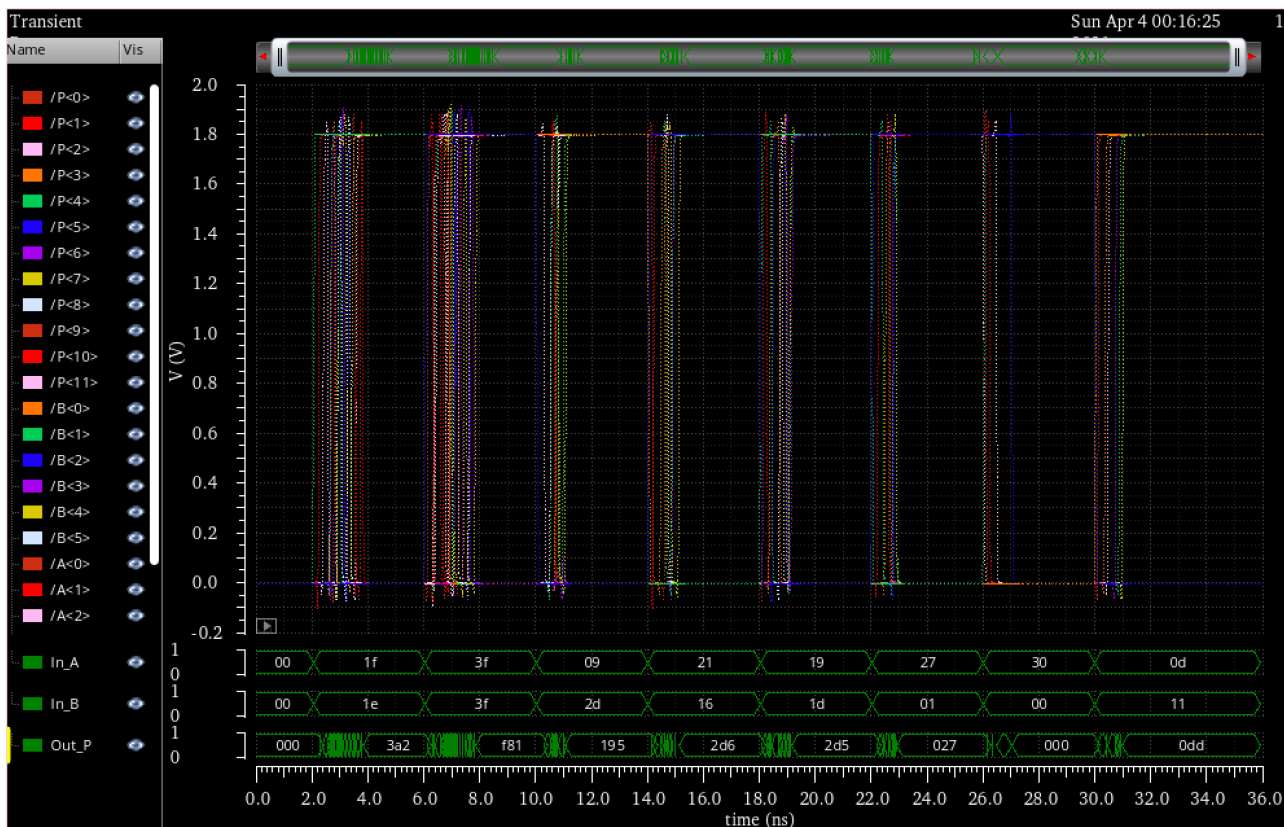
- Run Directory:** LVS
- Create Netlist:**
  - schematic
  - extracted
- Library:** Project
- Cell:** Multiplier
- View:** schematic
- LVS Options:**
  - Rewiring
  - Device Fixing
  - Create Cross Reference
  - Terminals
- Correspondence File:** lvs\_corr\_file
- Priority:** 0
- Run Mode:** background

A dialog box in the center of the screen displays the following message:

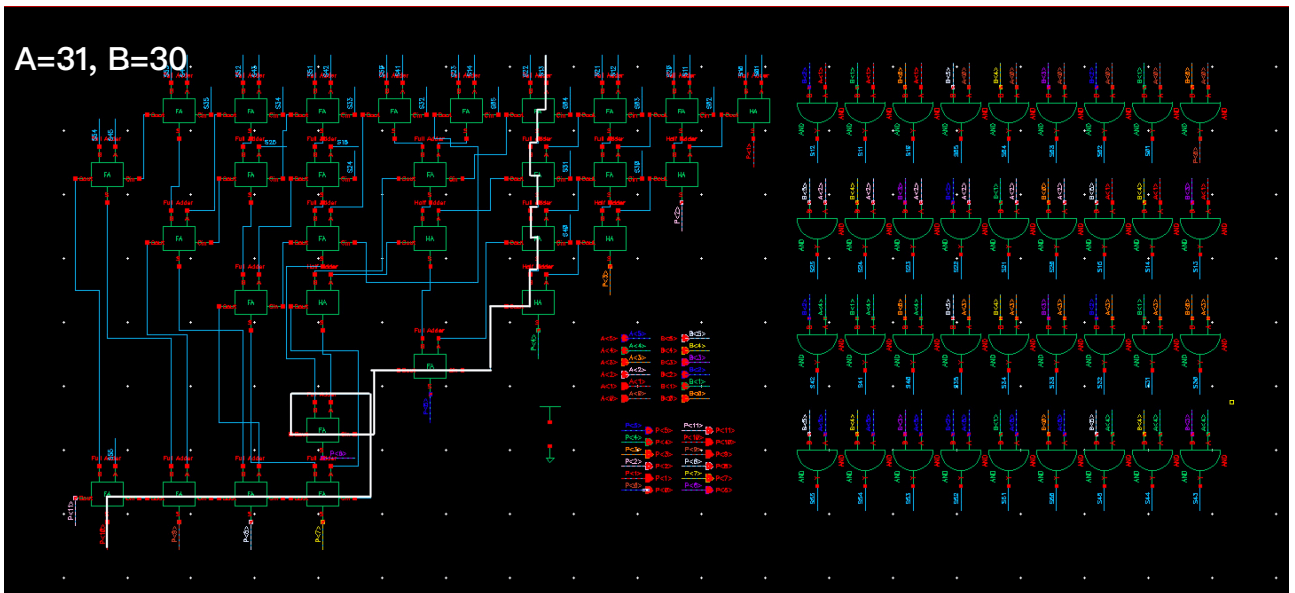
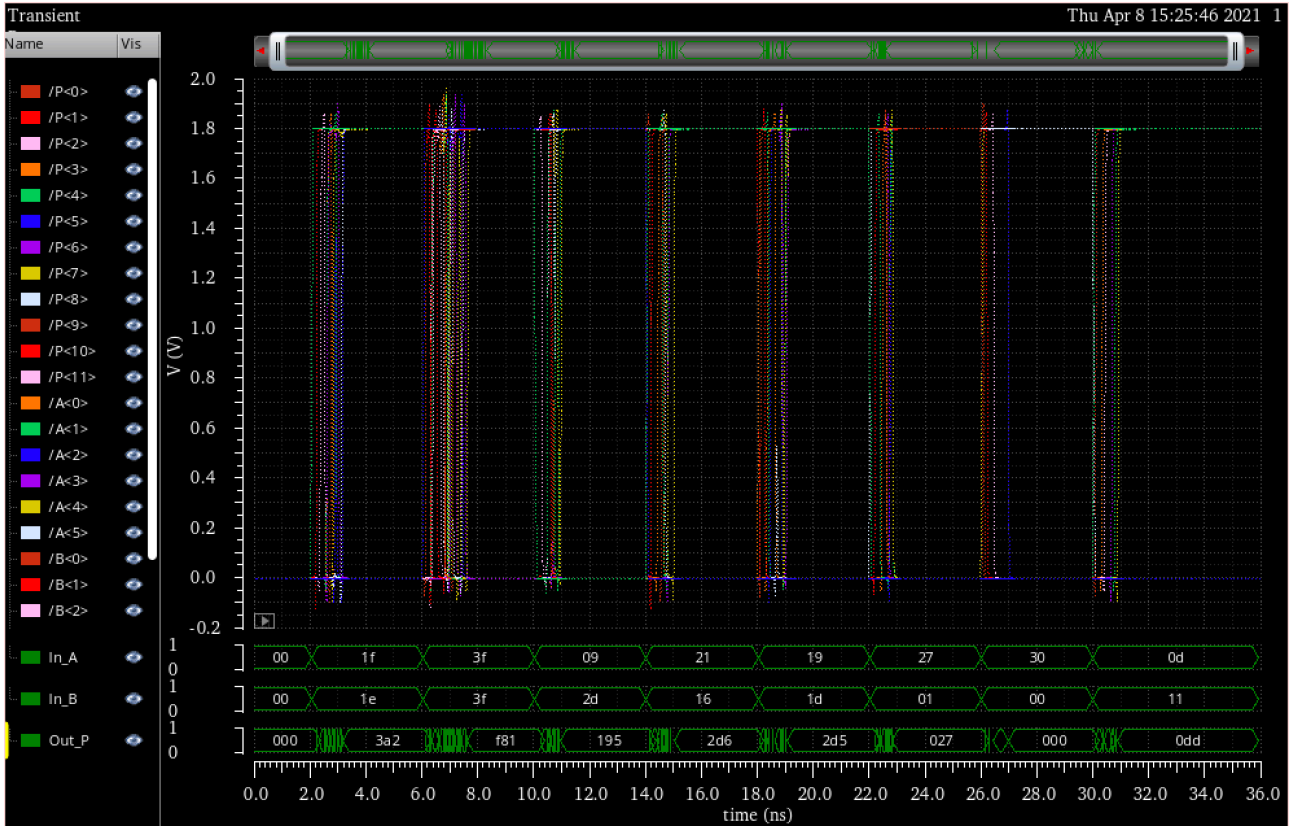
The LVS job has completed. The net-lists match.  
Run Directory: /home/viterbi01/chueh/cds/LVS

The right side of the image shows the multiplier layout, which is a dense grid of repeating multiplier cells with various colored traces and labels.

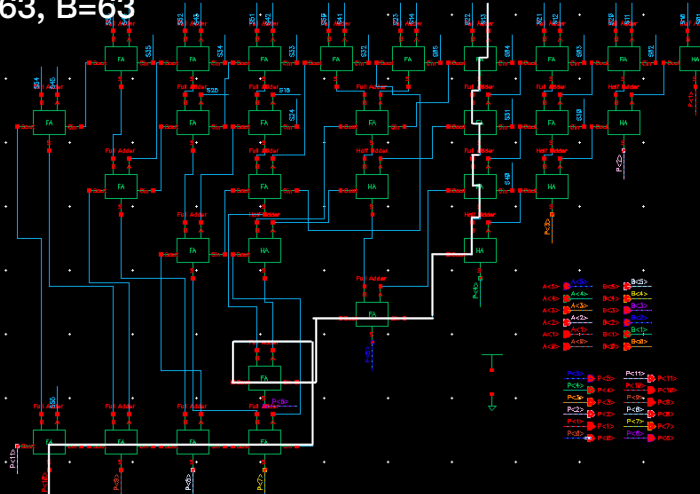
# Schematic delay



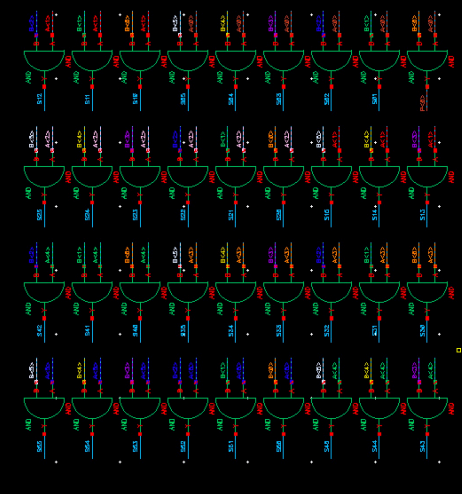
# Extracted view delay



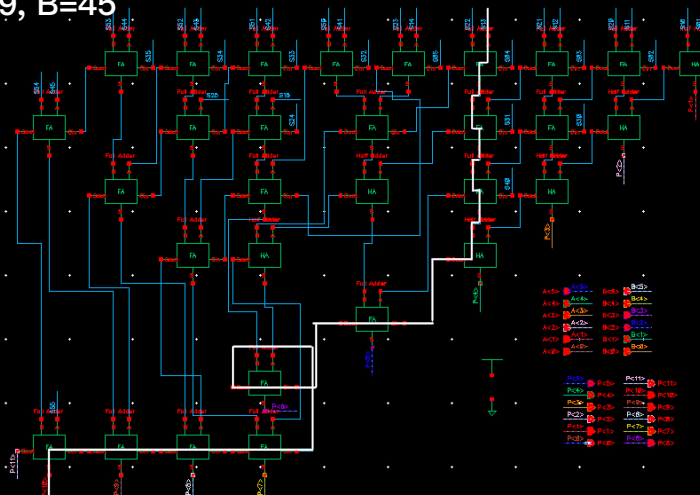
A=63, B=63



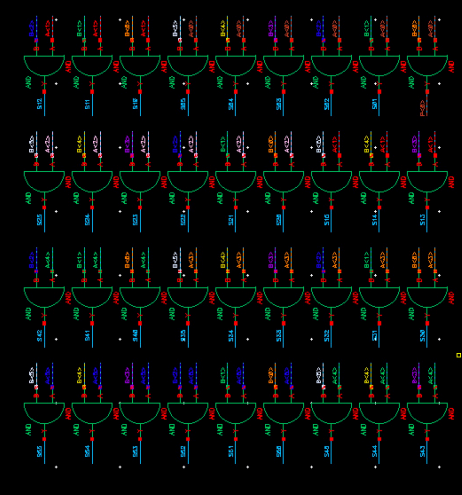
- A1-C1: A1-C1, A2-C2, A3-C3, A4-C4
- A5-C5: A5-C5, A6-C6, A7-C7, A8-C8
- A9-C9: A9-C9, A10-C10, A11-C11, A12-C12
- A13-C13: A13-C13, A14-C14, A15-C15, A16-C16
- A17-C17: A17-C17, A18-C18, A19-C19, A20-C20
- A21-C21: A21-C21, A22-C22, A23-C23, A24-C24
- A25-C25: A25-C25, A26-C26, A27-C27, A28-C28
- A29-C29: A29-C29, A30-C30, A31-C31, A32-C32
- A33-C33: A33-C33, A34-C34, A35-C35, A36-C36
- A37-C37: A37-C37, A38-C38, A39-C39, A40-C40
- A41-C41: A41-C41, A42-C42, A43-C43, A44-C44
- A45-C45: A45-C45, A46-C46, A47-C47, A48-C48
- A49-C49: A49-C49, A50-C50, A51-C51, A52-C52
- A53-C53: A53-C53, A54-C54, A55-C55, A56-C56
- A57-C57: A57-C57, A58-C58, A59-C59, A60-C60
- A61-C61: A61-C61, A62-C62, A63-C63, A64-C64
- A65-C65: A65-C65, A66-C66, A67-C67, A68-C68
- A69-C69: A69-C69, A70-C70, A71-C71, A72-C72
- A73-C73: A73-C73, A74-C74, A75-C75, A76-C76
- A77-C77: A77-C77, A78-C78, A79-C79, A80-C80
- A81-C81: A81-C81, A82-C82, A83-C83, A84-C84
- A85-C85: A85-C85, A86-C86, A87-C87, A88-C88
- A89-C89: A89-C89, A90-C90, A91-C91, A92-C92
- A93-C93: A93-C93, A94-C94, A95-C95, A96-C96
- A97-C97: A97-C97, A98-C98, A99-C99, A100-C100



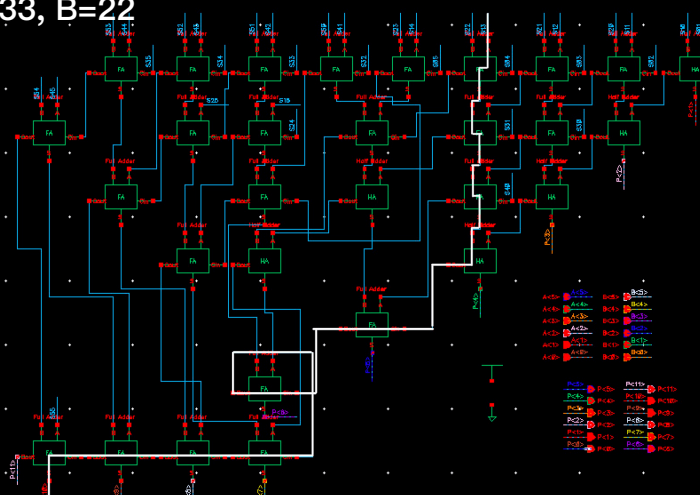
A=9, B=45



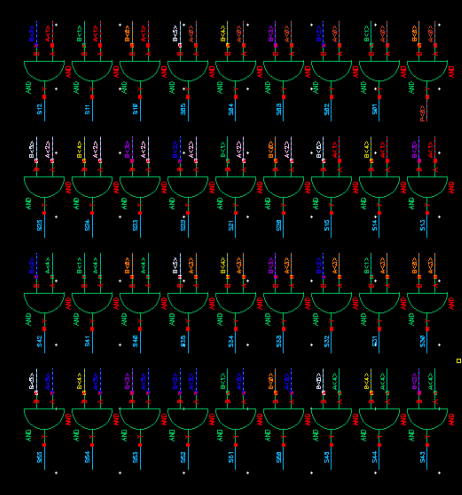
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- A5-C5: A5-C5, A6-C6, A7-C7, A8-C8
- A9-C9: A9-C9, A10-C10, A11-C11, A12-C12
- A13-C13: A13-C13, A14-C14, A15-C15, A16-C16
- A17-C17: A17-C17, A18-C18, A19-C19, A20-C20
- A21-C21: A21-C21, A22-C22, A23-C23, A24-C24
- A25-C25: A25-C25, A26-C26, A27-C27, A28-C28
- A29-C29: A29-C29, A30-C30, A31-C31, A32-C32
- A33-C33: A33-C33, A34-C34, A35-C35, A36-C36
- A37-C37: A37-C37, A38-C38, A39-C39, A40-C40
- A41-C41: A41-C41, A42-C42, A43-C43, A44-C44
- A45-C45: A45-C45, A46-C46, A47-C47, A48-C48
- A49-C49: A49-C49, A50-C50, A51-C51, A52-C52
- A53-C53: A53-C53, A54-C54, A55-C55, A56-C56
- A57-C57: A57-C57, A58-C58, A59-C59, A60-C60
- A61-C61: A61-C61, A62-C62, A63-C63, A64-C64
- A65-C65: A65-C65, A66-C66, A67-C67, A68-C68
- A69-C69: A69-C69, A70-C70, A71-C71, A72-C72
- A73-C73: A73-C73, A74-C74, A75-C75, A76-C76
- A77-C77: A77-C77, A78-C78, A79-C79, A80-C80
- A81-C81: A81-C81, A82-C82, A83-C83, A84-C84
- A85-C85: A85-C85, A86-C86, A87-C87, A88-C88
- A89-C89: A89-C89, A90-C90, A91-C91, A92-C92
- A93-C93: A93-C93, A94-C94, A95-C95, A96-C96
- A97-C97: A97-C97, A98-C98, A99-C99, A100-C100



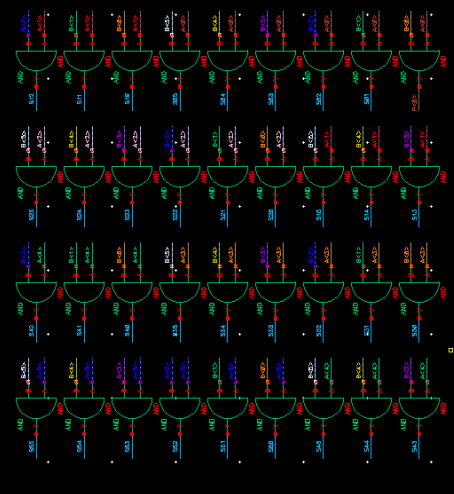
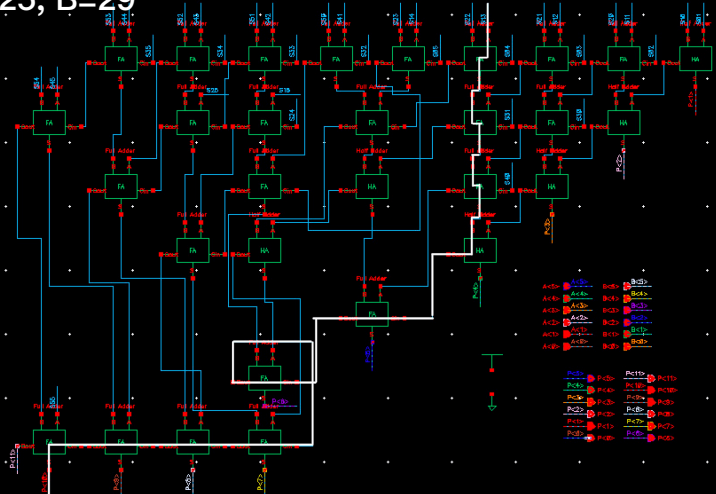
A=33, B=22



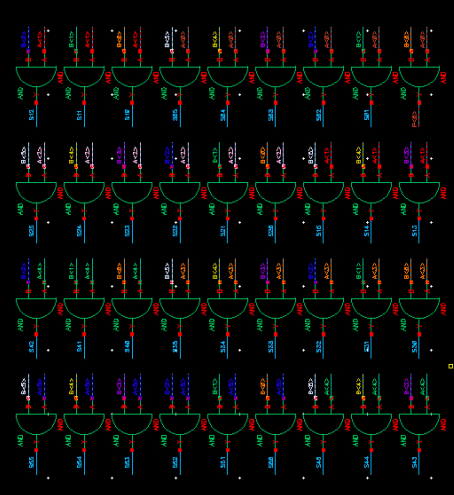
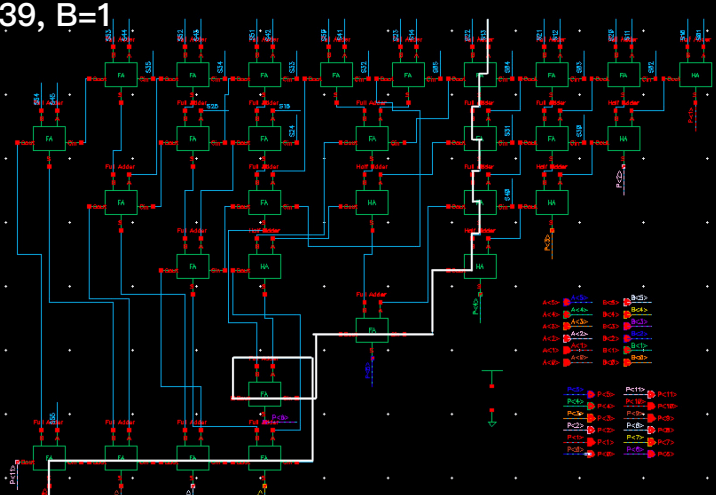
- A1-C1: A1-C1, A2-C2, A3-C3, A4-C4
- A5-C5: A5-C5, A6-C6, A7-C7, A8-C8
- A9-C9: A9-C9, A10-C10, A11-C11, A12-C12
- A13-C13: A13-C13, A14-C14, A15-C15, A16-C16
- A17-C17: A17-C17, A18-C18, A19-C19, A20-C20
- A21-C21: A21-C21, A22-C22, A23-C23, A24-C24
- A25-C25: A25-C25, A26-C26, A27-C27, A28-C28
- A29-C29: A29-C29, A30-C30, A31-C31, A32-C32
- A33-C33: A33-C33, A34-C34, A35-C35, A36-C36
- A37-C37: A37-C37, A38-C38, A39-C39, A40-C40
- A41-C41: A41-C41, A42-C42, A43-C43, A44-C44
- A45-C45: A45-C45, A46-C46, A47-C47, A48-C48
- A49-C49: A49-C49, A50-C50, A51-C51, A52-C52
- A53-C53: A53-C53, A54-C54, A55-C55, A56-C56
- A57-C57: A57-C57, A58-C58, A59-C59, A60-C60
- A61-C61: A61-C61, A62-C62, A63-C63, A64-C64
- A65-C65: A65-C65, A66-C66, A67-C67, A68-C68
- A69-C69: A69-C69, A70-C70, A71-C71, A72-C72
- A73-C73: A73-C73, A74-C74, A75-C75, A76-C76
- A77-C77: A77-C77, A78-C78, A79-C79, A80-C80
- A81-C81: A81-C81, A82-C82, A83-C83, A84-C84
- A85-C85: A85-C85, A86-C86, A87-C87, A88-C88
- A89-C89: A89-C89, A90-C90, A91-C91, A92-C92
- A93-C93: A93-C93, A94-C94, A95-C95, A96-C96
- A97-C97: A97-C97, A98-C98, A99-C99, A100-C100



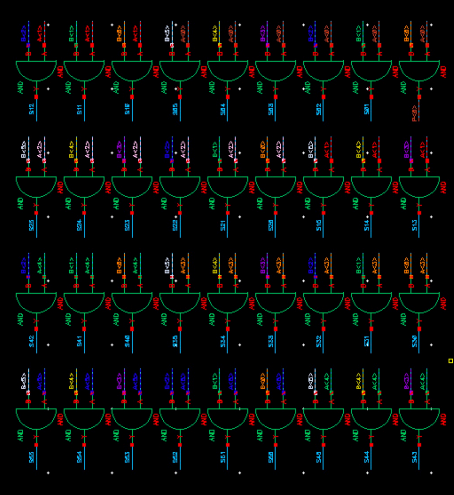
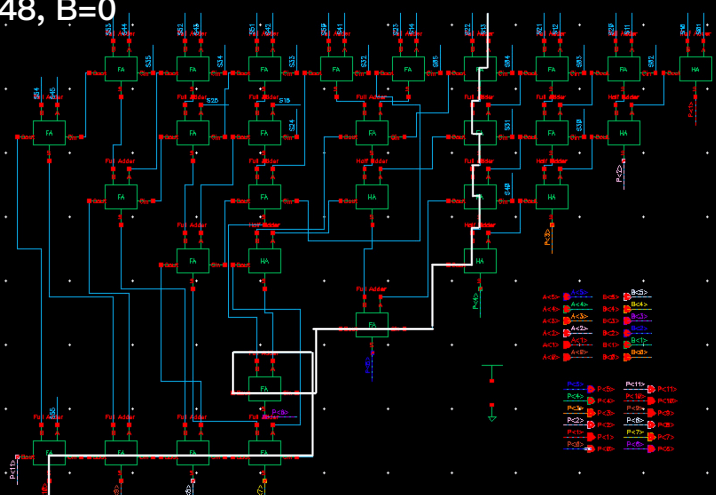
A=25, B=29



A=39, B=1

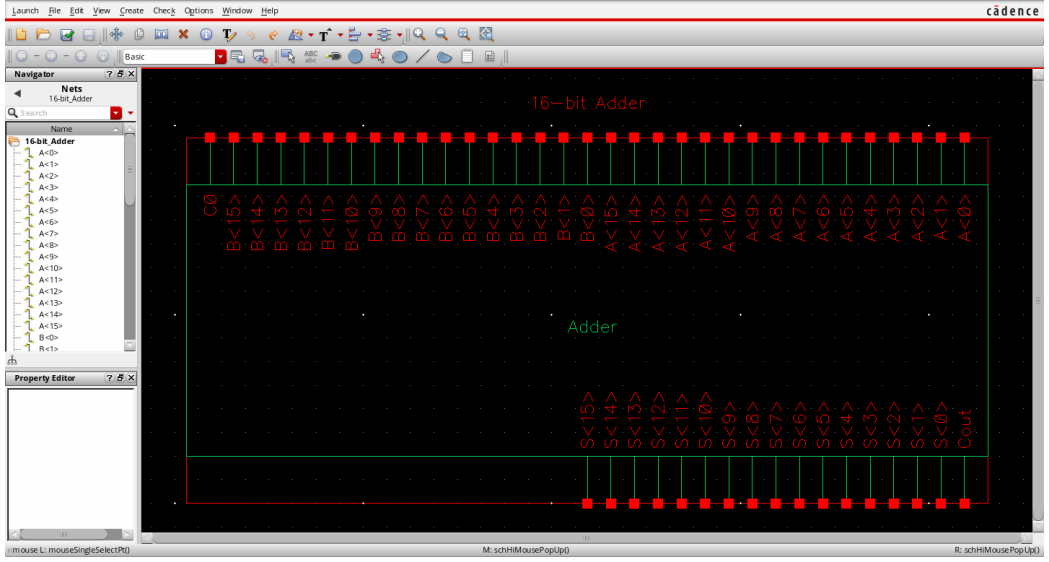
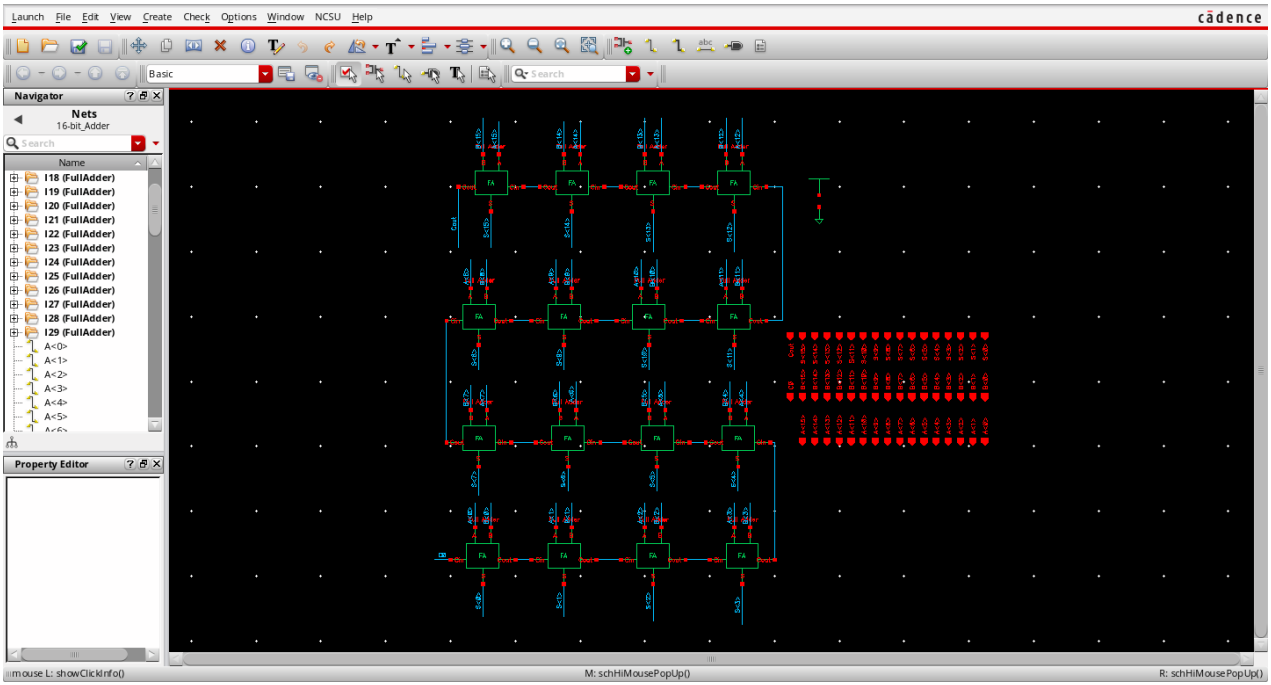
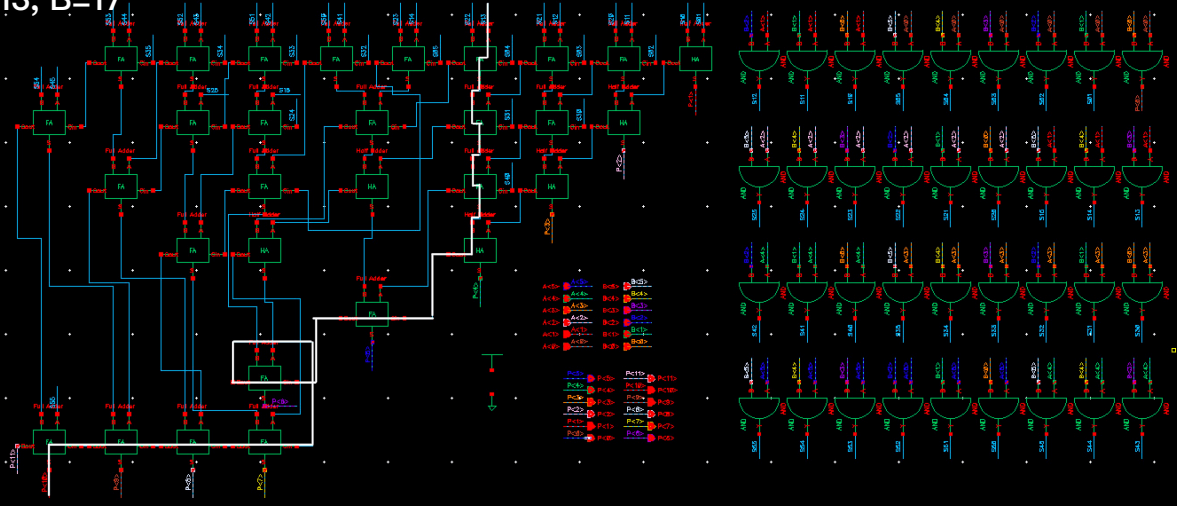


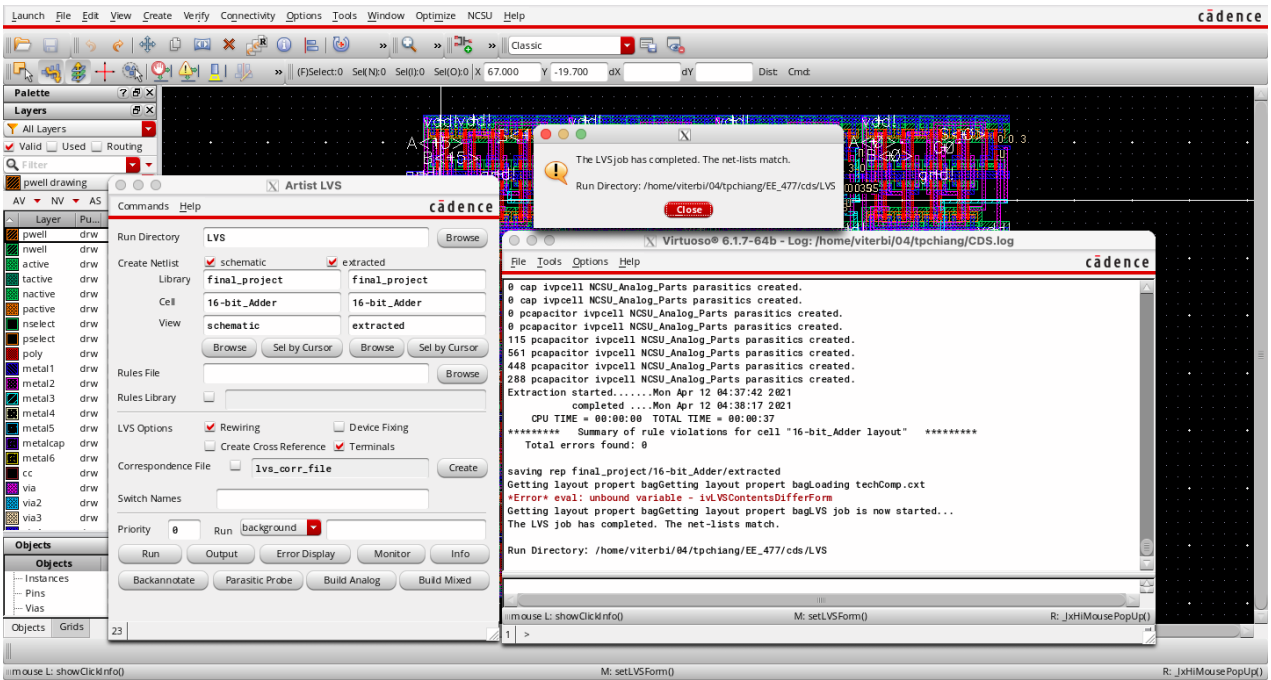
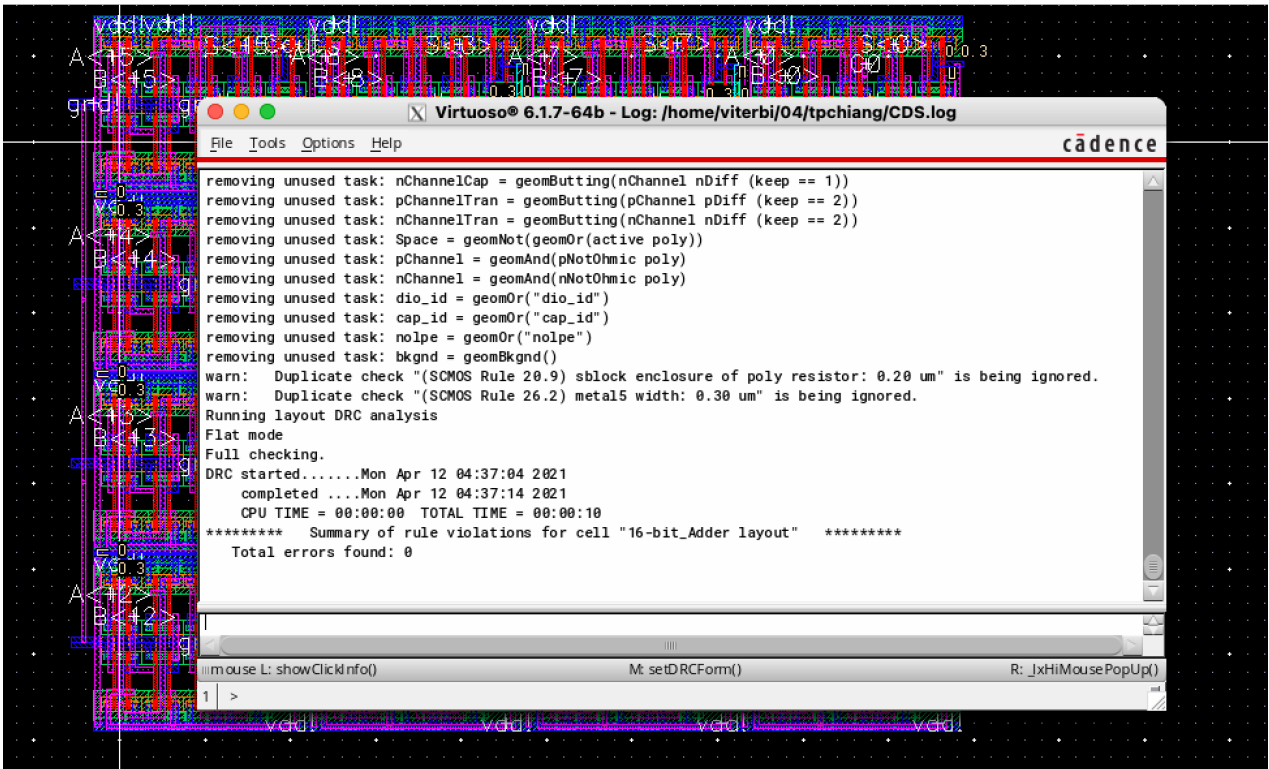
A=48, B=0

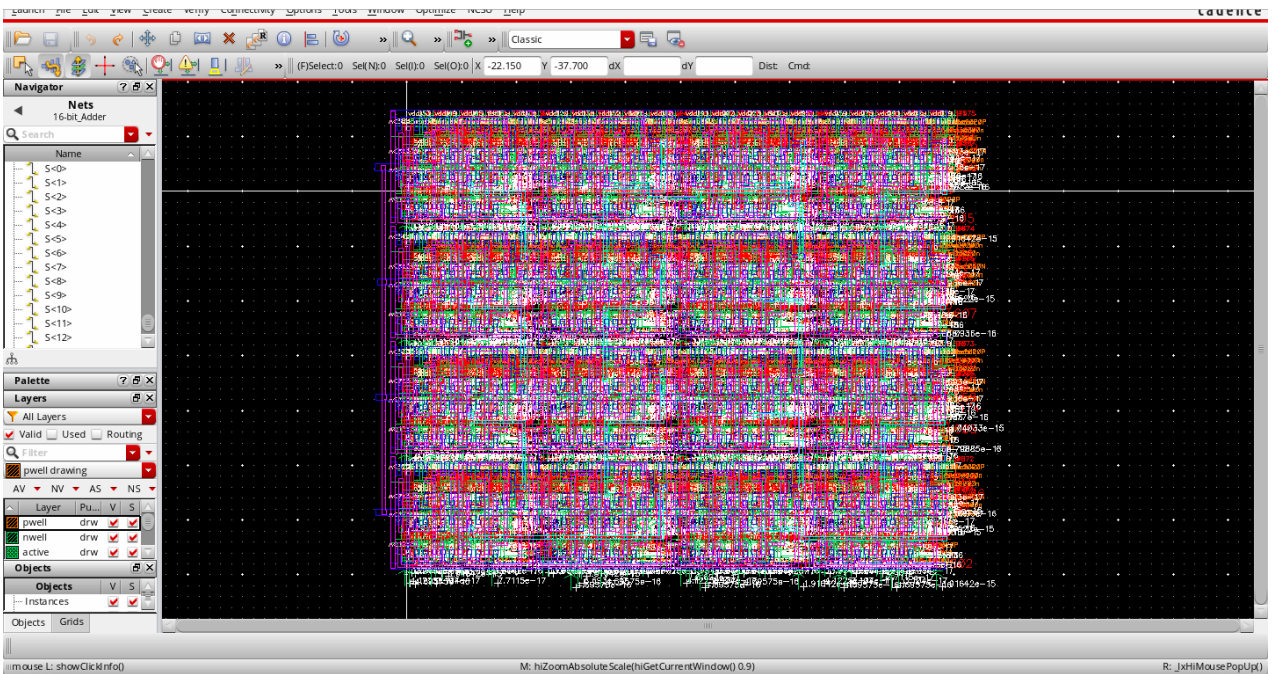
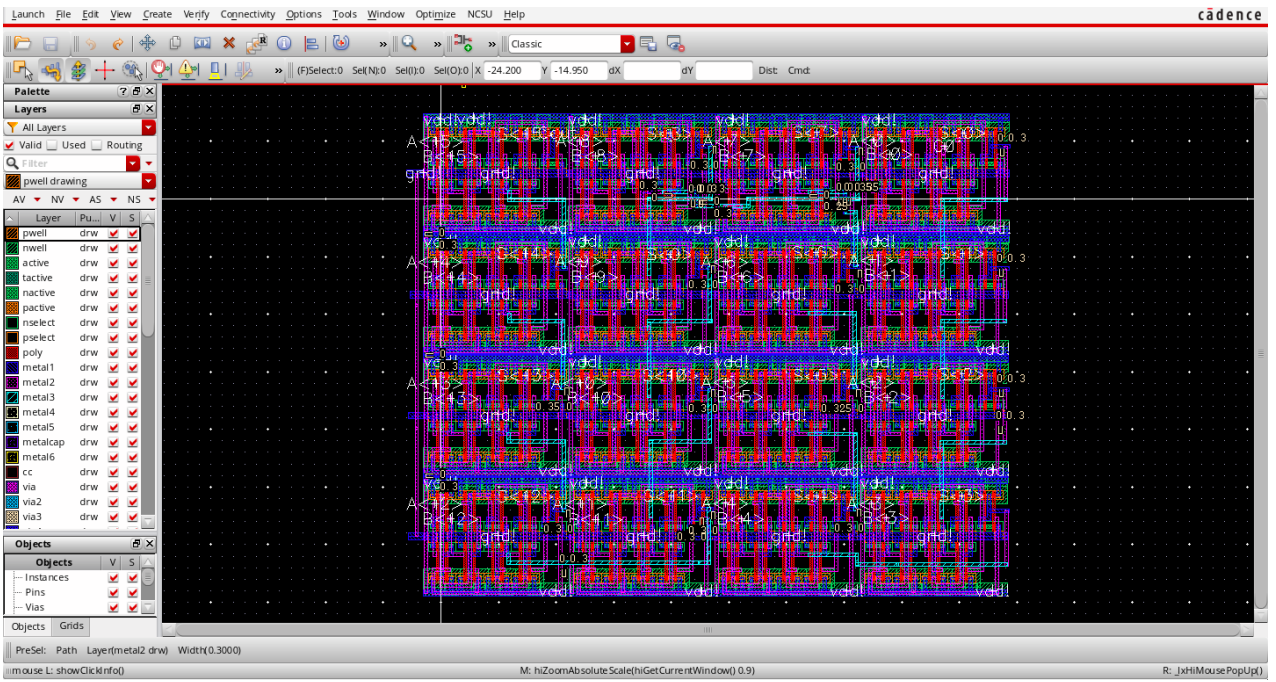




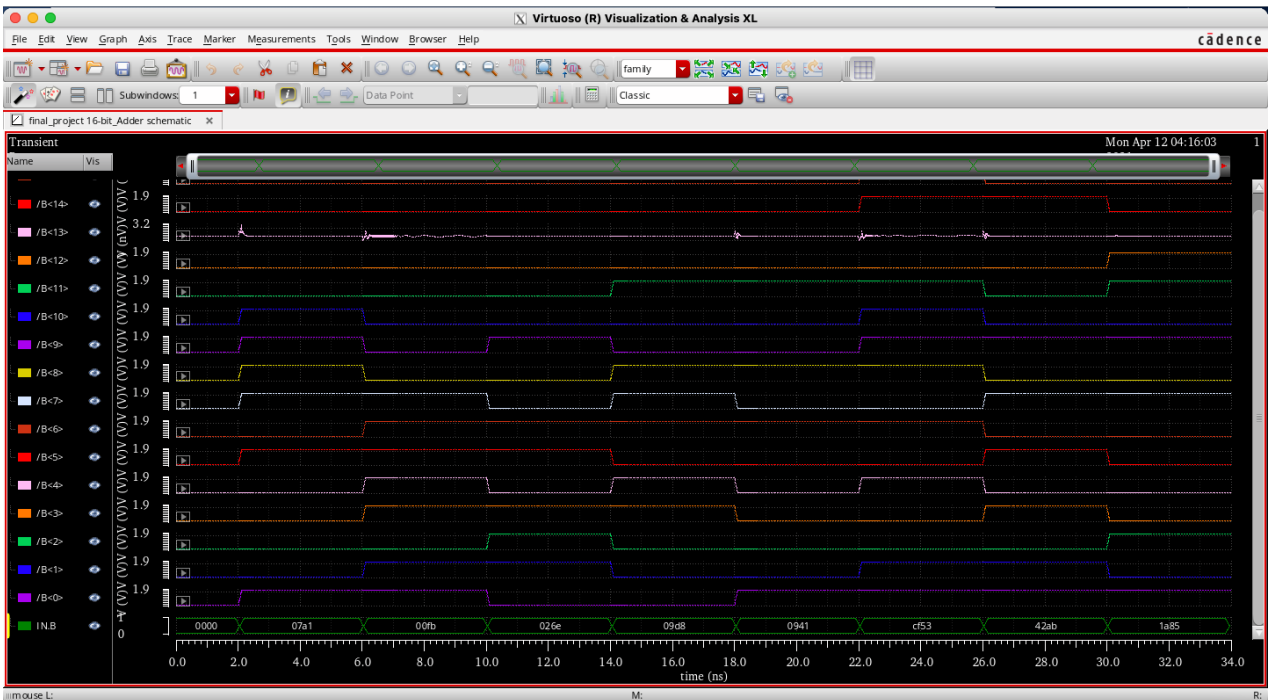
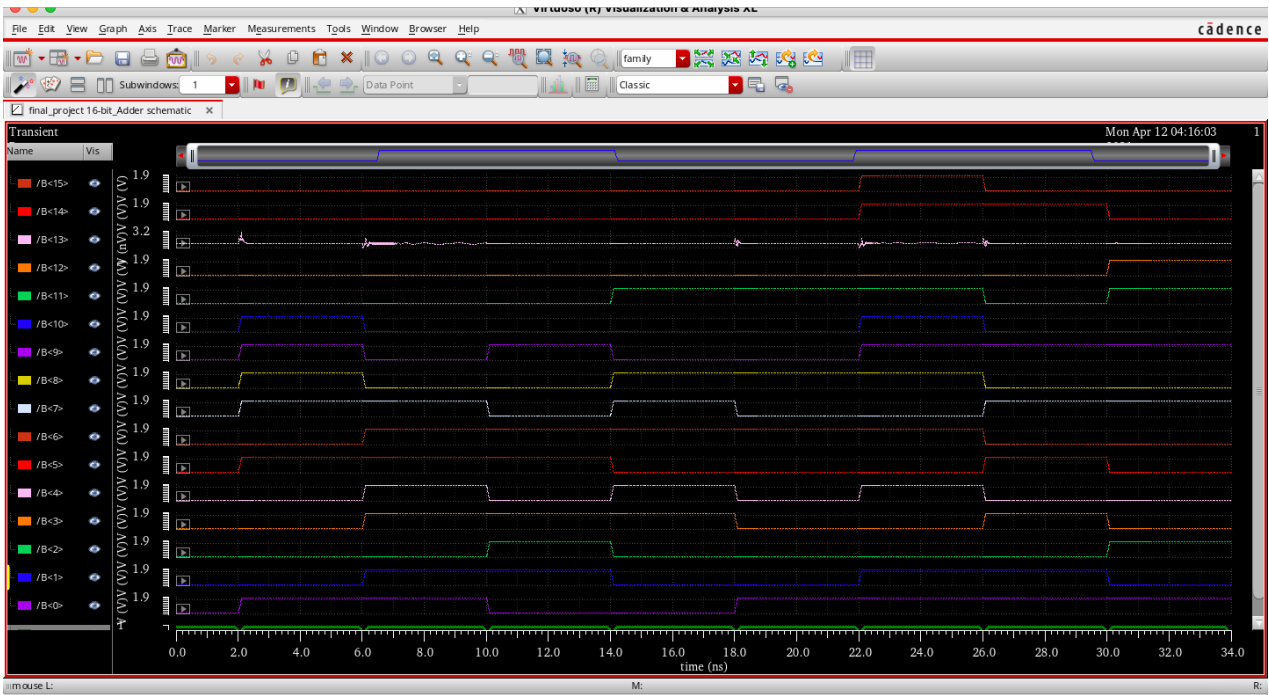
A=13, B=17

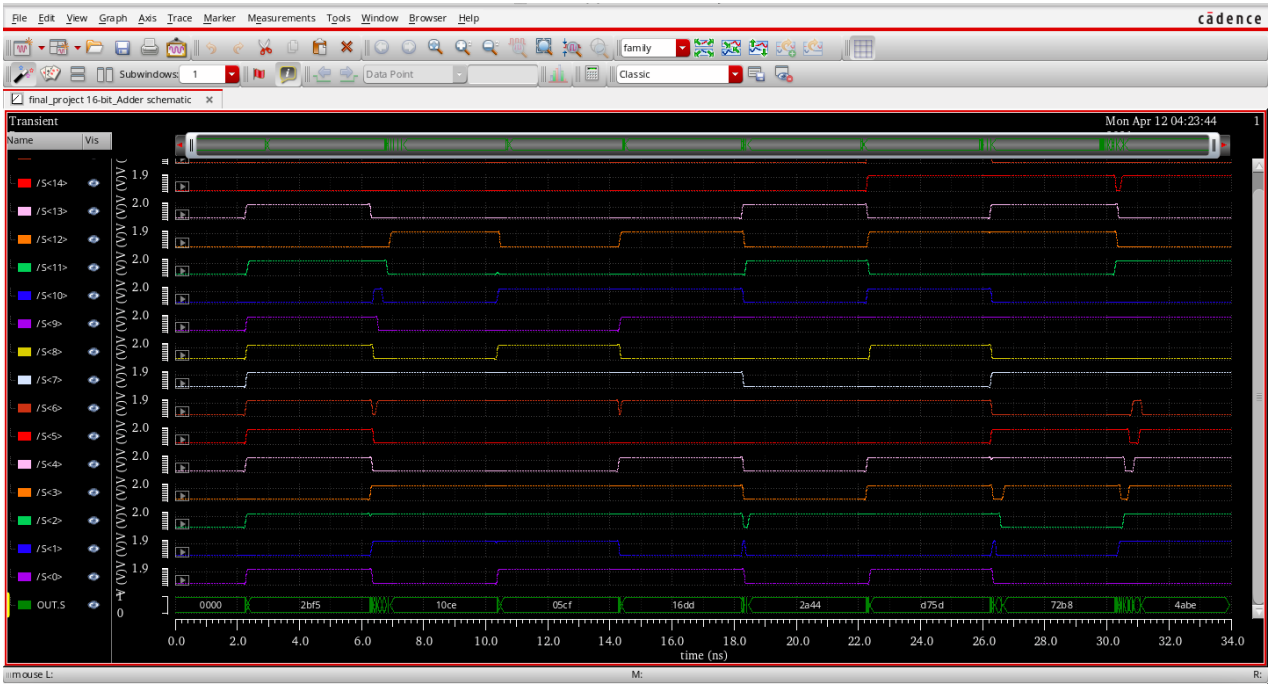
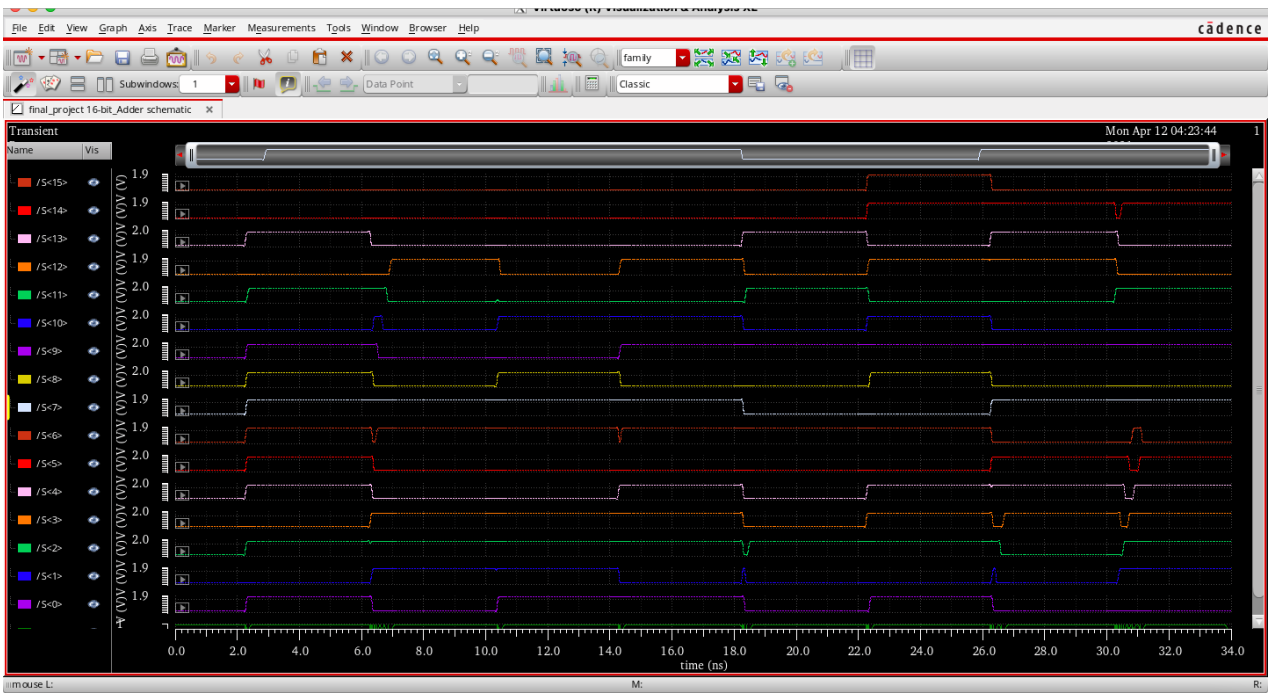


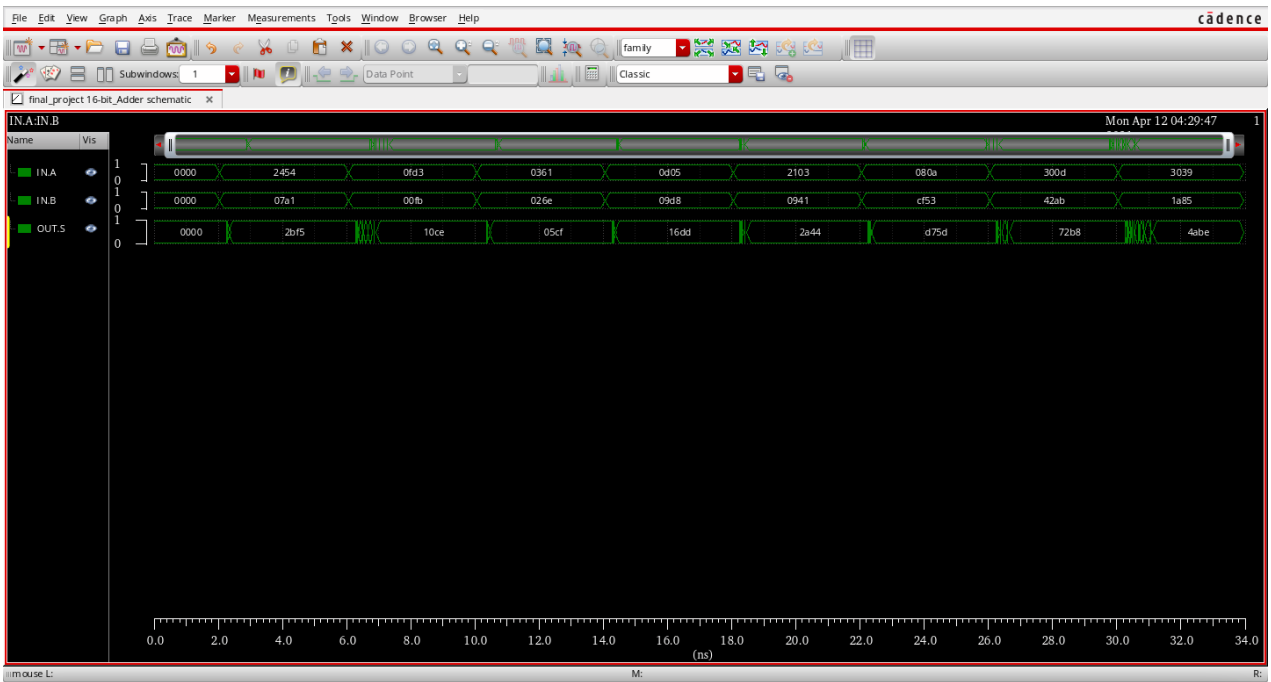




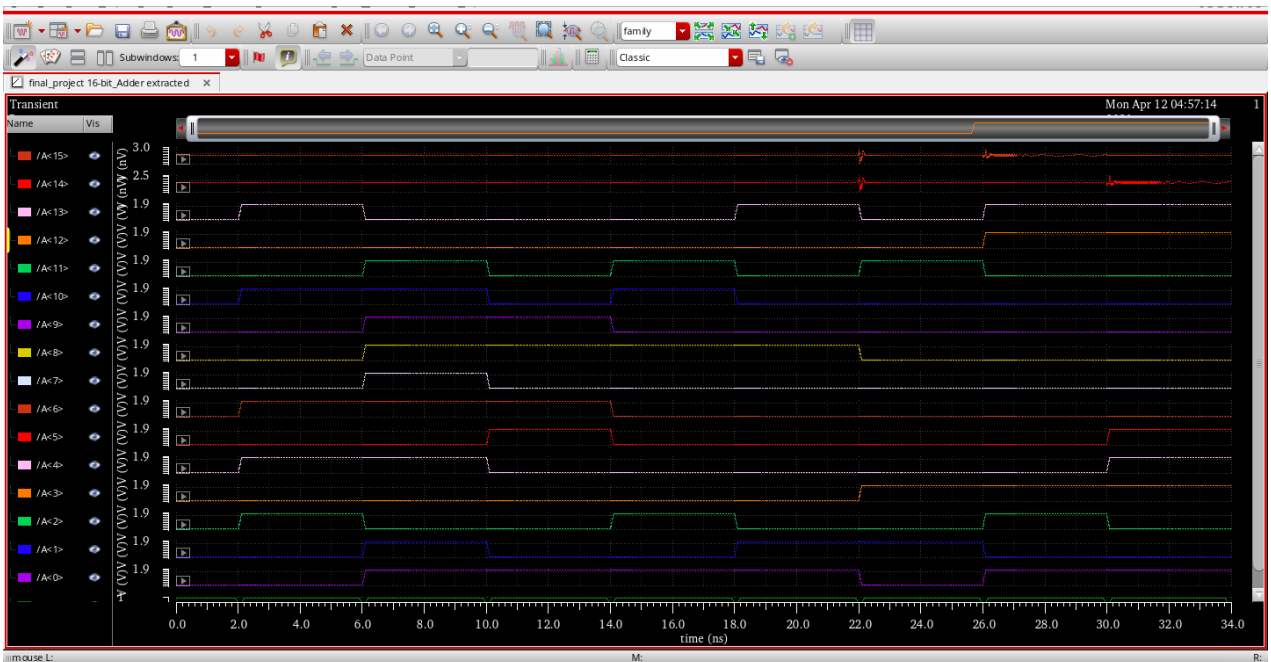


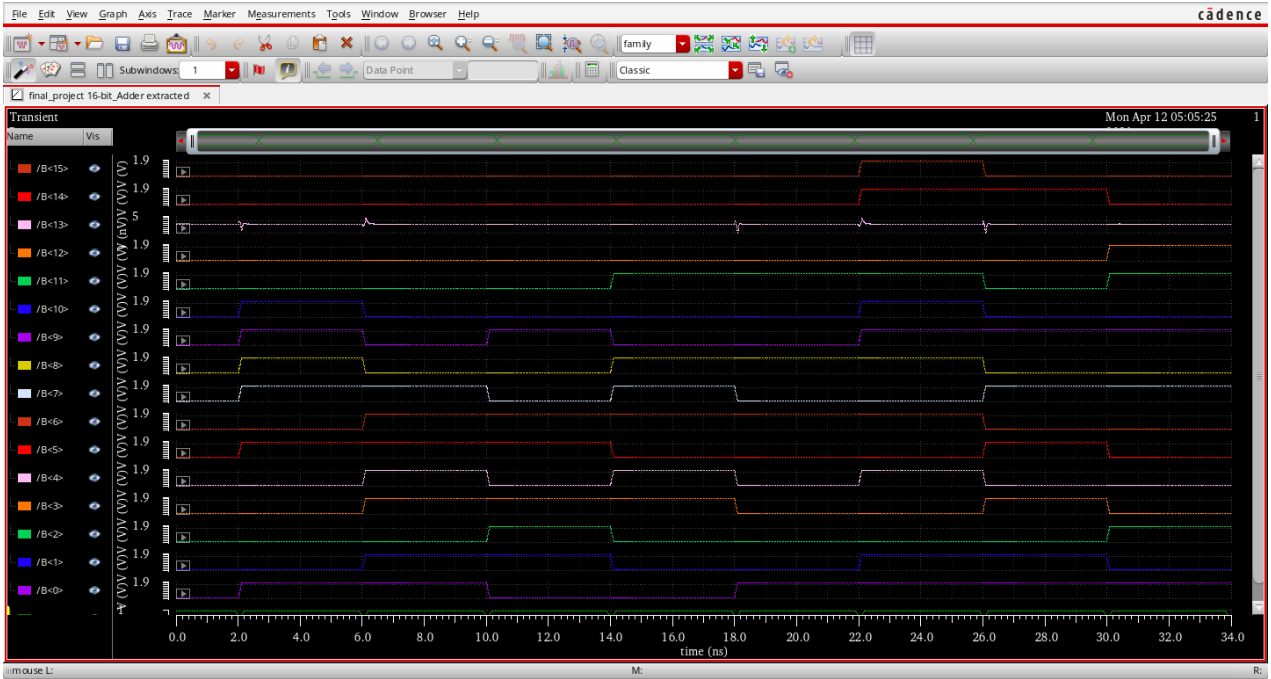
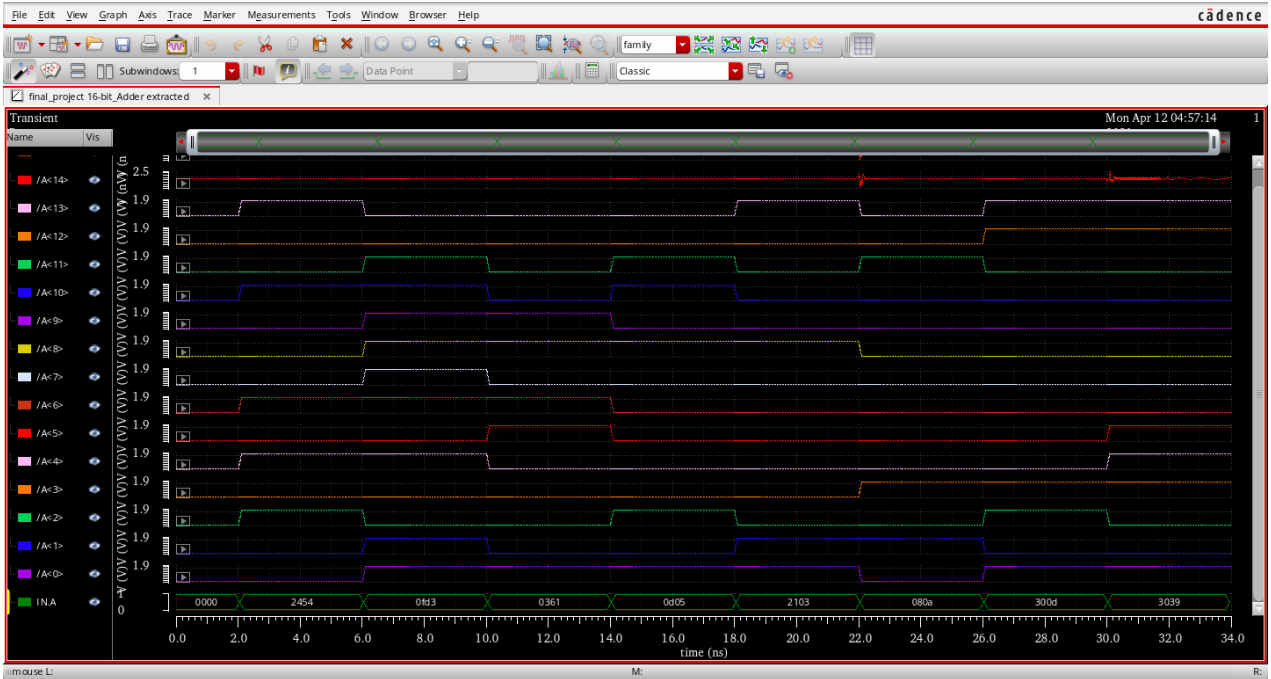




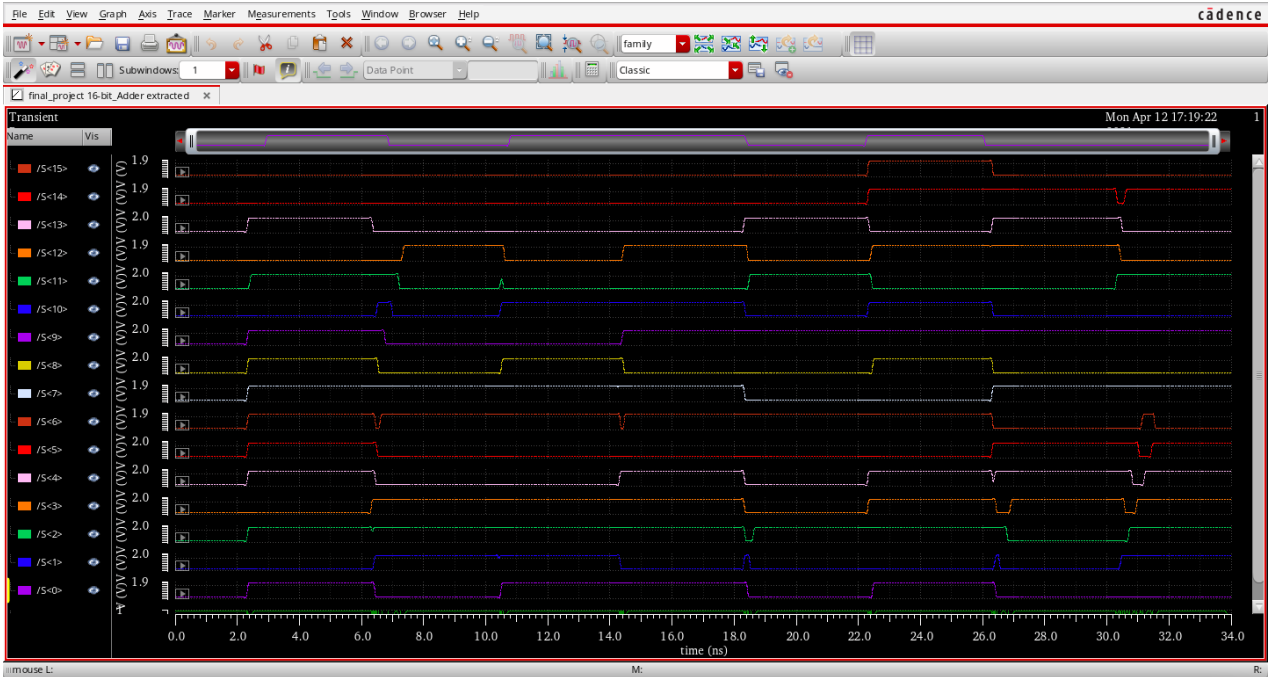
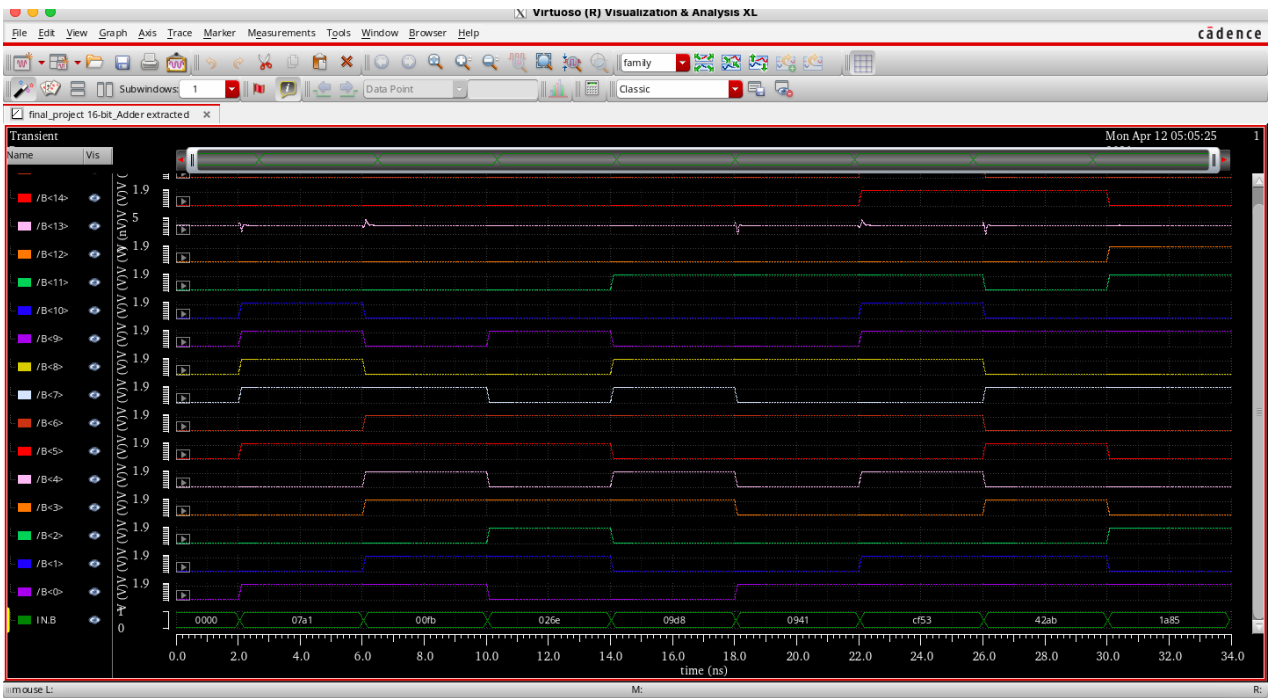


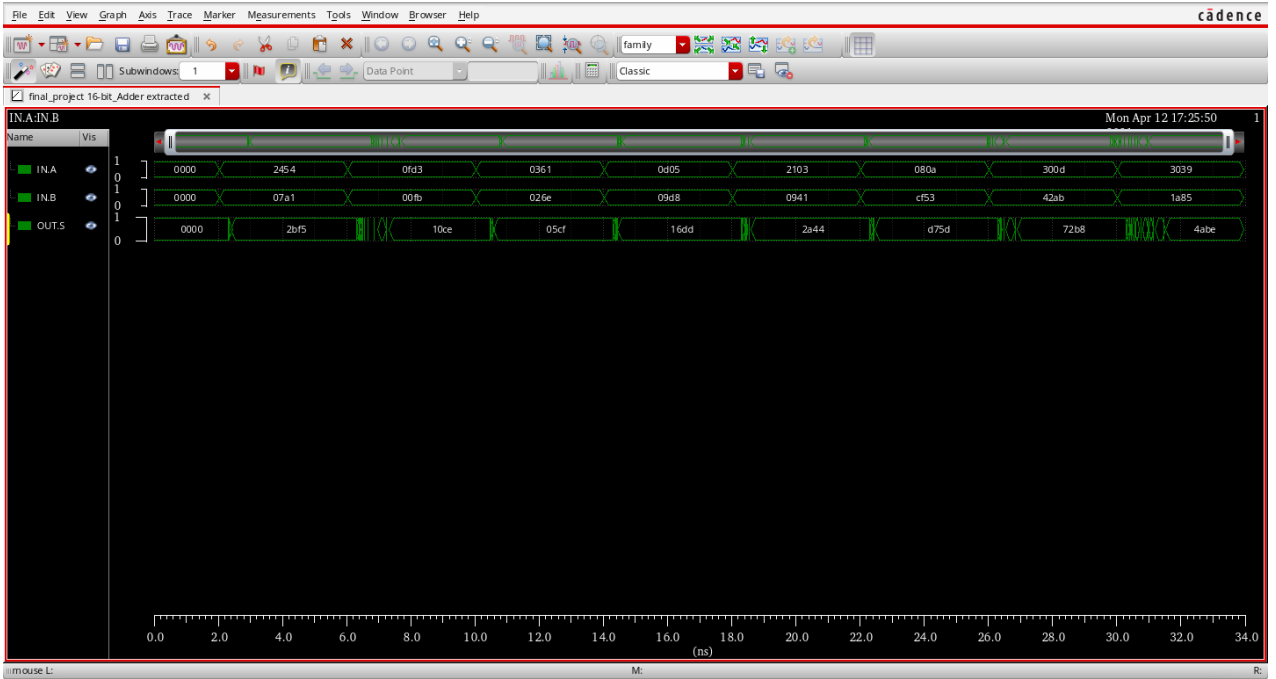
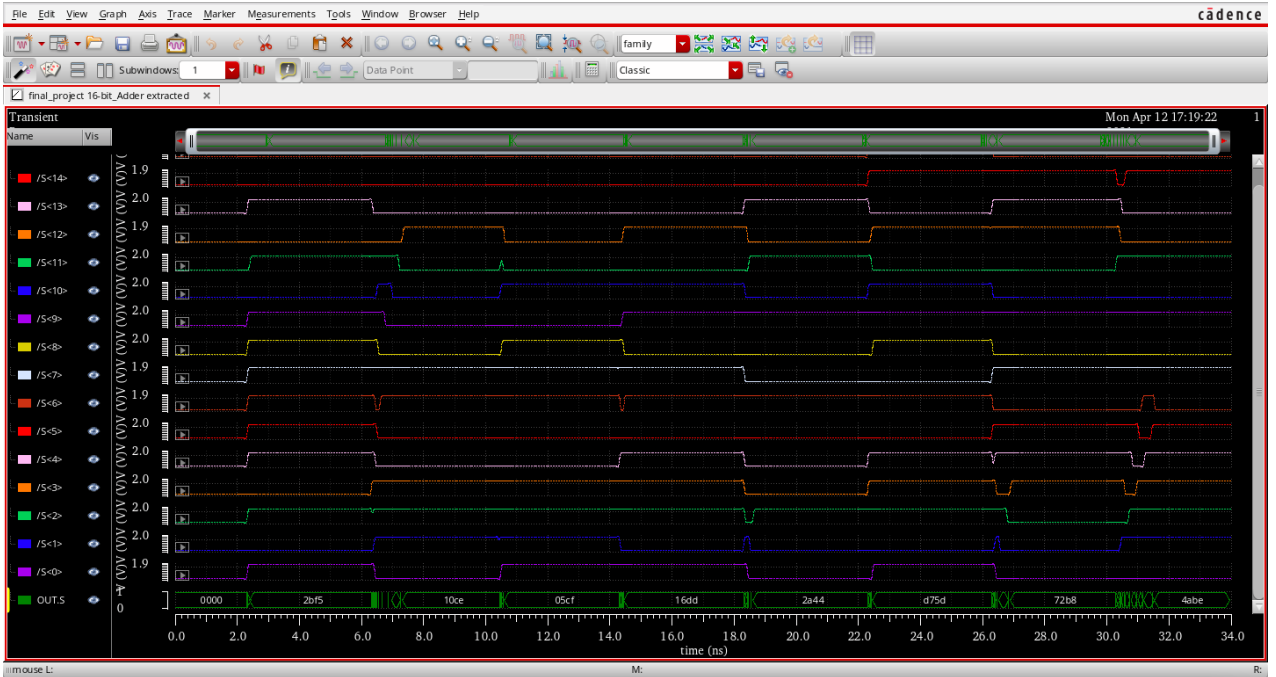
## Extract view delay

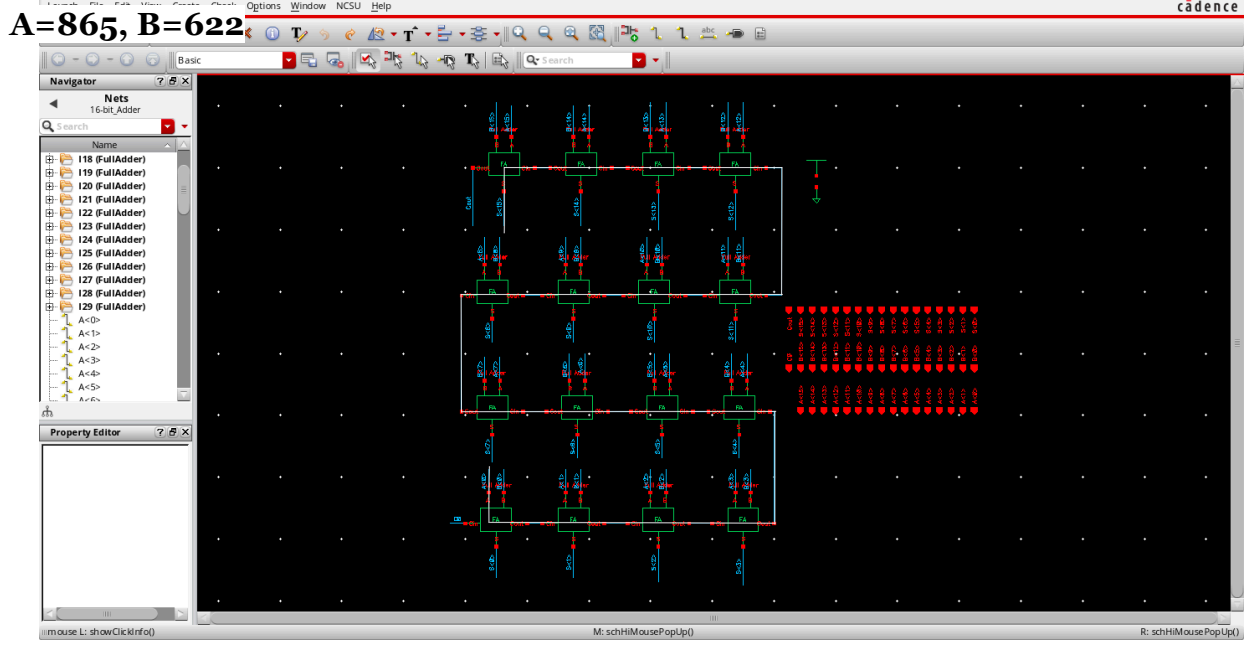
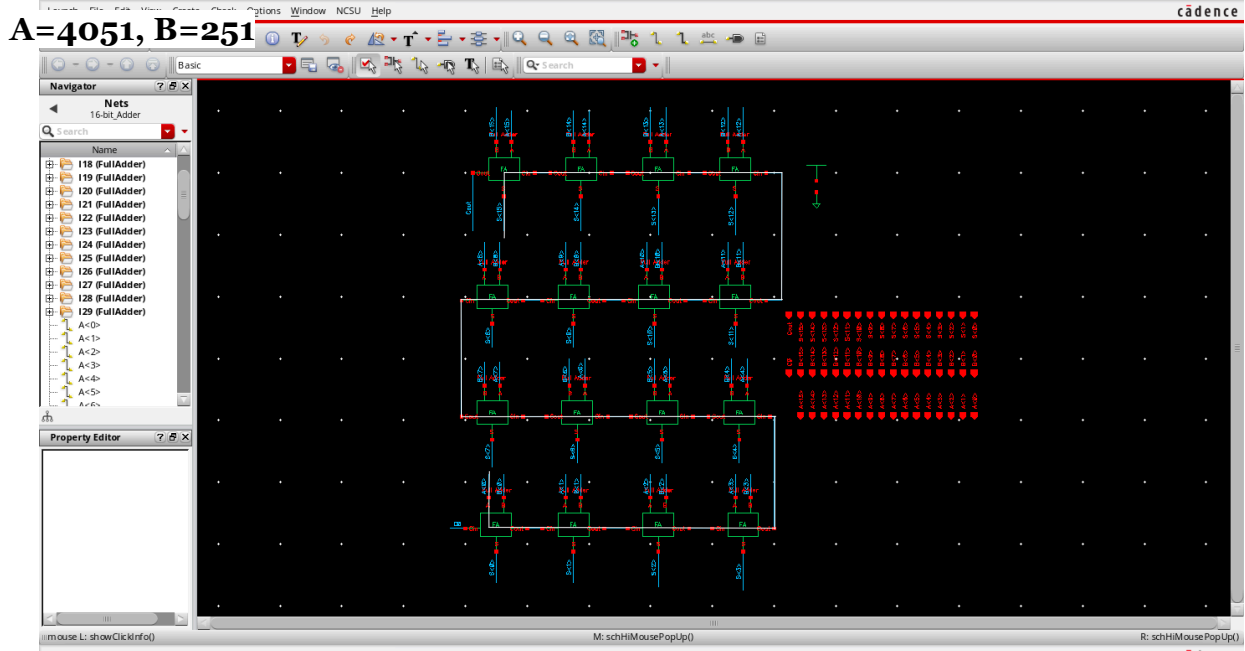
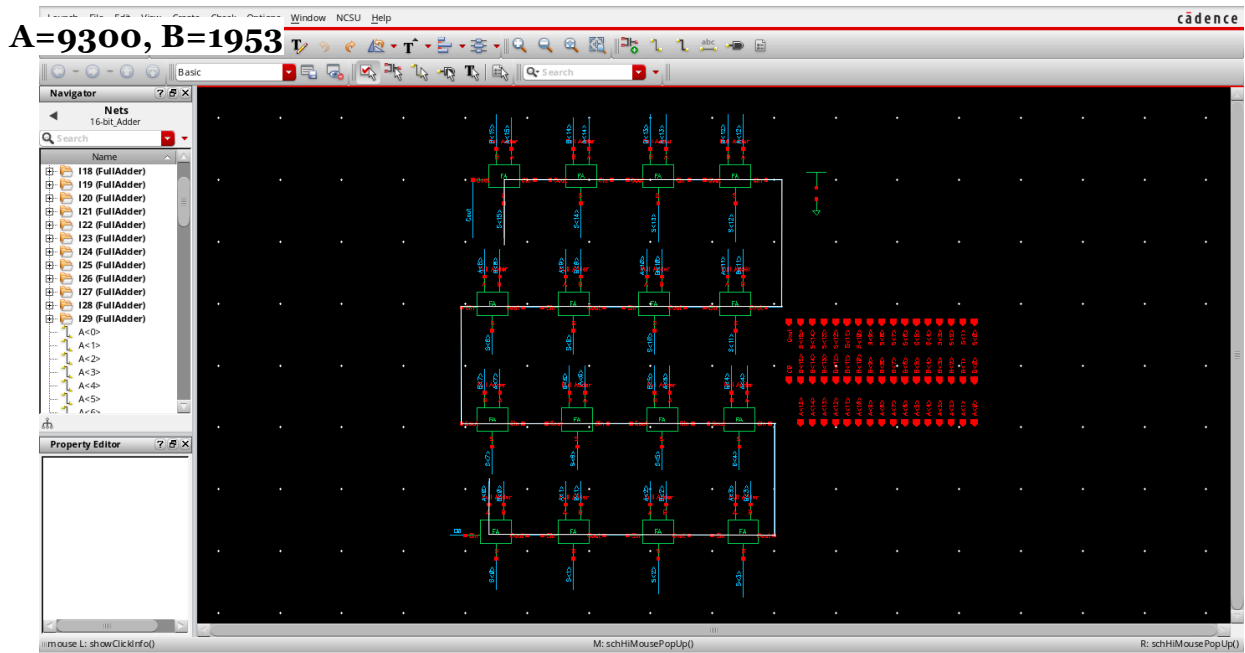




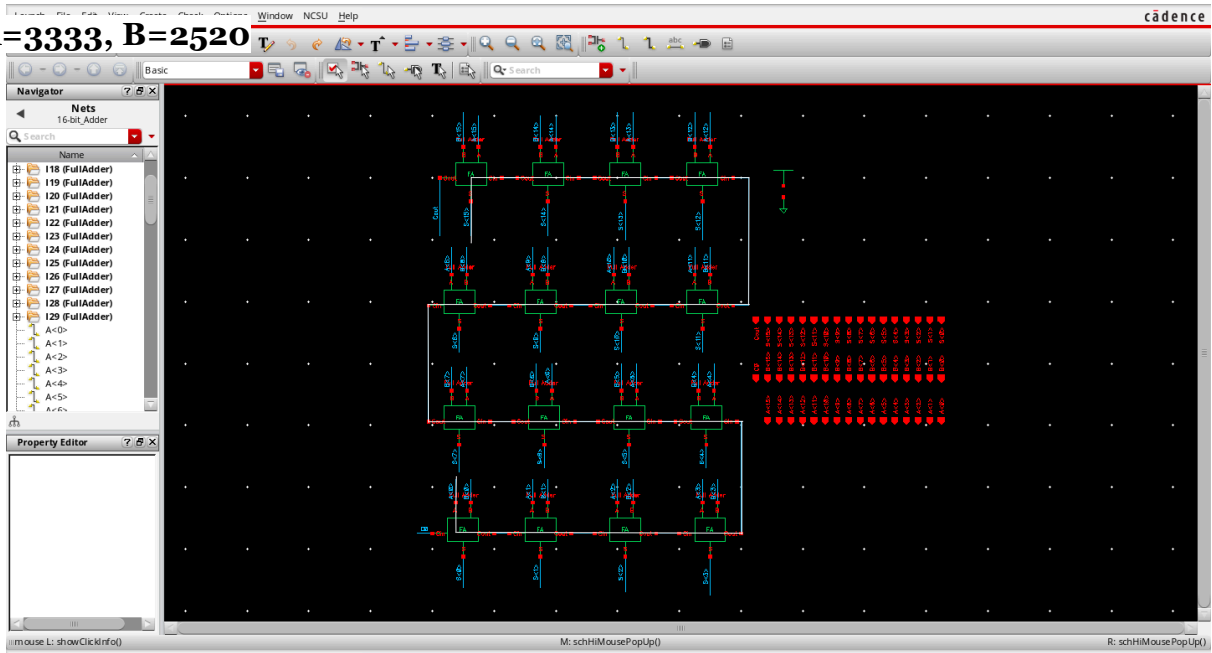




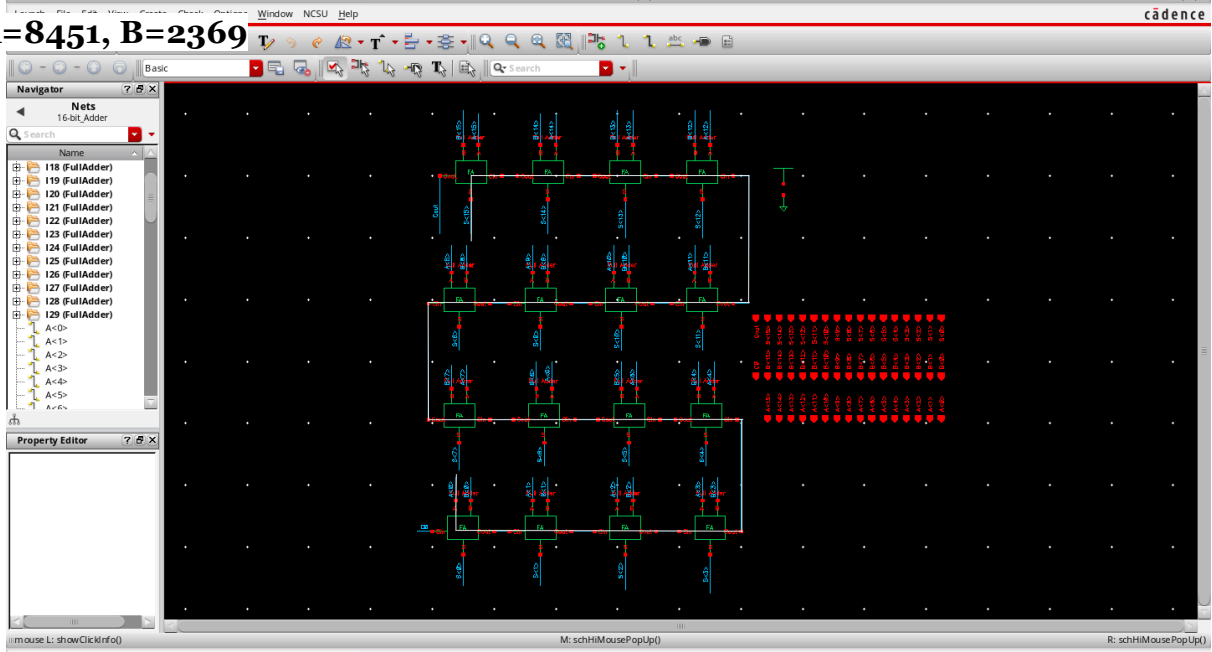




**A=3333, B=2520**



**A=8451, B=2369**



**A=2058, B=53075**

