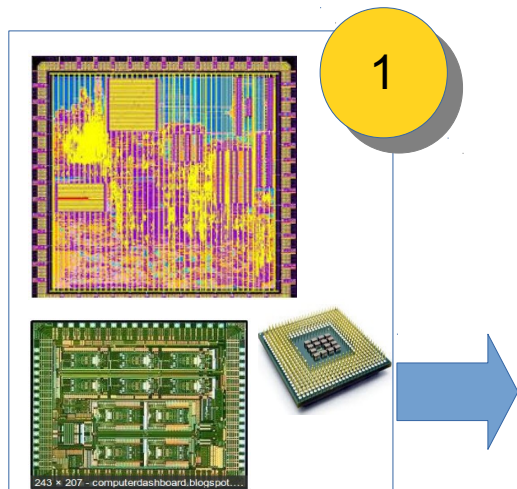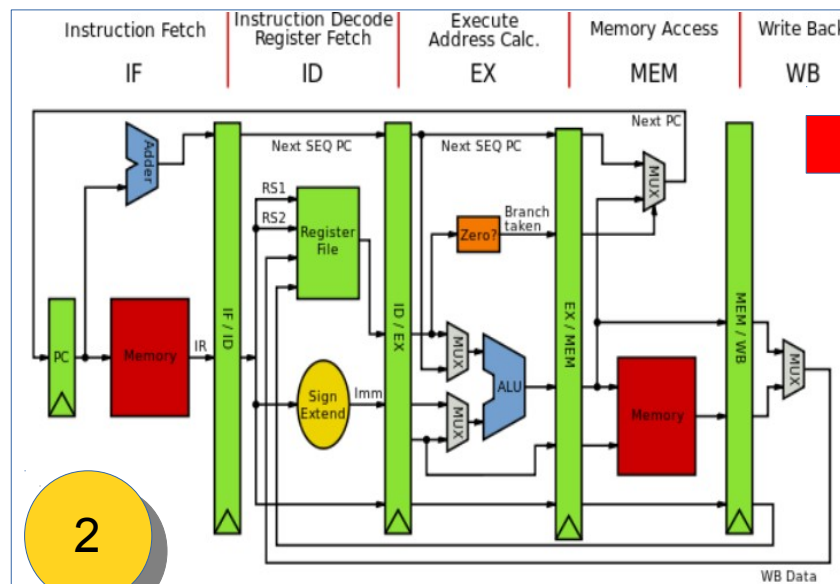# Scope of the Advanced Microprocessor Systems
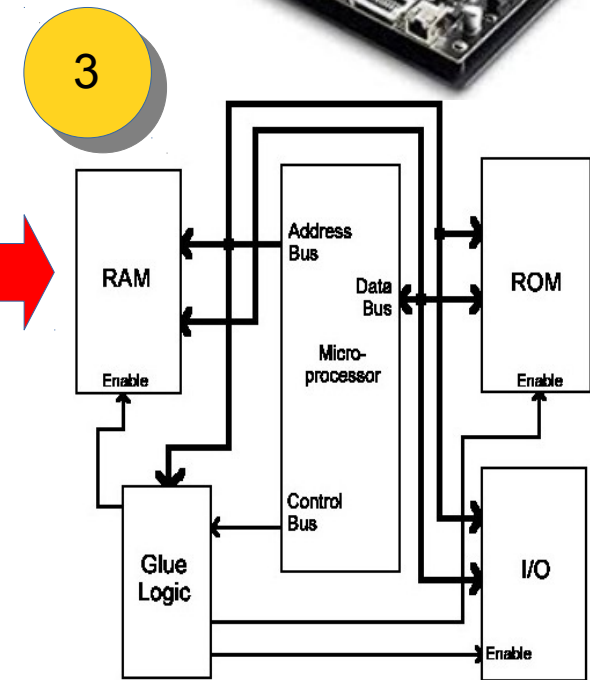

Physical:

VLSI Design, place and route, bonding and packaging
Tools: Cadence CAD design tools, Verilog language and VHDL language

Architecture:

ALU, Memory Hierarchy, Pipeline, Register Files, Cache etc.
Tools: C, System C, Verilog, VHDL, FPGA for prototyping

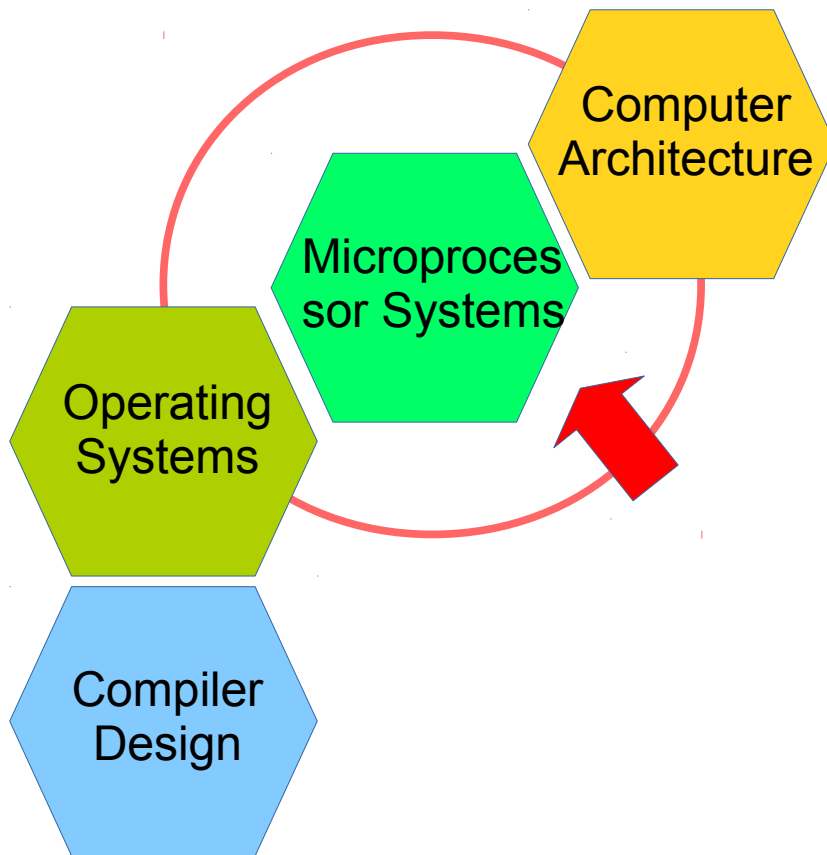http://5rulamir.tripod.com/

Systems:

CPU, bus systems, memory unit, I/O interface peripheral controllers and the design for its optimized operations
Tools: Assembly (more on the compiler design), C/C++, and higher programming language

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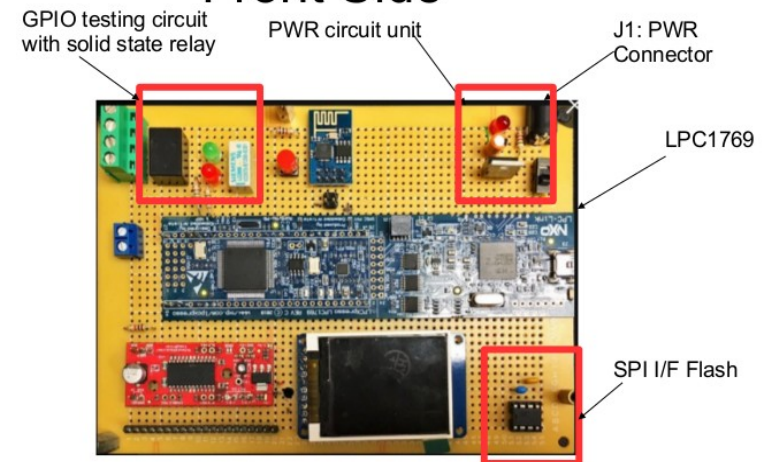
Emphasis On System Aspects
For Advanced Microprocessor Systems

Selection Criterion: (1) Focus on the system aspects; (2) with good understanding of architecture, but not architecture design course, not designing sub-systems and basic building blocks, such memory management unit, bus controller, pipeline etc.

(3) Focus on the system aspects but staying on the microprocessor side of the study with litter or no discussion of OS, to leave the OS aspects out for separate subject to discuss.

Computer Architecture

Microproces sor Systems

Operating Systems

Compiler Design

System Layout Design Front Side

GPIO testing circuit with solid state relay

PWR circuit unit

J1: PWR Connector

LPC1769

SPI I/F Flash

Dimension: 16 x 11 mm or 6.25 x 4.50 inch

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Advanced Aspects: GPU
of Microprocessor Systems

1 ARM

Combines an ARM Cortex-A8 CPU with a PowerVR GPU. Apple's iPad, iPhone and Apple TV

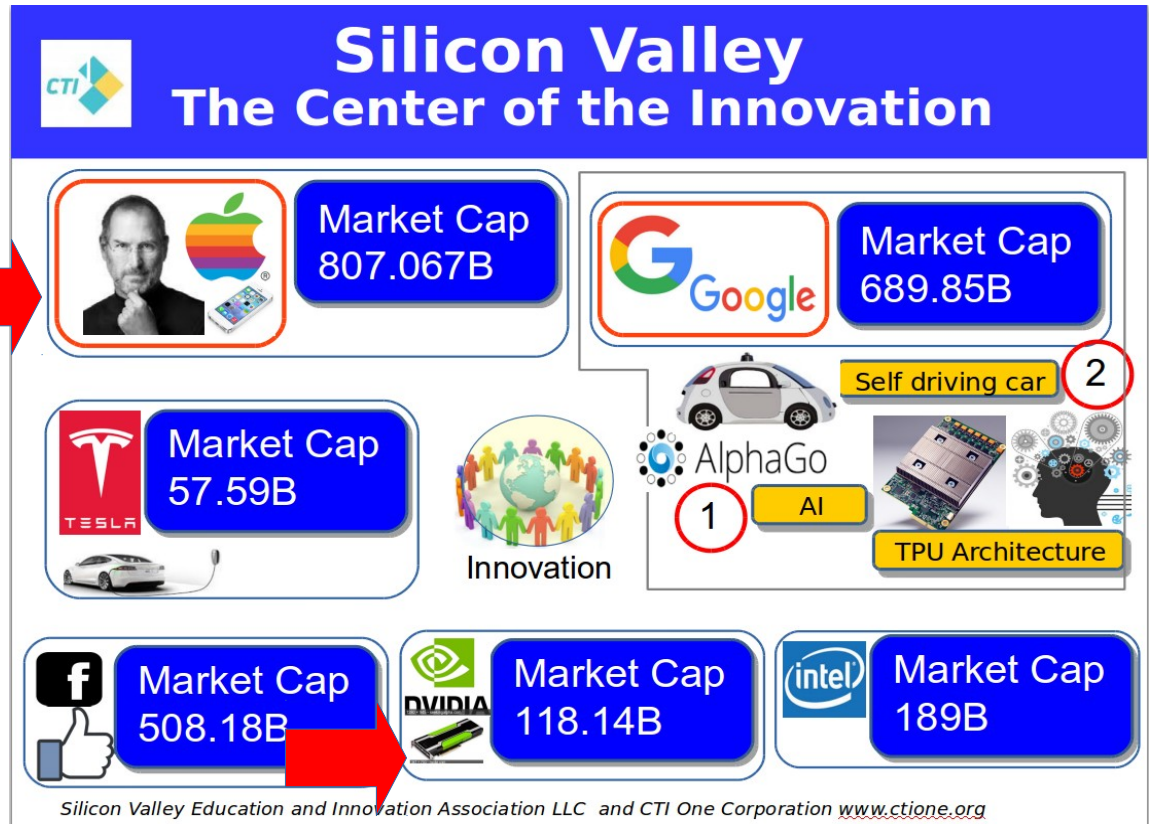| Produced	From September 9, 2015 to Present
Designed by	Apple Inc.
Common manufacturer(s)	TSMC; Samsung
Max. CPU clock rate	1.85 GHz (iPhone 6s, iPhone 6s Plus, iPhone SE, iPad 9.7 2017)

2

TESLA
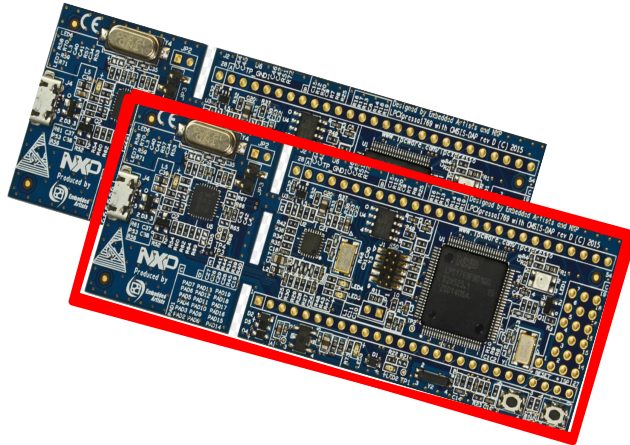
GPU

3

Microprocessor+GPU

CTI Silicon Valley
The Center of the Innovation

Market Cap 807.067B

Google Market Cap 689.85B

Self driving car **2**

Market Cap 57.59B

TESLA

AlphaGo

1 AI

TPU Architecture

Innovation

Market Cap 508.18B

NVIDIA Market Cap 118.14B

intel Market Cap 189B

Silicon Valley Education and Innovation Association LLC and CTI One Corporation www.ctione.org

www.ctione.com And www.ctione.org

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Enhance MCU With Graphics Processing Engine
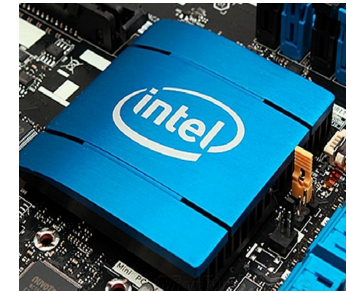
GE To GPU
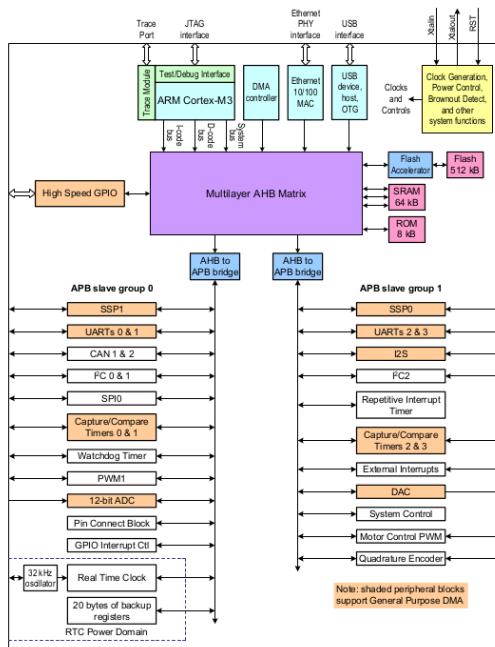
Use LPC 1769

Compare to Desktop or
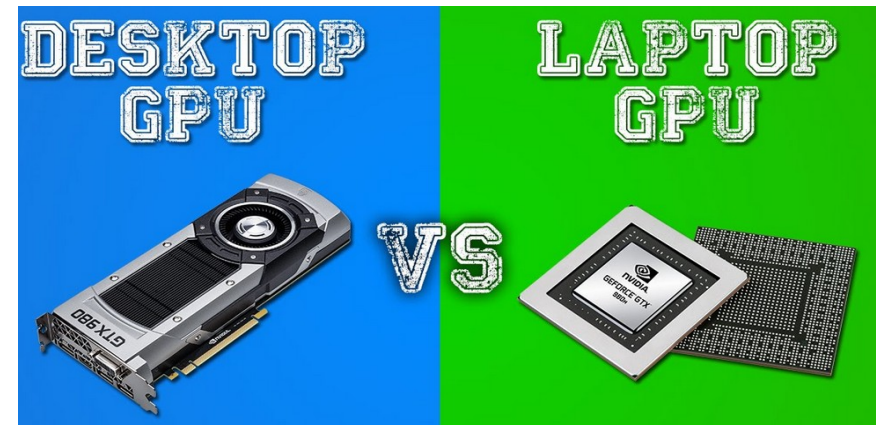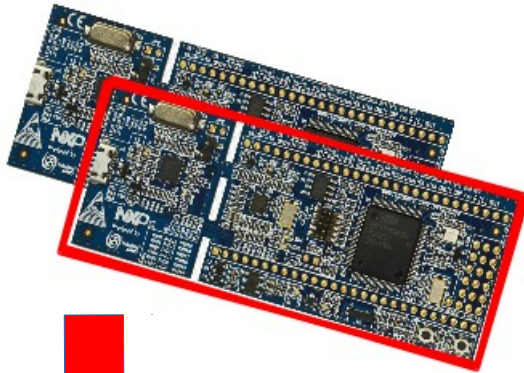Laptop GPU

Or

+   +

MCU With GE Or (GPE)
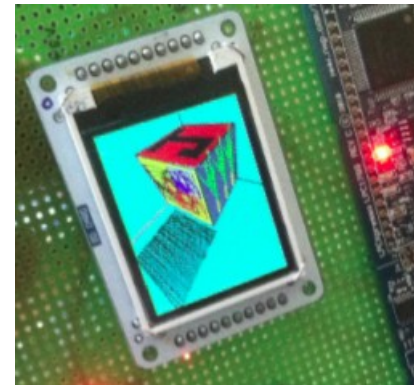## Build Its Capability Now

Use LPC 1769

Display Driver

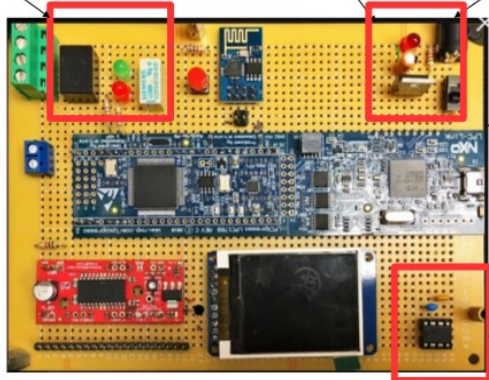2D GE or (GPE)

3D GE or (GPE)

System Layout Design
Front Side

GPIO testing circuit with solid state relay
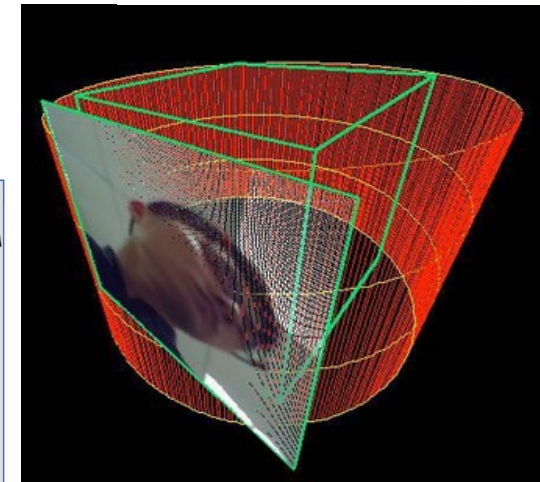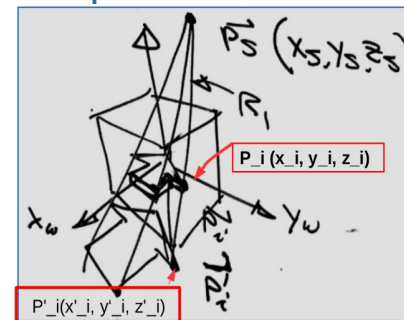PWR circuit unit
J1: PWR Connector
LPC1769
SPI I/F Flash

Dimension: 16 x 11 mm or 6.25 x 4.50 inch

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(1) Define a single point light source $P\_s(x_s, y_s, z_s)$

(2) Build 3 floating cubes, each different size and different orientation

(3) Decorate each surface of the cube just like in lab 2

(4) Compute and then paint the shade of each cube on xw-yw plane

AR

$\vec{P_s}(x_s, y_s, z_s)$

R_1

$P\_i(x_i, y_i, z_i)$

x_w

y_w

$P'\_i(x'\_i, y'\_i, z'\_i)$

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