

Q1 What Does Electronics Industry produce?

- [1] system Design } innovative [higher margins] (design for end user)  
 [2] IC Design } (chip) (تصميم الرقاقة)  
 [3] Physical products } IC, (chips) } PCB (printed circuit boards) } systems  
 labour intensive.

متجات زي ايه؟

- Silicon wafers  
 - IC Design  
 - IC Manufacturing  
 - IC Packaging/testing  
 PCB design  
 EMS (electronics manufacturing services)  
 PCB manufacturing  
 System assembly  
 Product/system definition & design
- تصميم  
 تصنيع  
 تعبئة واختبار  
 تصميم البورد  
 تصنيع البورد  
 تجميع النظام  
 تصميم المنتج

← تصنيع من السيليكون (الرقاقة) بعد تقطعه الى wafer

← تصنيع IC على الرقاقة ونشأ الرقاقة من تصنيع wafer

← بعد تصنيع IC بنقلها الى Packaging بنقلها الى Chip بنقلها الى IC

← نقل البورد من IC تصنيع ثم إنتاج وتصنيع البورد EMS

خدمات تصنيع الإلكترونيات

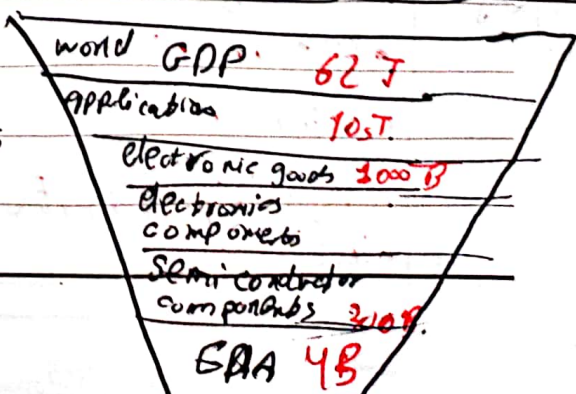
فصلها بتصنيع PCB وتجميع أجزاء system التي عليها design

← تجميع النظام وتصنيع النظام التي هيكلها من PCBs

electronics TAM (2010)

total available market

تحت إشراف العالم بكامله من 2000





## Q3 Electronics Industry Segments

total available market  
\$352B (2016)

### I By end user market

- |                         |                                |
|-------------------------|--------------------------------|
| ① Computing 52%         | ⑤ Telecom / wireless 23%       |
| ② Consumer 18%          | ⑥ Aerospace                    |
| ③ Military              | ⑦ Industrial / process control |
| ④ Medical , measurement |                                |

مستخدمين منتجات الإلكترونيات (في):  
 - الحواسيب والأجهزة والأجهزة والأجهزة  
 - الطيران والفضاء والفضاء والفضاء

## Q4 Semiconductor industry segments

### II By Business Model

### Fab: Microchip fabrication plant

IDM Integrated Device Manufacturer	Fabless	Merchant Foundry تاجر المصنع
<p>العمود</p> <p>Vertical integration (تصنيع وبيع)</p> <p>has in-house manufact. using its own fabs beside design ✓</p>	<p>بصرف المصنع</p> <p>outsources to a foundry</p> <p>focuses on:</p> <ul style="list-style-type: none"> <li>products</li> <li>IP حقوق الملكية الفكرية</li> <li>Patent براءة الاختراع</li> <li>licensing الترخيص</li> </ul>	<p>بصرف المصنع</p> <p>fabless company</p> <p>requires careful:</p> <ul style="list-style-type: none"> <li>scheduling</li> <li>pricing</li> <li>contracts</li> <li>to remain at full utilization</li> </ul>
<ul style="list-style-type: none"> <li>Samsung</li> <li>IBM</li> <li>Toshiba</li> <li>Mitsubishi</li> <li>Motorola</li> <li>magnaChip, TI, NEC</li> <li>infineon</li> </ul>	<ul style="list-style-type: none"> <li>Qualcomm</li> <li>Nvidia</li> <li>Media Tek</li> <li>ON</li> <li>Cirrus Logic</li> </ul>	<ul style="list-style-type: none"> <li>TSMC</li> <li>Global foundries</li> <li>UMC</li> <li>X-Fab</li> <li>SMIC</li> <li>power chip</li> <li>Tower Jazz</li> <li>Donghu &amp; TR</li> </ul>

# Semiconductor Industry Segments

## Role in Supply Chain

Upstream

UP stream

Wipro  
- TATA Elxsi  
- HCL Technologies

IC Design Service Companies

- MIPS - ARM  
- Cadence  
- Artisan  
- Virage  
- Rambus  
- Synopsys

IP providers

IC layout design

Fabless:-  
- Qualcomm  
- AMP  
- Broadcom  
- NVIDIA  
- MediaTek

EDA vendors

- Cadence  
- Synopsys  
- Mentor  
- Mentor Graphics (Synopsys)

Mid Stream

Pure Play Foundries:-

• TSMC  
• UMC  
• SMIC  
• Global Foundries

IDMs Samsung, IBM, Intel

IC manufacturing

IDMs  
- Intel  
- IBM  
- Samsung  
- TI  
- Micron

Wafer

Equipment Vendors:-

- ASML  
- Hitachi  
- Applied Materials  
- KLA-Tencor  
- Novellus

Down Stream

(ASE) Advanced Semiconductor Engineering

- Amkor  
- Siliconware Precision

Packaging & Testing

Substrate

Lead frame



By products:-

- ① Discretes ذات الصفة
- ② Logic gates بوابة - U'la
- ③ Memory : DRAM, flash ذاكرة
- ④ Analog
- ⑤ Opto Electronics opto → for optical
- ⑥ Sensors, MEMS (Micro electronic mechanical system)
- ⑦ DSP (Digital signal Processing) Time is important
- ⑧ & ⑨ Micro Processors  
controllers
- ⑩ CPLD / FPGA complex programmable logic device
- ⑪ AIESBC Field programmable gate array  
ASSP American Society of Safety professionals  
association internationale des Etudiants en Sciences  
Económicas et Comerciales

Egypt → Design services IP, good for startups  
Semiconductors manufacturing

- Mentor Graphics (EDA multinational)
- Goodix Egypt (Chinese)
- Si-ware Systems (Fully Egyptians)
- Si-Vision (Egyptian with tie to Synopsys)
- Hittite now Analog Devices Inc (US)
- IC Peddon (was Swifttronix)

used to have

- Newport Media Inc  
(acquired by AT&T then  
Dialpad)
- Sys DS of it then  
citer
- Siemens  
+ acquisition

## Other related Companies

### • PCB manufacturing & Assembly

- AL-Araby, AOI, AIS weedy Electronics ~
- Samsung (Ben swaitf)

### • Electronic System manufacturing

- Samsung, LG
- Bio-Business
- Valeo

- Morocco : Sizable operation for S T - Micro electronics
- Kingdom of Saudi Arabia & UAE : → Sizable research activities



# Old Exams Collection

Mid

not June

2015 Tor F

Fabless Companies are companies that Perform fabrication only

(F)

2016 Fabless " are limited by the available commercial technologies.

2017 IDM Companies are Not limited by " " " (F)

Final 2014

simple logical

→ State your opinion & support with clear arguments

a) state different roles (at least 6) a company can play in the supply chain of semiconductor industry.

• Give one example of an international company for each role.

1- IP providers : MIPS, ARM, Cadence, synopsys

2- IC house design : Qualcomm, AMD, intel, IBM, Samsung

3- IC manufacturing : Samsung, IBM, intel, TSMC, SMTC, UMC

4- Packaging & Testing : ASE, Amkor

5- EDA vendors : Cadence, Mentor Graphics, synopsys, Magma

6- IC design Service Company : Wipro, TATA, WEL

7- Wafer 8- Substrate. 9- Lead Frame

b) In your opinion, which role in the semiconductor industry can be readily adopted by starting-up Egyptian Companies (1<sup>st</sup> 5 years of company life)?

→ I think ~~EDA vendor~~ <sup>Design Service</sup> is more suitable as for a startup working with Design and get design from outside IP vendors

c) ~~How~~ How can they evolve & grow beyond that role? (longer term beyond 5 years)?

→ start to design himself, not from outside / IP vendors

e.g. Al Araby

قول رايك  
والتصميم من خارج

التصميم من خارج