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**EE466**  
**ASIC & Digital Systems**

HSPICE

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# Overview

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- HSPICE is a SPICE software for transistor-level circuit analysis.

# How to Run HSPICE

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- Run the following command:
    - Log in to an EECS server. (use ssh1.eecs.wsu.edu or ssh2.eecs.wsu.edu or ssh3.eecs.wsu.edu or ssh4.eecs.wsu.edu or Go to EME205 and work in the lab.)
    - Download the following file and unzip it:
      - [http://eecs.wsu.edu/~daehyun/teaching/2017\\_EE466/labs/hspice\\_tutorial.zip](http://eecs.wsu.edu/~daehyun/teaching/2017_EE466/labs/hspice_tutorial.zip)
      - unzip hspice\_tutorial.zip
    - To run HSpice, you should run the following commands (you should run it whenever you log in)
      - source ictools\_generic.sh
      - source synopsys.sh
    - If you are using cshell, run “bash” first and then source the above files
  - Run HSPICE:
    - > hspice <file\_name>
  - Run WaveView:
    - > wv <file\_name>
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# Library Files

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- You will see the following files:
  - 45nm\_PTM\_HP\_v2.1.pm
    - 45nm transistor models for SPICE
  - inv.sp
    - An HSPICE netlist for an inverter
  - nand2.sp
    - An HSPICE netlist for a two-input Nand gate

# SPICE Netlist

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- Open inv.sp in a text editor and see the contents.
- There are comments, so it won't be too hard to understand the netlist.

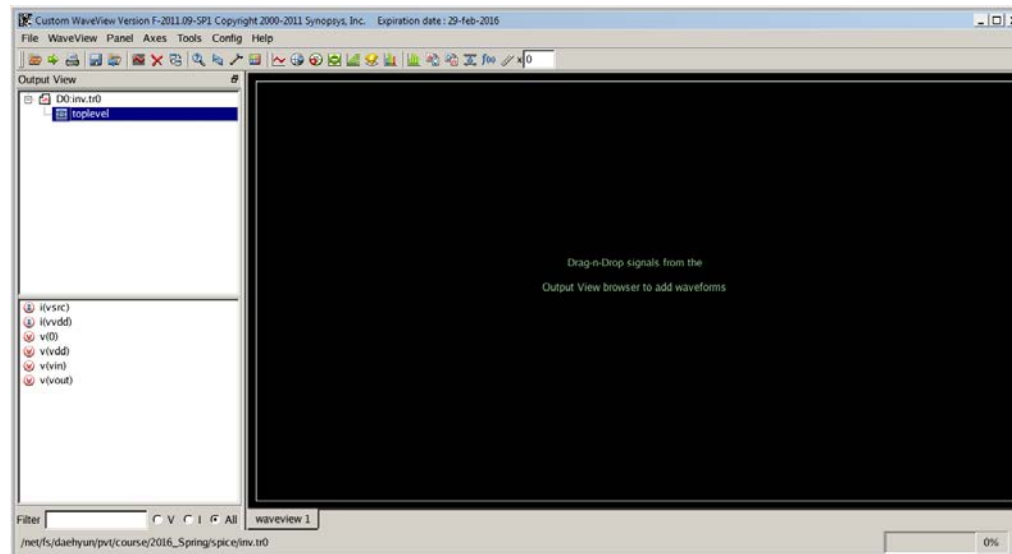
# Run HSPICE

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- Perform HSPICE simulation for the inverter as follows:  
    > hspice inv.sp
- If the simulation is successful, you will see the following message:  
    \*\*\*\*\* hspice job concluded
- If something is wrong, you should debug it.

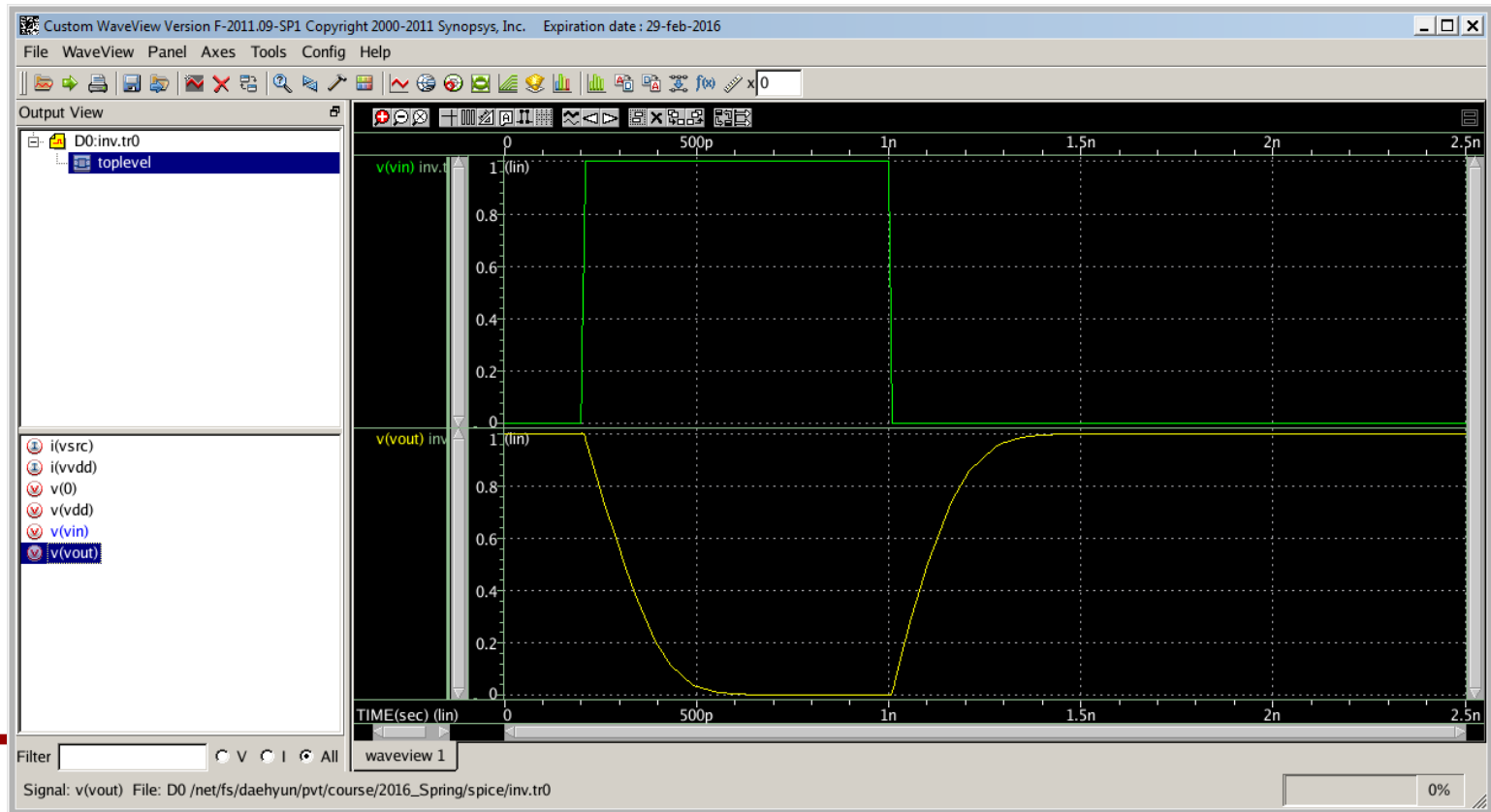
# Run WV

- Once the simulation is done, HSPICE generates some output files.
- Let's open the waveform.
  - > wv inv.tr0
- Then, click “D0:inv.tr0” and click “toplevel”. You will see some signals in the bottom.



# Run WV

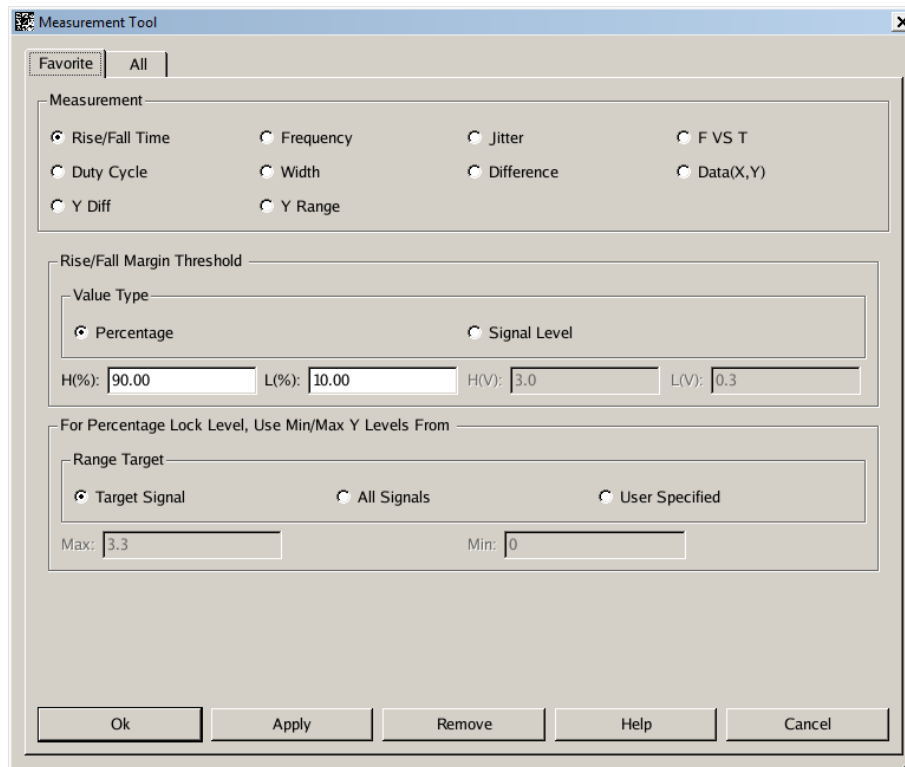
- Double-click
  - v(vin)
  - v(vout)





# How to Measure

- Click the “ruler” icon (Measurement Tool) in the icon bar.
- Choose “Rise/Fall Time” and set H(%) to 90.00 and L(%) to 10.00.



# How to Measure

- Click OK. Drag and drop the measurement icon to measure the fall time. You can measure the rise time in the same way.

