What is VLSI and Why You Should Care

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Cypress Semiconductor
Why you should care?

- One day you will graduate, then what?
- Do you want to apply your previous class work?
- What are your options for jobs or grad school?
  - Possibilities you may not have thought of
Why am I here?

• VLSI and semiconductors should excite you

• Why?
  – In a word → Jobs
  – Cutting edge technology
  – Wide ranging interests
    » Chemistry, Design, Physics, Video, Audio, Hardware, Software, Writing
  – Graduate programs support this industry
VLSI

• Very Large Scale Integration

• How you make computer chips

• Knowledge of
  Circuits    Electro-magnetics
  Physics    Computer Architecture
  Chemistry  Math
  Logic      Software
What can VLSI do for me?

• Although Kentucky traditionally does not have a large semiconductor presence, there is at least one example:
  – Cypress

• However, knowledge of this industry can lead you anywhere:
  – West Coast (OR, CA)
  – East Coast (NY, MA, NJ, NC)
  – Midwest (IL, MN)
  – Southwest (TX, AZ)
  – International (India, Ireland, Germany, Denmark, England, Japan, Taiwan, China)
Who Hires VLSI-Types?

- **Semiconductor companies**

<table>
<thead>
<tr>
<th>Rank</th>
<th>Company</th>
<th>2001 Sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Intel</td>
<td>23.5</td>
</tr>
<tr>
<td>2</td>
<td>ST Micro</td>
<td>6.4</td>
</tr>
<tr>
<td>3</td>
<td>Toshiba</td>
<td>6.1</td>
</tr>
<tr>
<td>4</td>
<td>TI</td>
<td>6.0</td>
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<tr>
<td>5</td>
<td>Samsung</td>
<td>5.2</td>
</tr>
<tr>
<td>6</td>
<td>Motorola</td>
<td>4.8</td>
</tr>
<tr>
<td>7</td>
<td>NEC</td>
<td>4.8</td>
</tr>
<tr>
<td>8</td>
<td>Infineon</td>
<td>4.6</td>
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<tr>
<td>9</td>
<td>Philips</td>
<td>4.4</td>
</tr>
<tr>
<td>10</td>
<td>AMD</td>
<td>3.9</td>
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</tbody>
</table>

- **Fab-less “Design Houses”**

<table>
<thead>
<tr>
<th>Rank</th>
<th>Company</th>
<th>2001 Sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Qualcomm</td>
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<tr>
<td>2</td>
<td>Nvidia</td>
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<tr>
<td>3</td>
<td>Xilinx</td>
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<tr>
<td>4</td>
<td>Via</td>
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<tr>
<td>5</td>
<td>Broadcom</td>
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<tr>
<td>6</td>
<td>Altera</td>
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<td>7</td>
<td>Cirrus Logic</td>
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<td>9</td>
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<tr>
<td>10</td>
<td>QLogic</td>
<td>0.36</td>
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</tbody>
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Historical Trends

![Historical Trends Graph]

- Year
- Sales ($B)
- Percent Change

Legend:
- Solid line indicates a steady increase in sales.
- Dashed line shows fluctuations and declines in sales.
- Circled areas highlight significant changes in sales trends.
Recent Trends

Year

Sales ($B)

Percent Change

Recession

Boom

Recession

Recession

Recession

Size, Speed Trends

Present solutions will no longer work in 2005
Scale: human hair → 100,000 nm, red blood cell 5,000nm
How Many Chips?

Chips per wafer 50 – 2000

Wafers (Millions) vs. Time

Year-Quarter

Semiconductor Impact

- 1998 study indicates semiconductor industry the #1 driver of the U.S. economy

- Semiconductor industry responsible for 260,000 jobs directly, 1.4 million in support role

- In spite of recent downturn, semiconductors are not going away – the industry remains vibrant
What do you learn in VLSI?

- Physics
- Chemistry
- Software
- Presentations
- Documentation
- What is important in order to get a job
- 584 TR 3:30 – 4:45