

Semiconductors Industry Segments: 1Q14 Top Performers (Growth)

1Q14 Top 20 Semiconductor Sales Leaders
Ranked by Growth (\$M, Including Foundries)

1Q14 Rank	Company	Headquarters	1Q13 Tot Semi	1Q14 Tot Semi	1Q14/1Q13 % Change
1	MediaTek + MStar**	Taiwan	1,083	1,608	48%
2	SK Hynix	South Korea	2,577	3,507	36%
3	AMD**	U.S.	1,088	1,397	28%
4	Micron + Elpida	U.S.	3,300	4,175	27%
5	Infineon	Europe	1,208	1,440	19%
6	Freescale	U.S.	931	1,071	15%
7	Avago + LSI**	Singapore	1,136	1,305	15%
8	NXP	Europe	1,085	1,246	15%
9	Nvidia**	U.S.	940	1,072	14%
10	UMC*	Taiwan	899	1,006	12%
11	Samsung	South Korea	7,946	8,797	11%
12	TSMC*	Taiwan	4,470	4,852	9%
13	Qualcomm**	U.S.	3,916	4,243	8%
14	GlobalFoundries*	U.S.	946	1,010	7%
15	TI	U.S.	2,717	2,792	3%
16	Broadcom**	U.S.	1,962	1,984	1%
17	Intel	U.S.	11,555	11,666	1%
18	Renesas	Japan	1,886	1,865	-1%
19	Toshiba	Japan	2,939	2,793	-5%
20	ST	Europe	1,994	1,801	-10%
—	Top 20 Total		54,578	59,630	9%

*Foundry

**Fabless

Source: Company reports, IC Insights' *Strategic Reviews* database

Semiconductors Industry Segments: Top 10 Ranking By 2016 Revenue

Worldwide Ranking of the Top 10 Suppliers of Semiconductors in 2016
(Ranking by Revenue in Millions of U.S. Dollars)


2015 Rank	2016 Rank	Company Name	2015 Revenue (\$)	2016 Revenue (\$)	Revenue Percent Change	Revenue Percent of Total	Revenue Cumulative Percent
1	1	Intel	51,420	54,981	6.9%	15.6%	15.6%
2	2	Samsung Electronics	38,713	40,323	4.2%	11.4%	27.0%
4	3	Qualcomm	16,496	15,405	-6.6%	4.4%	31.4%
N/A	4	Broadcom Limited*	15,304	14,979	-2.1%	4.2%	35.7%
3	5	SK Hynix	16,502	14,699	-10.9%	4.2%	39.8%
5	6	Micron Technology	14,080	12,963	-7.9%	3.7%	43.5%
6	7	Texas Instruments	12,258	12,686	3.5%	3.6%	47.1%
8	8	Toshiba	8,833	10,258	16.1%	2.9%	50.0%
7	9	NXP	9,619	9,306	-3.3%	2.6%	52.7%
13	10	MediaTek	6,654	8,733	31.2%	2.5%	55.1%
Top 10 Companies			189,879	194,333	2.3%	55.1%	
All Others			155,715	158,116	1.5%	44.9%	
Total Semiconductor			345,594	352,449	2.0%	100.0%	

Note - 2015 Broadcom Limited revenue (Avago+Broadcom)*

Semiconductors Industry Segments: By Product

- 
- Discretes
 - Logic
 - DRAM Memory
 - Flash Memory
 - Other Memories
 - Analog
 - Optoelectronics
 - Sensors/MEMS
 - DSP
 - Microcontrollers
 - Microprocessors
 - CPLDs/FPGAs
 - ASICs/ASSPs

Semiconductors Industry Segments: By Product (Y2015)

Total Semiconductors - \$335.2B									
Integrated Circuits - \$274.5B								Discretes Sensors & Opto \$60.7B	
Digital - \$229.3B						Analog \$45.2B		Discretes \$18.6B	Opto \$33.3B
MOS - \$229.3B						General Purpose 18.6B	App. Specific \$26.6B		
Memory - \$77.2B		Micro - \$61.3B		Logic - \$90.8B		Sensors \$8.8B			
DRAM \$45.0B	Flash \$30.4B	MPU \$43.3B	MCU \$15.5B	Special Purpose Logic \$70.2B	Standard Logic \$20.6B	Note: Numbers are rounded Source: WSTS			
SRAM \$0.4B		Non-volatile memory; ROMs; EPROM; EEPROM \$1.4B		DSP \$2.5B		 SIA SEMICONDUCTOR INDUSTRY ASSOCIATION			

Semiconductors Industry In Egypt

- Which role in the semiconductors industry can be readily adopted in the Egyptian industry?
- Which business model to use?
- Why do that?
- What careers to expect?
- Is there any risk?
- Is there any reward?

Design Service Market

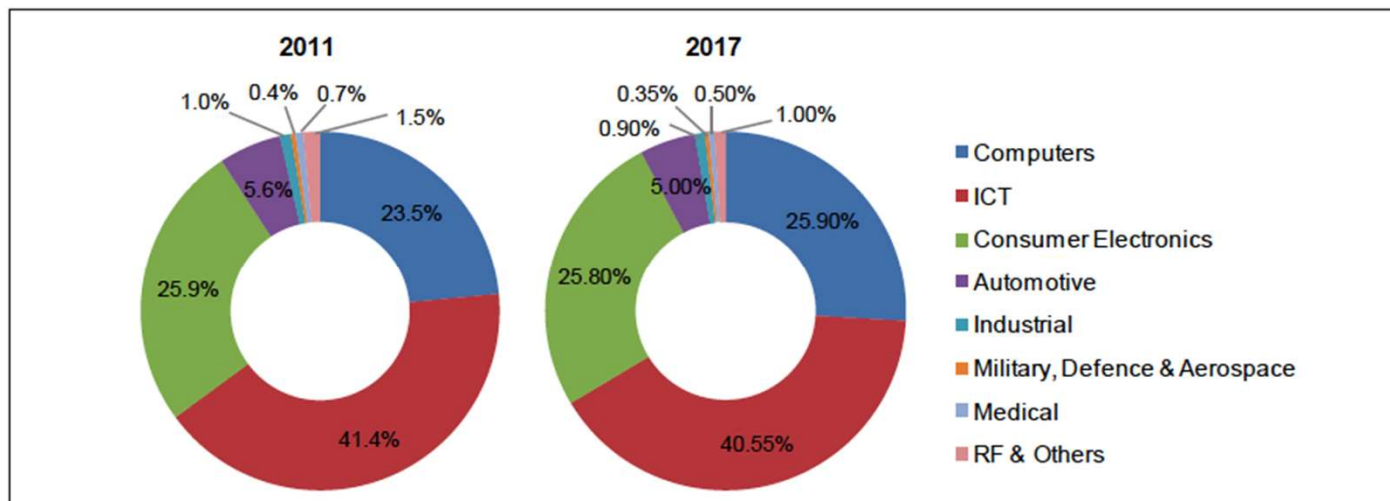
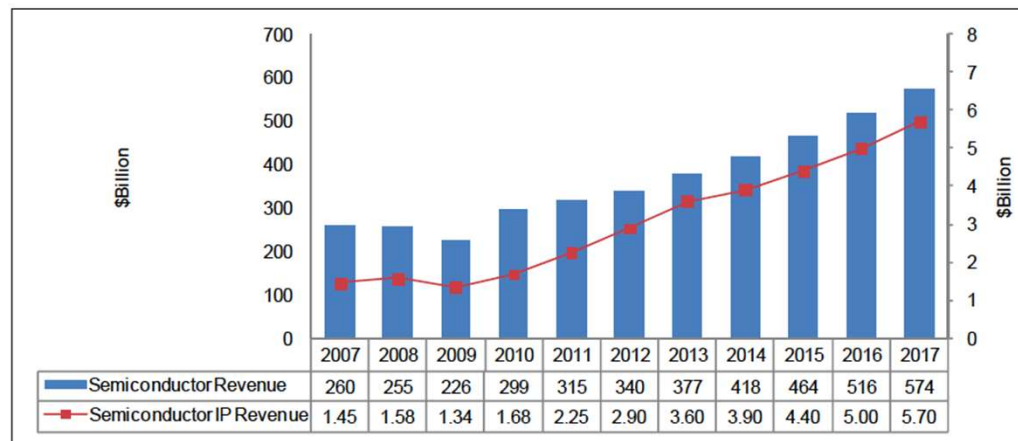
Chart 15: Overall effective market size and structural distribution in the IC design service sector, 2007-2011 (US\$b)



Source: Gartner, September 2011, compiled by Digitimes Research, February 2012

IP Market Size

- SIP market revenue is estimated to have grown from \$2.90 bn in 2012 to \$5.70 bn in 2017, @ CAGR of 14.47%.



Tour the Fab

- **Videos 1, 2 & 3**



Semiconductor Industry - Revisited

- **Which role in the semiconductors industry can be readily adopted in the Egyptian industry?**
- **Which business model to use?**
- **Why do that?**
- **What careers to expect?**
- **Is there any risk?**
- **Is there any reward?**

Semiconductors Industry In Egypt

- Mentor Graphics (EDA Multi-national)
 - Goodix Egypt (Chinese)
 - Si-Ware Systems (Fully Egyptian)
 - Si-Vision (Egyptian with ties to Synopsys)
 - Hittite now Analog Devices Inc. (US)
 - ICpedia (used to be Swiftronix)
 - Mipex
 - MEMS-Vision
 - Pearl Semiconductors
 - Used to have Newport Media Inc. (acquired by ATMEL then Dialog)
 - Used to have SysDSoft (then Intel – Siemens Acquisition)
-

Local Semiconductor Industry Growth



Other Related Companies

- PCB Manufacturing and Assembly
 - Al-Araby, AOI, AISweedy Electrometers, ... etc
 - Samsung (Beni Swaif)
- Electronic systems manufacturing
 - Samsung, LG
 - Bio-Business
 - Valeo
- Morocco
 - Sizable operation for ST-Microelectronics
- Kingdom of Saudi Arabia and UAE
 - Sizable research activities

Industry & Technology Overview



- Introduction to the semiconductor industry
- **Functional Structure of a Fabless Company**
- Manufacturing Process
- Design Rules

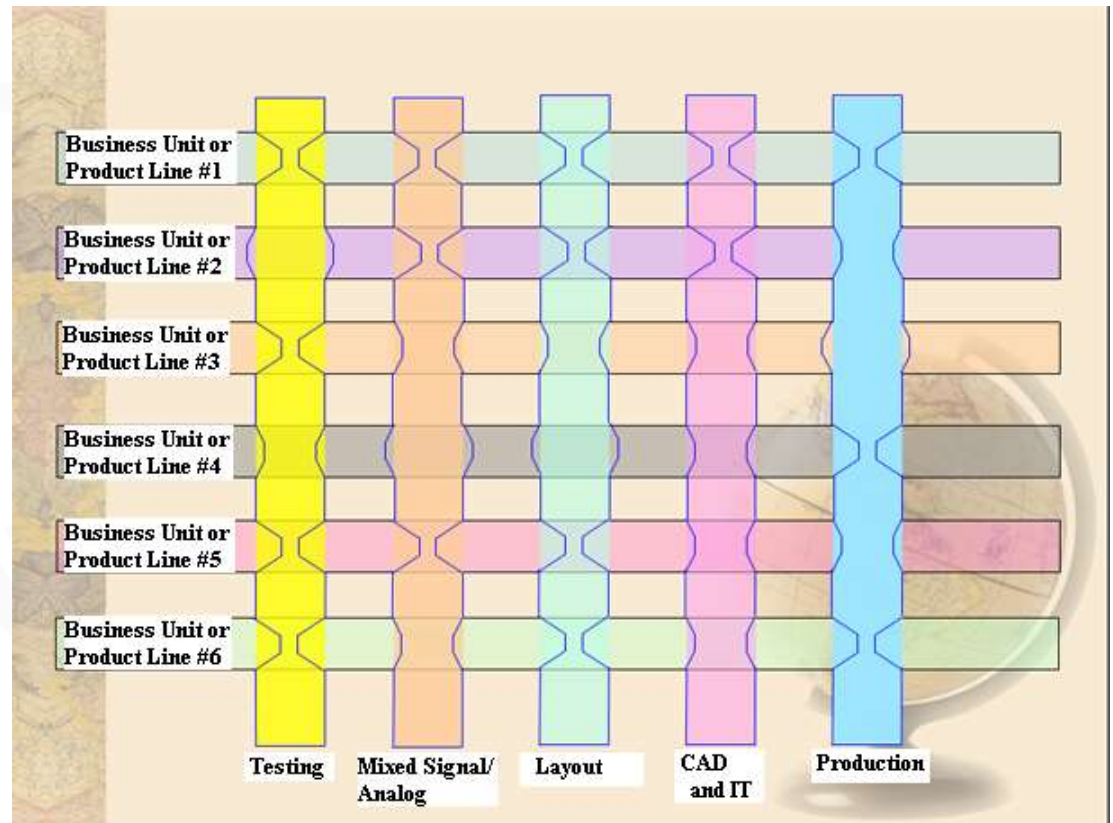
Functional Structure of a Fabless Company

- **Pros and cons of not owning the Fab**

- Focus on product development rather than technology development.
- Limited by available commercial technologies and foundry capacities.

- **Often a matrix organization**

- Rows are business units
- Columns are pooled functions



Functional Structure of a Fabless Company

- **Business Units own**
 - Design
 - System
 - Digital
 - Mixed Signal/Analog.
 - Verification
 - System
 - Digital
 - Mixed Signal/Analog.
 - Marketing
 - Applications Engr'g
- **Functional pools support**
 - CAD/EDA tools and IT
 - PCB/Hardware
 - Testing or Validation
 - Layout (Physical Design)
 - Technology / IP Acquisition
 - Assembly/Packaging
 - Product Engineering/ Production

What about MEMS?

- **Videos 4 & 5**



Industry & Technology Overview

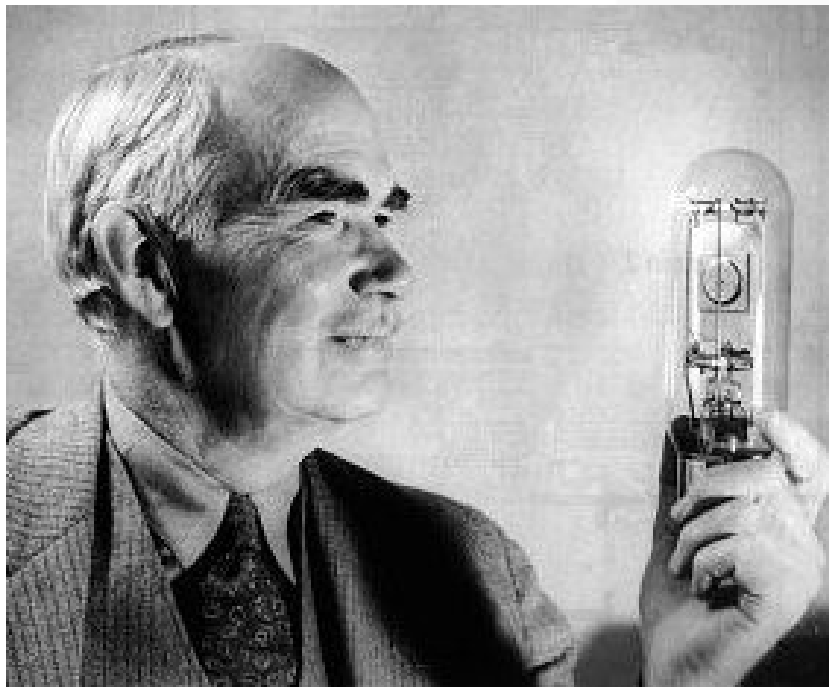


- Introduction to the semiconductor industry
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- **Manufacturing Process**
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Technology Trends:

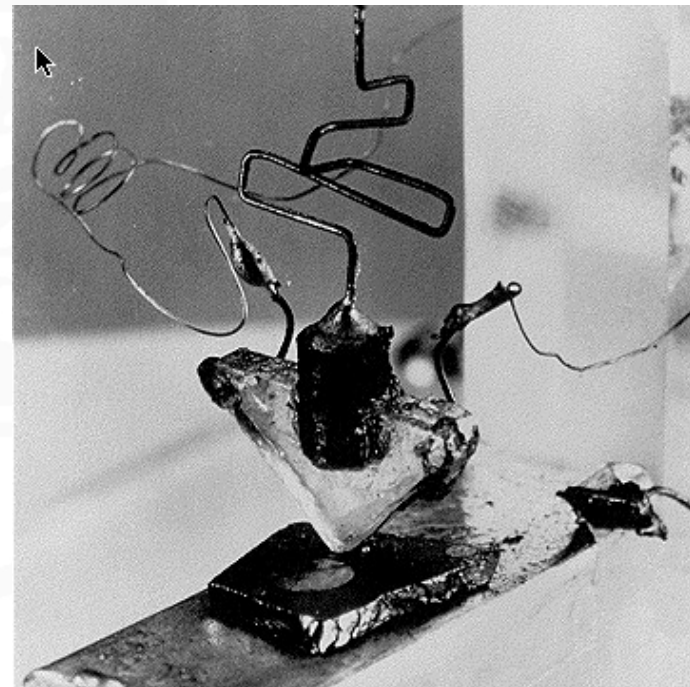
Basic Active Electronic Devices

1906



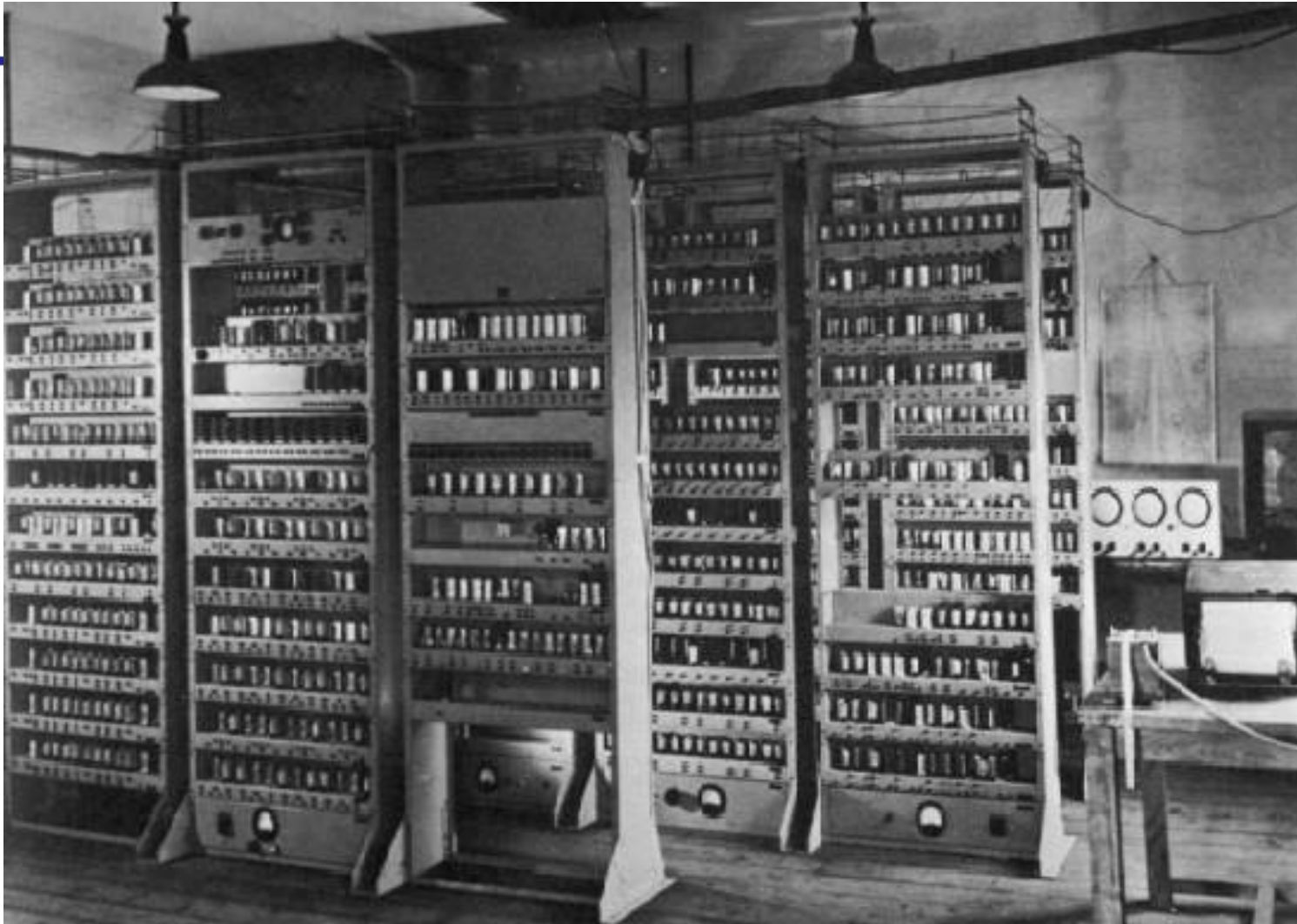
Audion (Triode), 1906
Lee De Forest

1947



First point contact transistor (germanium), 1947
John Bardeen and Walter Brattain
Bell Laboratories

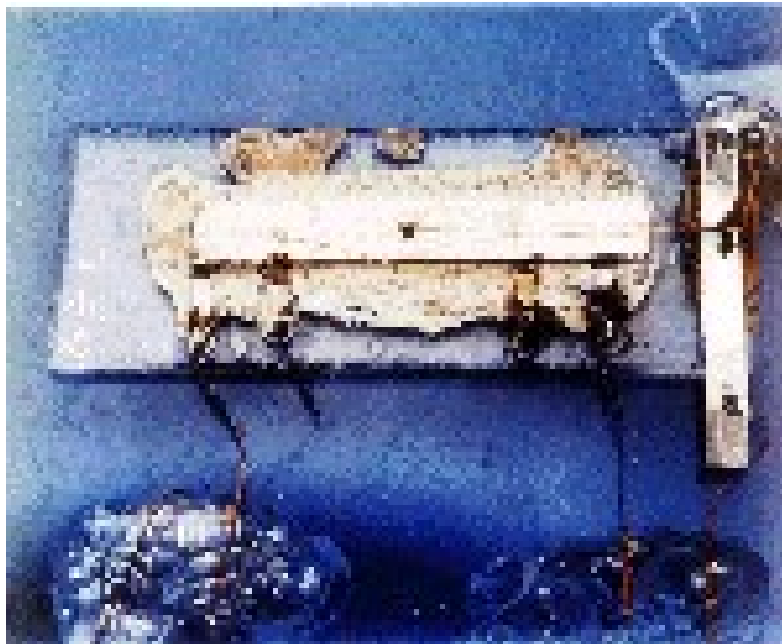
Computing Devices Then...



EDSAC, University of Cambridge, UK, 1949

Technology Trends (cont.)

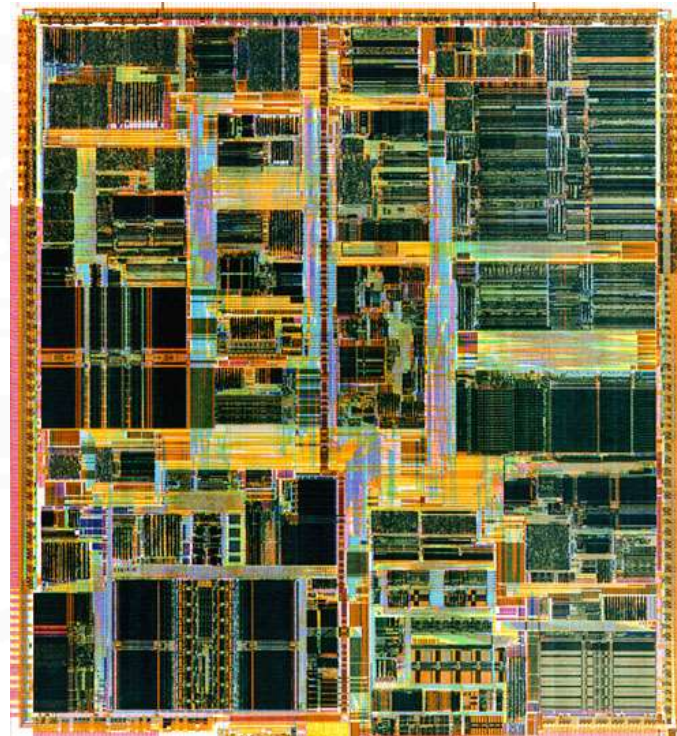
1958



First integrated circuit (germanium), 1958
Jack S. Kilby, Texas Instruments

Contained five components, three types:
transistors resistors and capacitors

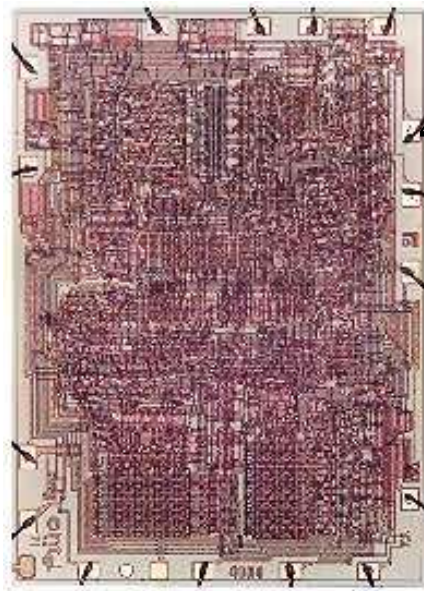
1997



Intel Pentium II, 1997
Clock: 233MHz
Number of transistors: 7.5 M
Gate Length: 0.35

Advances in Integration

**Intel 4004
(1971)**

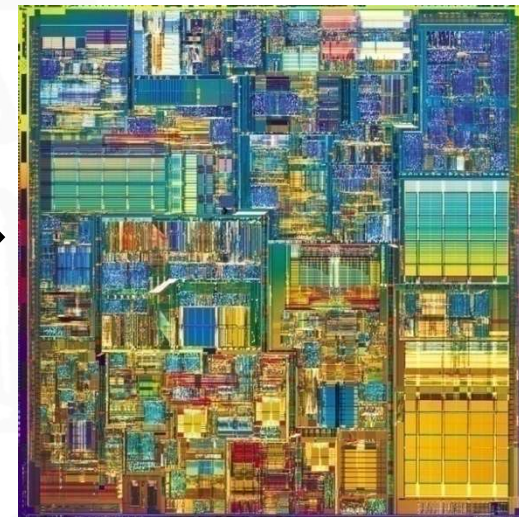


**1.5 GHz
42 million transistors**



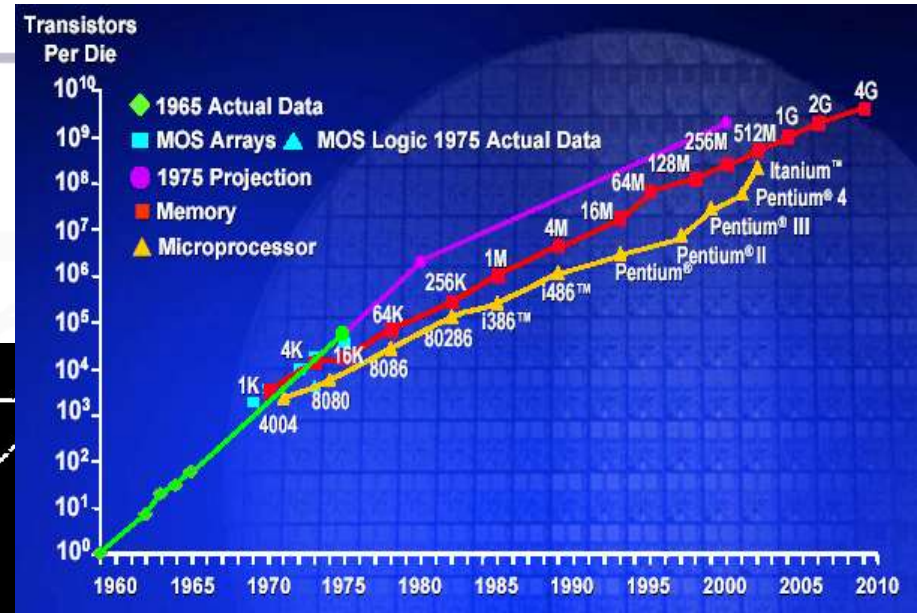
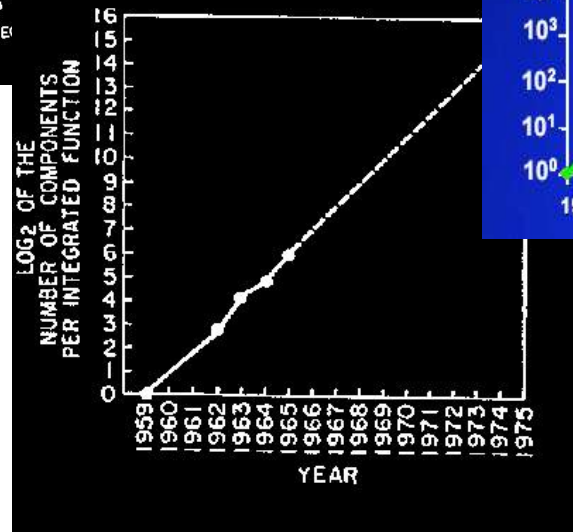
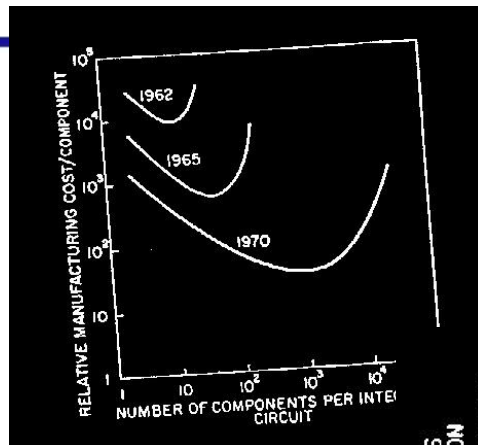
**108 KHz
2,300 transistors**

**Intel Pentium 4
(2000)**



If automobile speed had increased similarly over the same period, we could now drive from Cairo to Shanghai in 20-30 seconds.

Moore's Law



- “Cramming More Components onto Integrated Circuits”

“Intel CEO Gordon Moore, Electronics, 1965
 # of transistors on cost-effective integrated circuit doubles every 12-18 months.”