Background/History
Vacuum Tubes
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ENIAC
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## Downsizing and Upgrading

The inception of computing inspired a remarkable race for faster, smaller, lighter, cheaper hardware.

<table>
<thead>
<tr>
<th></th>
<th>ENIAC</th>
<th>Intel Core Duo chip</th>
</tr>
</thead>
<tbody>
<tr>
<td>Debut</td>
<td>1946</td>
<td>2006</td>
</tr>
<tr>
<td>Performance</td>
<td>5,000 addition problems/sec</td>
<td>21.6 billion ops/sec</td>
</tr>
<tr>
<td>Power use</td>
<td>170,000 watts</td>
<td>31 watts max</td>
</tr>
<tr>
<td>Weight</td>
<td>28 tons</td>
<td>negligible</td>
</tr>
<tr>
<td>Size</td>
<td>80' w x 8' h</td>
<td>90.3 sq. mm.</td>
</tr>
<tr>
<td>What's inside</td>
<td>17,840 vacuum tubes</td>
<td>151.6 M transistors</td>
</tr>
<tr>
<td>Cost</td>
<td>$487,000</td>
<td>$637</td>
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</tbody>
</table>
2nd Generation Transistor
2\textsuperscript{nd} Generation Transistors
2\textsuperscript{nd} Generation Transistors

![Diagram of 2\textsuperscript{nd} Generation Transistors]
Core Memory

X Drivers

Y Drivers

Sense/Inhibit Line
Core Memory
PCBs (Printed Circuit Boards)
Multilayer PCB
PCB with sockets
PCB with sockets
Populated PCB