

DAY 01/30

EMBEDDED SYSTEM DESIGN & IOT MASTERCLASS

arm



MK JEEVARAJAN
FOUNDER & DIRECTOR
19+ YEARS OF EXPERIENCE

Why 30 Days Challenge

Skill Set+ Mindset

Join the Group Activity at Discord, LinkedIn
and facebook

Why do you want to Learn Embedded System

- ✓ JOB
- ✓ Upskill

**Can You Commit for 30
Days?**

Take Notes, One Idea Can Change Your Life

What You will Learn

Embedded System Design -Week 1

- ✓ Day 1 -Introduction to Embedded System Design and Choosing the right processor
- ✓ Day 2 -Introduction to ARM Cortex M4 and Blinking Led
- ✓ Day 3 - UART
- ✓ Day 4 -Bluetooth Home Automation using STM32F411
- ✓ Day 5 - Sending Data to cloud using STM32F411

What You will Learn

8051-Week 2

- ✓ Day 6- 8051 Architecture-Keil
- ✓ Day 7 -Switch ,Relay,
- ✓ Day 8- UART,SPI
- ✓ Day 9- LCD,IIC
- ✓ Day 10- 8051 Mini Project-Bluetooth based Home automation(Project)

What You will Learn

ARM7 -Week 3

- ✓ Day 11- ARM Architecture-Keil, LED Blinking
- ✓ Day 12- Switch ,Relay,
- ✓ Day 13- UART,SPI
- ✓ Day 14- LCD,IIC
- ✓ Day 15- ARM Mini Project -IoT based weather monitoring system(Project)

What You will Learn

CORTEX M4-Week 4

- ✓ DAY 16- CORTEXM4 LPC4088 Architecture-Keil, LED Blinking
- ✓ DAY 17- Switch ,Relay,
- ✓ DAY 18- UART,SPI
- ✓ DAY 19- LCD,IIC
- ✓ DAY 20- Cortex -M4 - Temperature Monitroing using Zigbee and LORA (Project)

What You will Learn

PIC -Week 5

- ✓ DAY 21- Introduction to PIC Architecture
- ✓ DAY 22- MPLABIDE and LED Blinking
- ✓ DAY 23- Switch ,Relay, PWM
- ✓ DAY 24- UART,SPI
- ✓ DAY 25- LCD,IIC

What You will Learn

NodeMCU/ESP8266 -Week 6

- ✓ DAY 26- Introduction to NODE MCU
- ✓ DAY 27- Led,switch,relay,UART
- ✓ DAY 28- Iot Temperature Data Logging (Project)
- ✓ DAY 29- Build Your Home Automation with ESP8266 and Control Devices from Anywhere in the World (Project)
- ✓ DAY 30- Conclusion and Wrap up-Graduation Day

Materials Required

- ✓ STM32F411 Nucleo Board
- ✓ 8051 Board
- ✓ ARM7 LPC2148 Board
- ✓ LPC4088 ARMCORTEX M4
- ✓ NODE MCU/ESP32
- ✓ Logic Analyzer
- ✓ ESP8266
- ✓ DHTL11
- ✓ ADXL345
- ✓ LED ,330 Ohms
- ✓ Relays
- ✓ HC-05 Bluetooth

Self Investment is the Best Investment, The best investment you can do is investing on yourself

- ✓ You Invest Money for Entertainment(Movies)
- ✓ You Invest Money for Travel(Bike,Car)
- ✓ You spend money for Snacks.

**You can Read 100'S of books for
swimming, But you will never get
guts unless you dive in and
Practice**

About Me



- ✓ 19+ Years of Experience
- ✓ Build 300+ Products
- ✓ Generated 70+ Crores of Revenue
- ✓ Top 5 Innovation Products in India from Nasscom-2015

My Primary Expertise

Microcontroller Architecture: 8051, PIC, AVR, ARM, MSP430, PSOC3

DSP Architecture: Blackfin, C2000, C6000, 21065L Sharc

FPGA: Spartan, Virtex, Cyclone

Image Processing Algorithms: Image/Scene Recognition, Machine Learning, Computer Vision, Deep Learning, Pattern Recognition,

Object Classification, Image Retrieval, Image enhancement and denoising.

Copyright and Trademarks: Brainsense, Paper electronics

Announcement

- ✓ Attendance Link at End of the Session
- ✓ Minimum attendance required for an E-Certificate is 28 Days.
Attendance link will be valid for 1 hrs. after the event.
- ✓ For 3 Months Internship Candidates no attendance required ,it will be accessed from the LMS Portal.
(learn.pantechsolutions.net)
- ✓ Recorded Video Streaming for LAB classes to improve Learning Experience
- ✓ Videos will be removed from Youtube after 3-5 Days
- ✓ Be Active on facebook,Discord and Linkedin

Are You Ready?

What is an Embedded System?

- ✓ It is a Combination of Both Hardware and Software with some mechanical parts to perform a Specific task is called Embedded System
- ✓ Desktop Vs Embedded System
- ✓ Eg: printer, Induction Stove, Washing Machine, Wearable

Classification of Embedded System

- ✓ Real Time Embedded System
(System which completes the TASK within Specific Time)
 - Hard real time – Nuclear Reactor
 - Soft Real time – Game Controllers

Types of Processors and Controllers



Dallas,philips
Renesas,freescale,
Texas,Microchip

Microprocessors
Microcontrollers (8/16/32)



CPLD/FPGA

Xilinx,Altera
Lattice,Actel



GENERAL PURPOSE
PROCESSORS
(CPU Vs GPU)

Intel,AMD,Nvidia



Texas,analog
devices,Motorolla,



ASIC

INTEL



GPU

NVIDIA



SOC

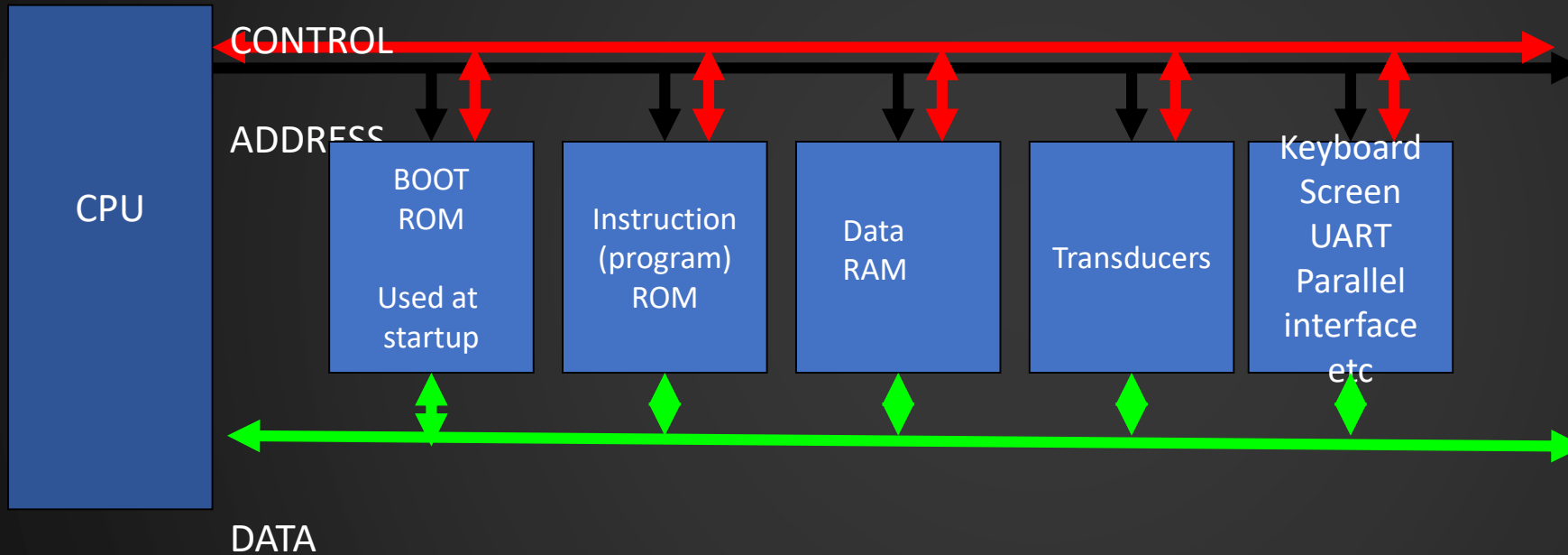
QUALCOMM
BROADCOMM



TPU

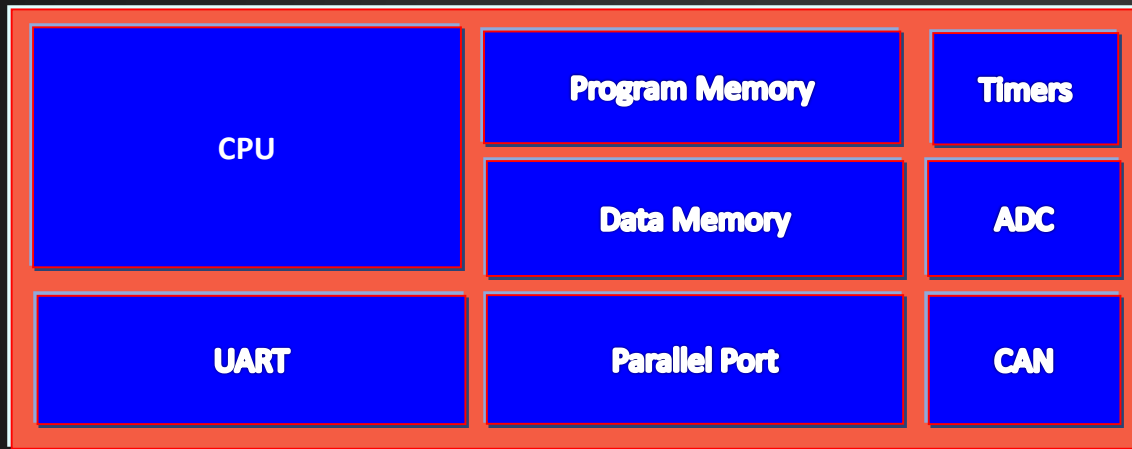
CORAL

Microprocessor Basic



Microprocessor, must have external peripherals to
Interact with outside world.

Microcontroller Basic



Basic Features of DSP

- ✓ Digital Signal Processor is mathematics on chip.
- ✓ DSPs usually run applications with hard real-time constraints:
- ✓ DSPs usually process infinite continuous data streams.
- ✓ MAC Capability
- ✓ DSP processors are microprocessors designed for efficient mathematical manipulation of digital signals.

Why do You Need DSP Processor?

Microcontroller

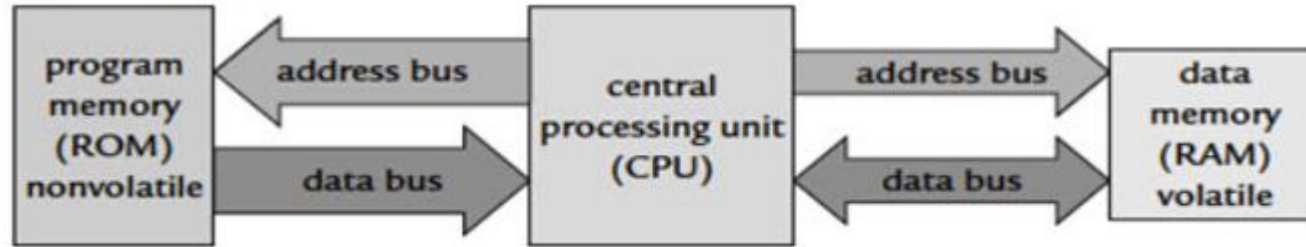
Use a C language

Library

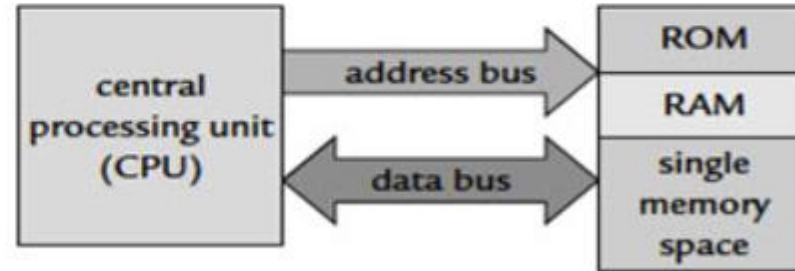
Use a C language

Library

(a) Harvard architecture



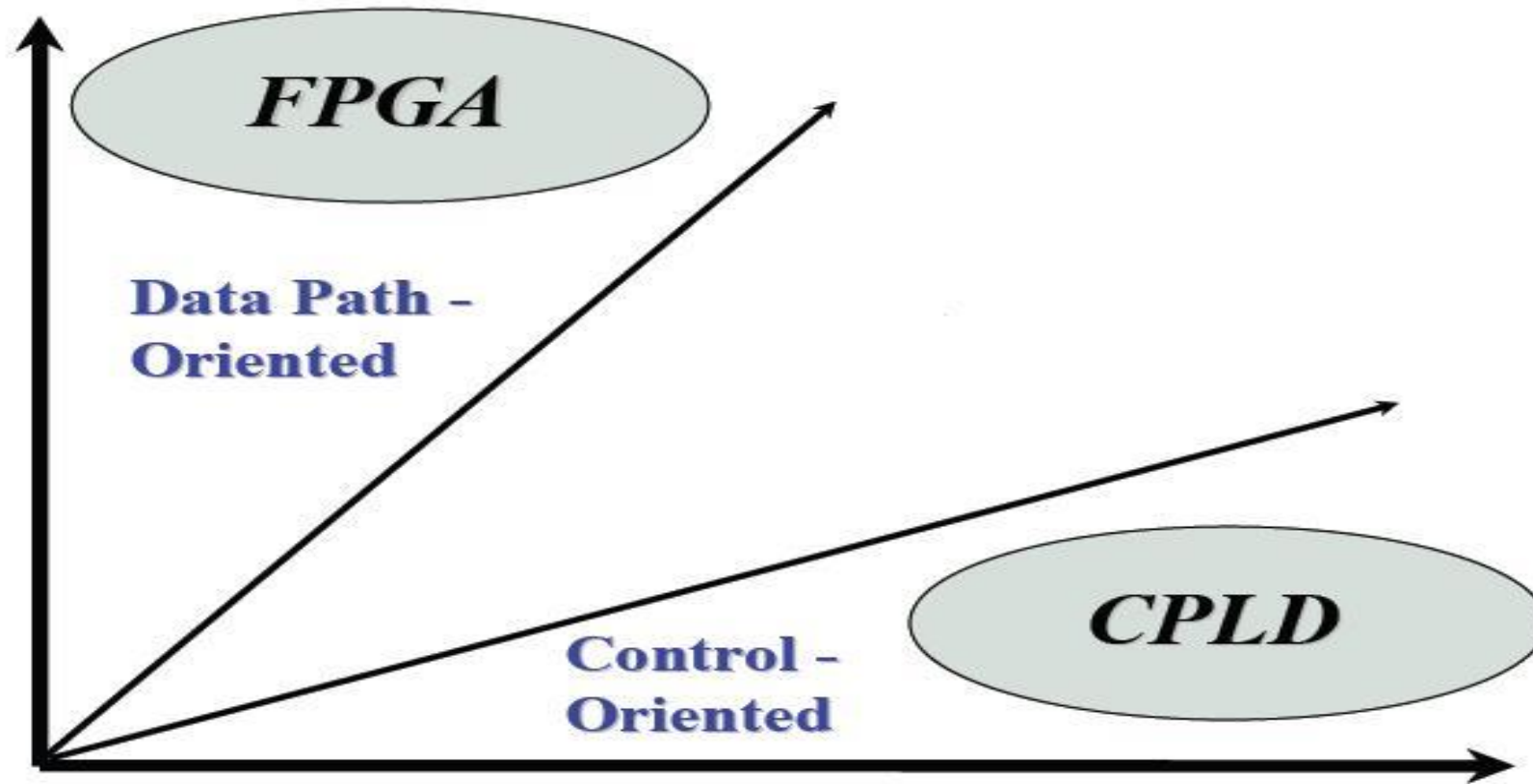
(b) von Neumann architecture



Von Neuman and Harvard Architectures for Memory

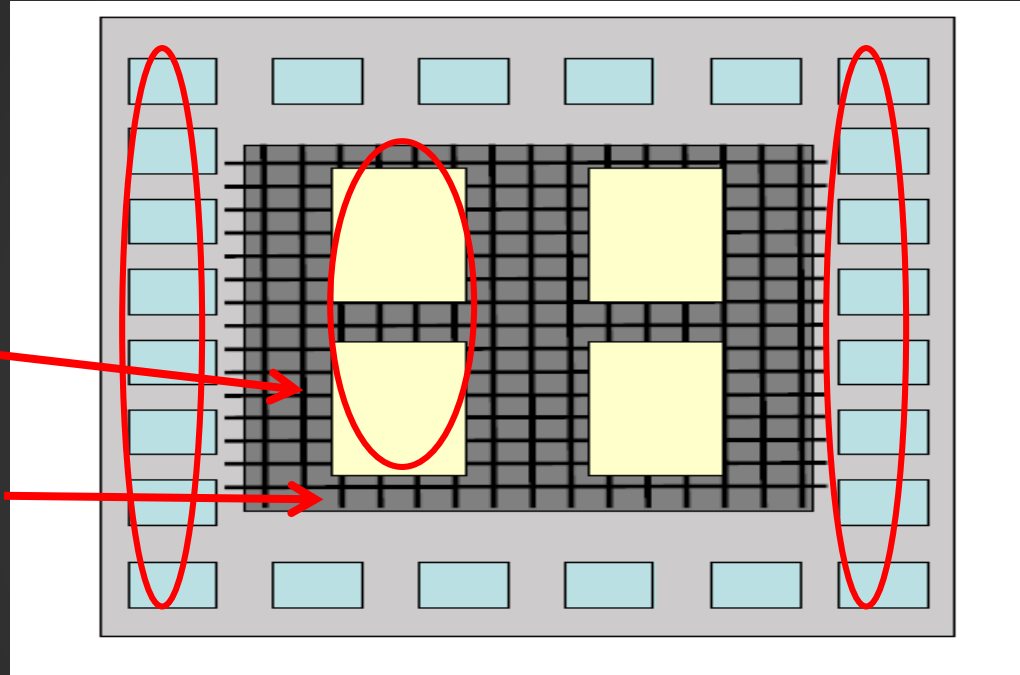
- Processing of signals in real-time.

CPLD VS FPGA



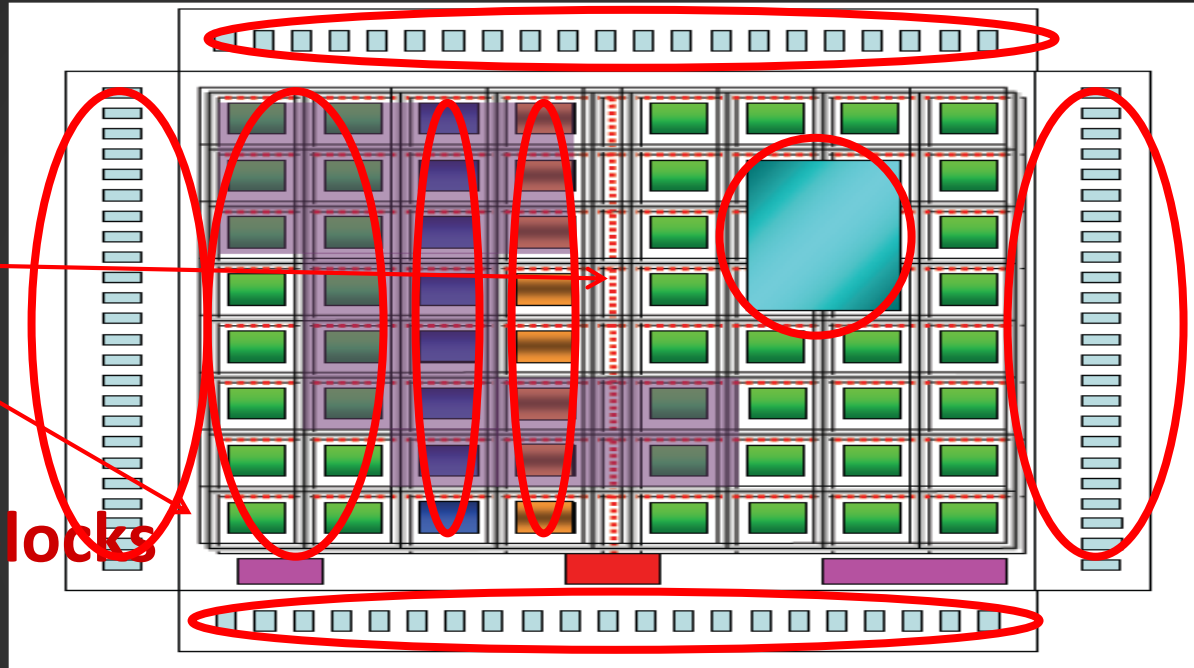
CPLD Architecture

- ✓ Logic blocks
- ✓ I/O blocks
- ✓ Clock routing
- ✓ Routing matrix

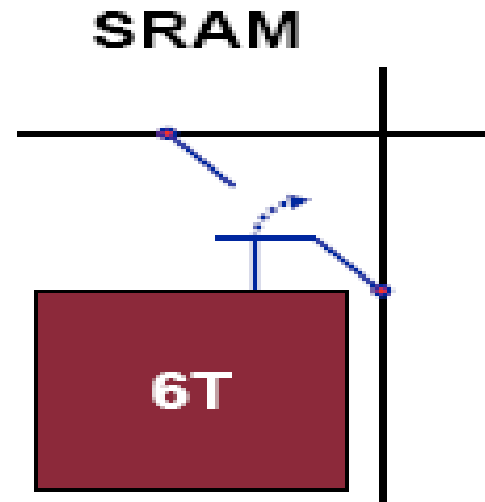


FPGA Architecture

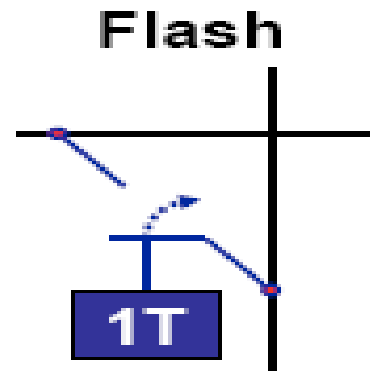
- ✓ Logic blocks
- ✓ I/O blocks
- ✓ Clock routing
- ✓ Routing matrix
- ✓ Memory
- ✓ Multipliers /DSP blocks
- ✓ Processor core



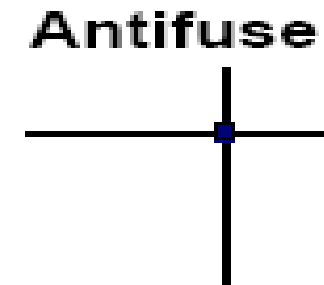
FPGA Technologies



Reprogrammable



Best of Both Worlds
Reprogrammable
& Nonvolatile



Nonvolatile

When to use DSP in FPGA

- ✓ **Higher Performance**

 - Parallel algorithm implementation

- ✓ **Customizable Design**

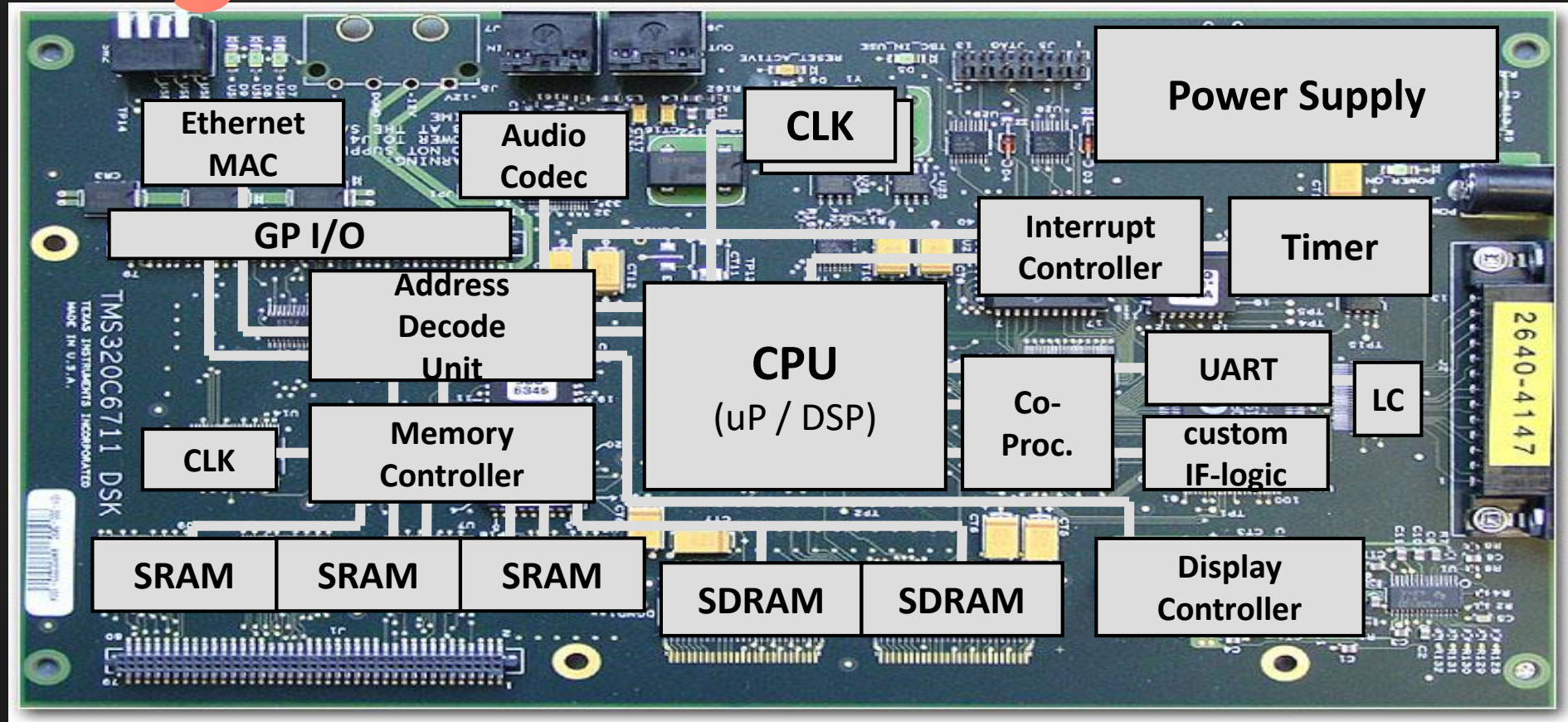
 - Optimize for speed and cost

- ✓ **System Integration**

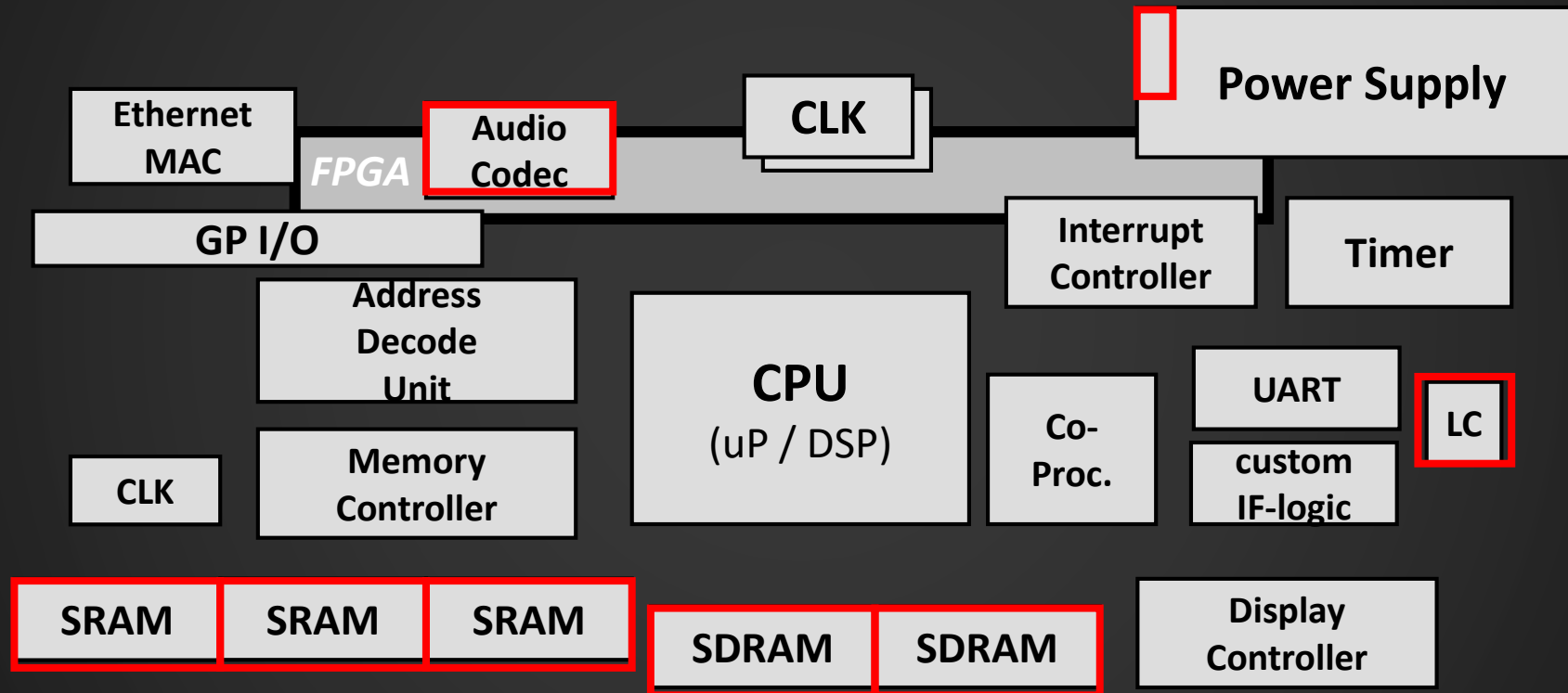
 - Less board real estate

 - Less chips could mean less system cost

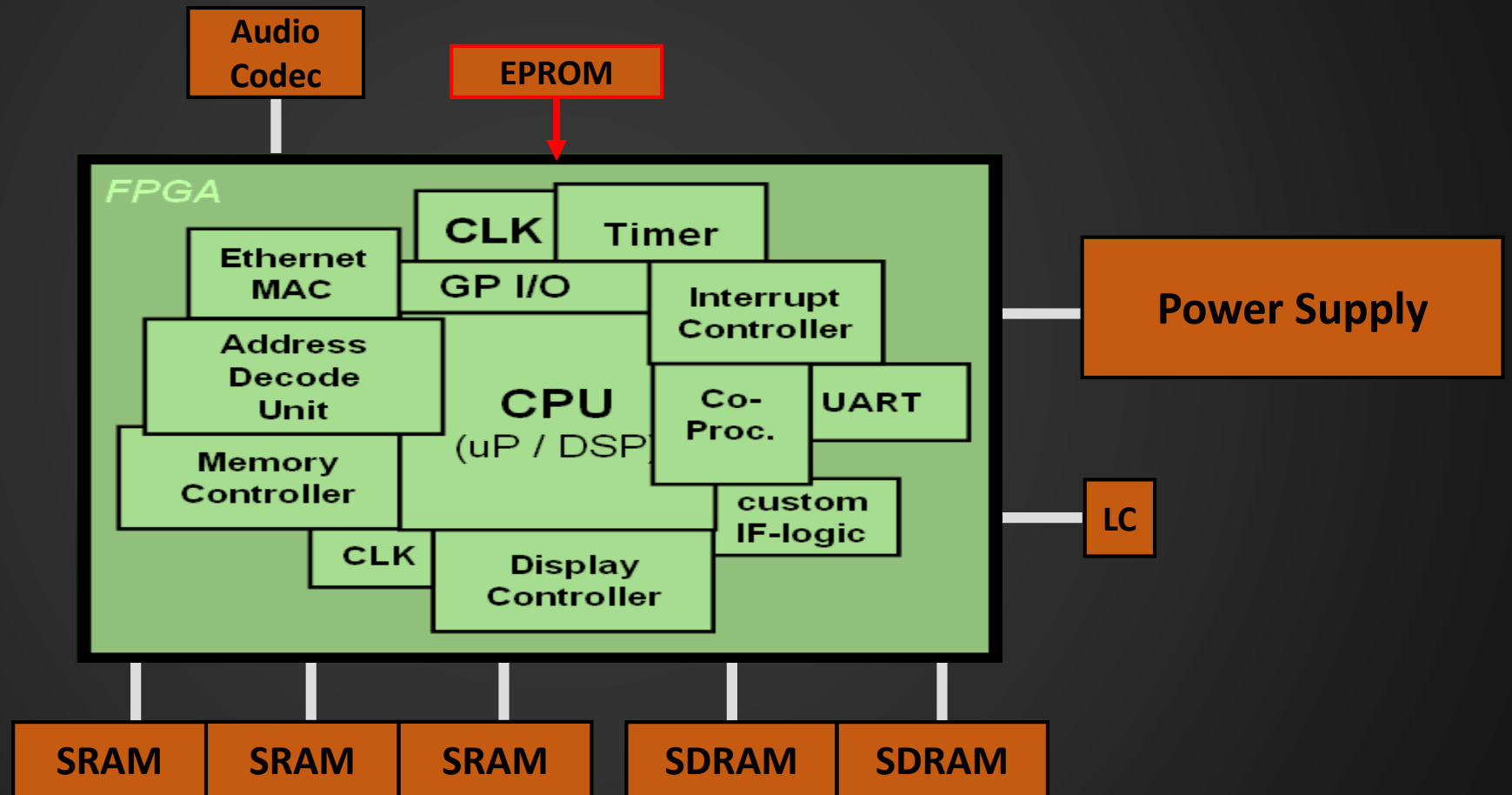
Traditional Embedded system using DSP



Next Step...



Configurable SoC...



Multicore Processor-SoC

2 or More Independent Processors in 1 Package

Symmetric Multiprocessing

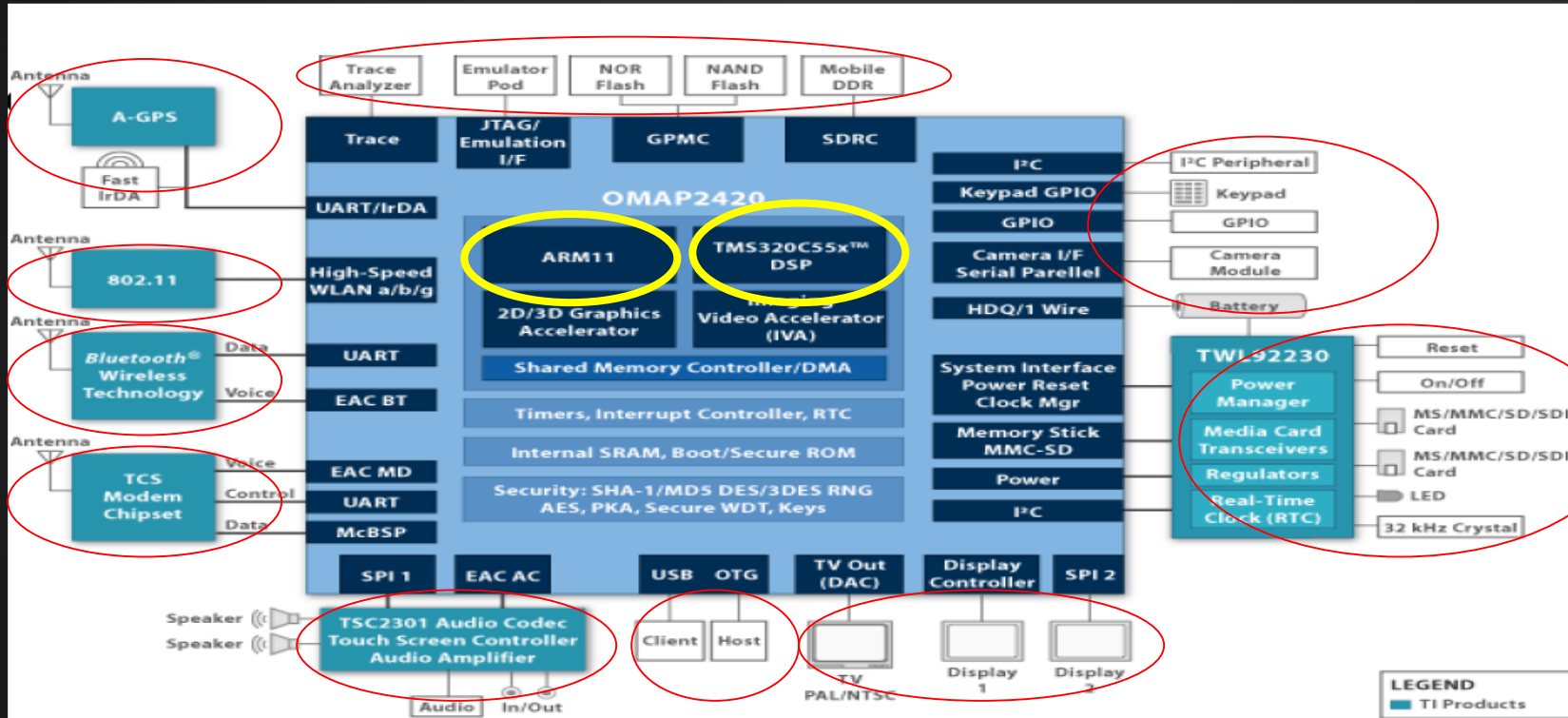
- ✓ Number of Identical Processors
- ✓ Common Shared Memory
- ✓ One Operating System

Asymmetric Multiprocessing

- ✓ Different Processors, Instruction Sets
- ✓ Different Operating Systems
- ✓ Possibly Without Shared Memory



AMP – TI OMAP



- Processors Need Not be Identical
- Processor Specialization may Increase Performance.
- T.I.'s OMAP • General Purpose Processor + Digital Signal Processor ("DSP")

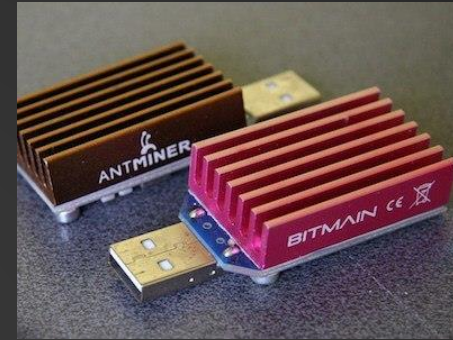
How is FPGA Different from ASIC's

ASIC (Application-Specific Integrated Circuit)

Special chip purpose-built for an application

E.g., ASIC bitcoin miner, Intel neural network accelerator

Function cannot be changed once expensively built

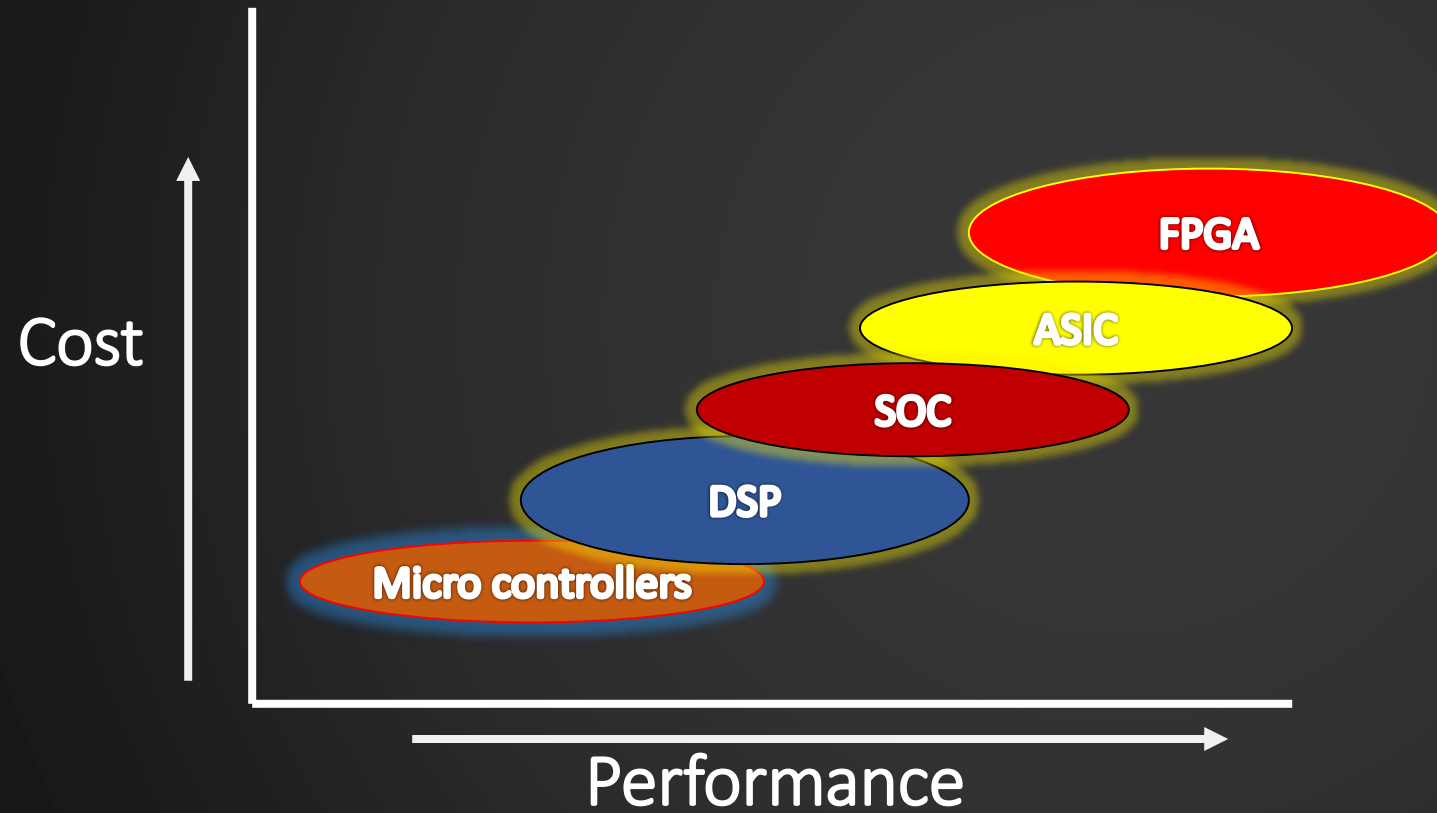


+ FPGAs can be *field-programmed*

Function can be changed completely whenever

FPGA fabric *emulates* custom circuits

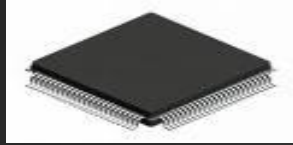
Comparison



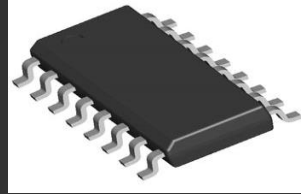
Selection of Packages



DIP



QFP



SOIC



PLCC



BGA



SOLDERING
IRON



SOLDERING
STATION

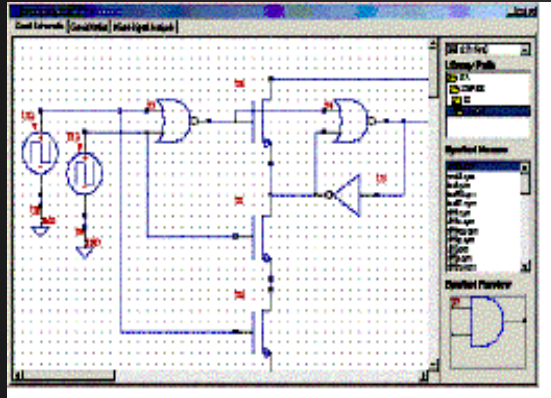


OVEN

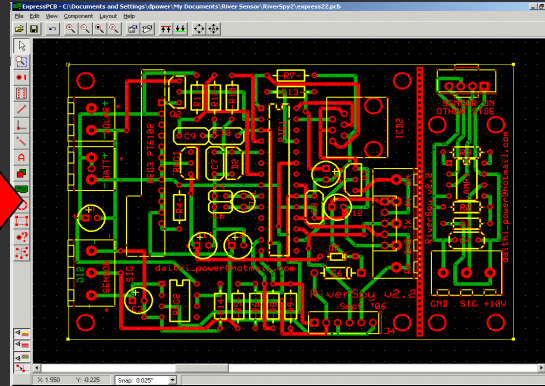
Processor Selection Criteria

- ✓ Development tools
- ✓ Number of I/O's
- ✓ Performance
- ✓ Cost
- ✓ Operating systems
- ✓ Hardware tools
- ✓ Peripherals
- ✓ Power consumption
- ✓ Supplier reputation

Hardware Design Flow



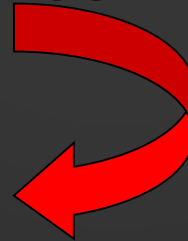
SCHEMATIC DESIGN



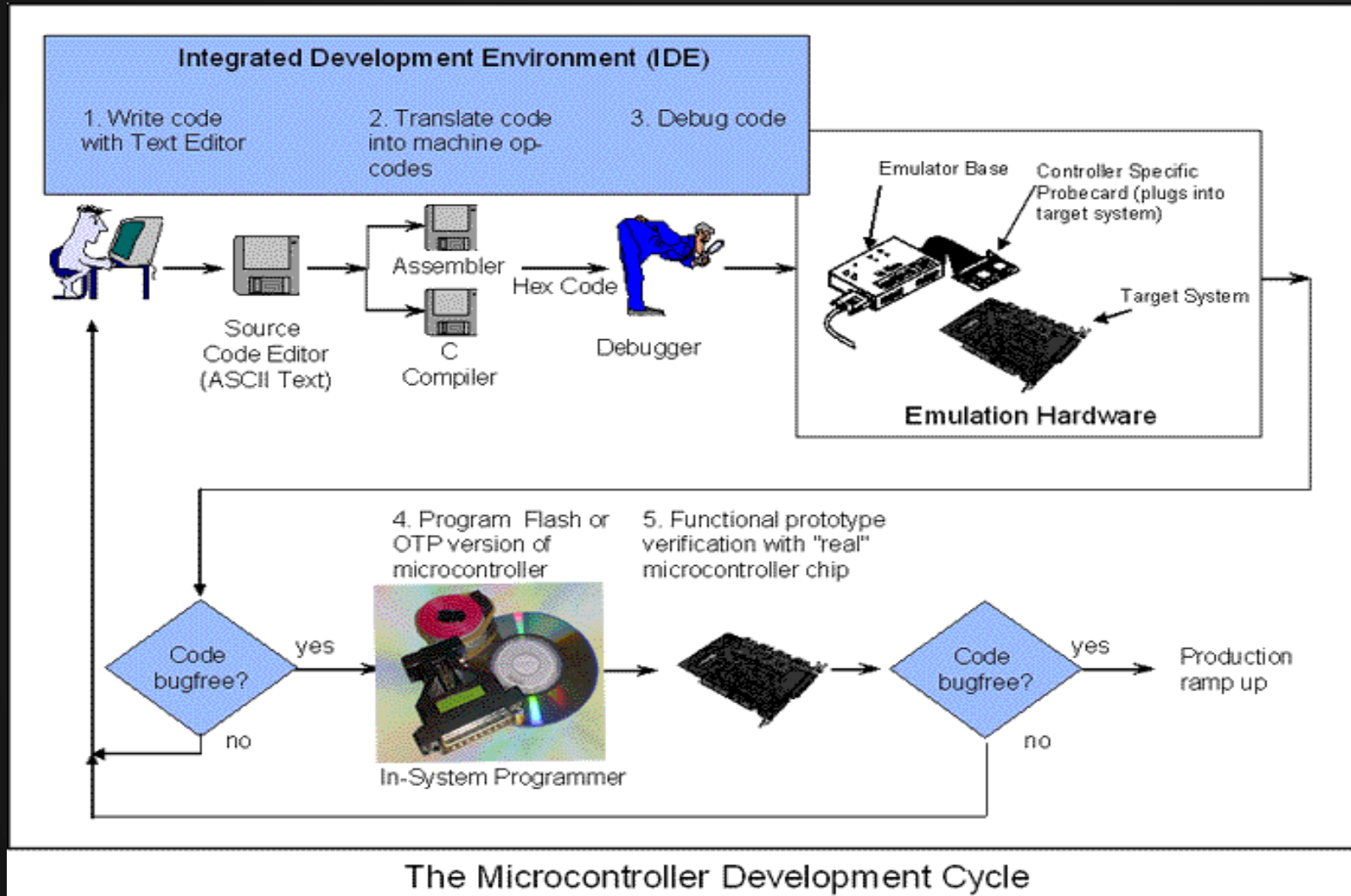
LAYOUT DESIGN



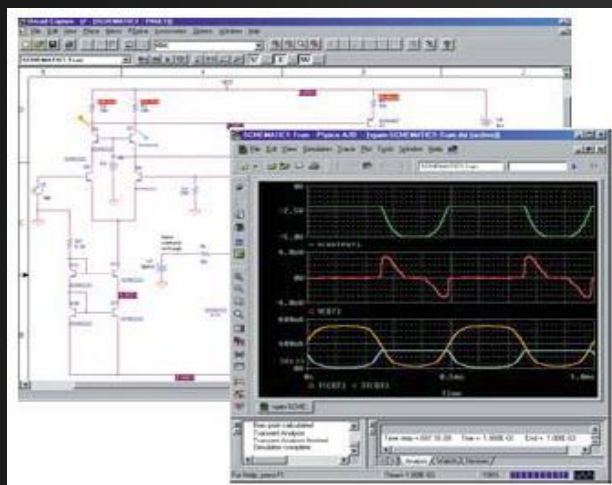
ASSEMBLY & TESTING



Software Design Flow



Simulation



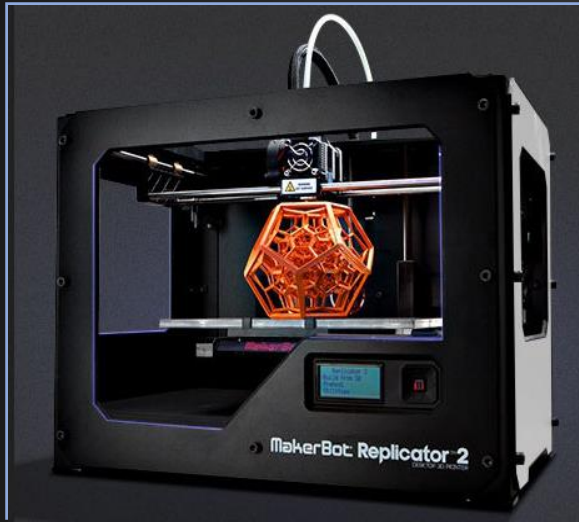
Evaluation



Emulation



Cabinet Design

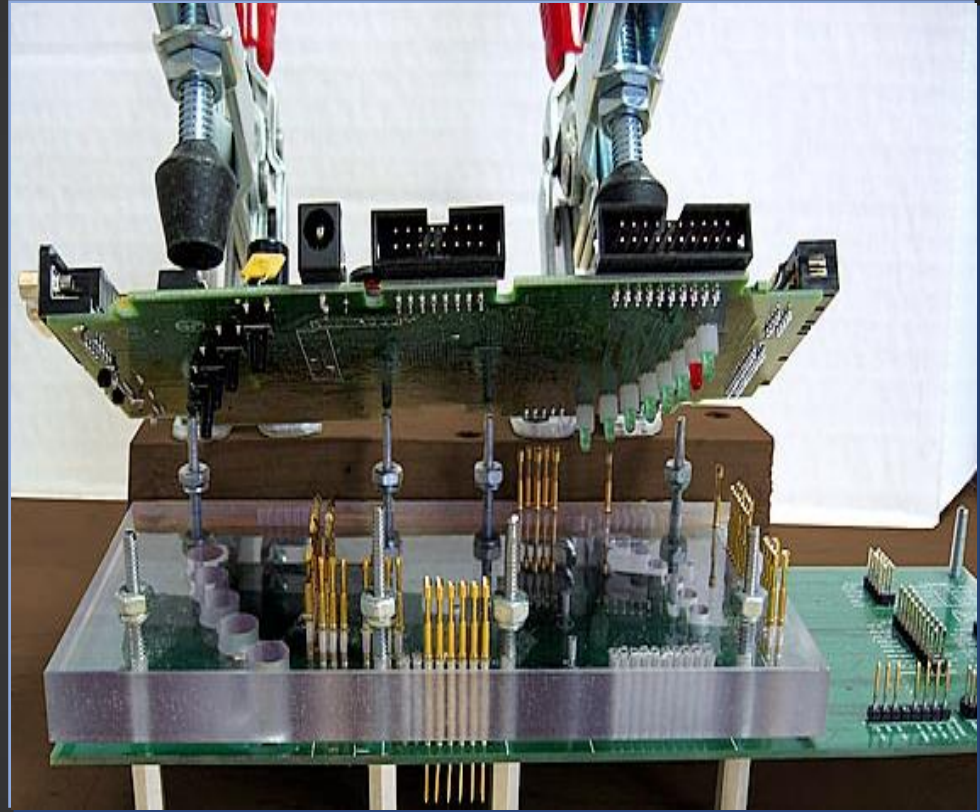
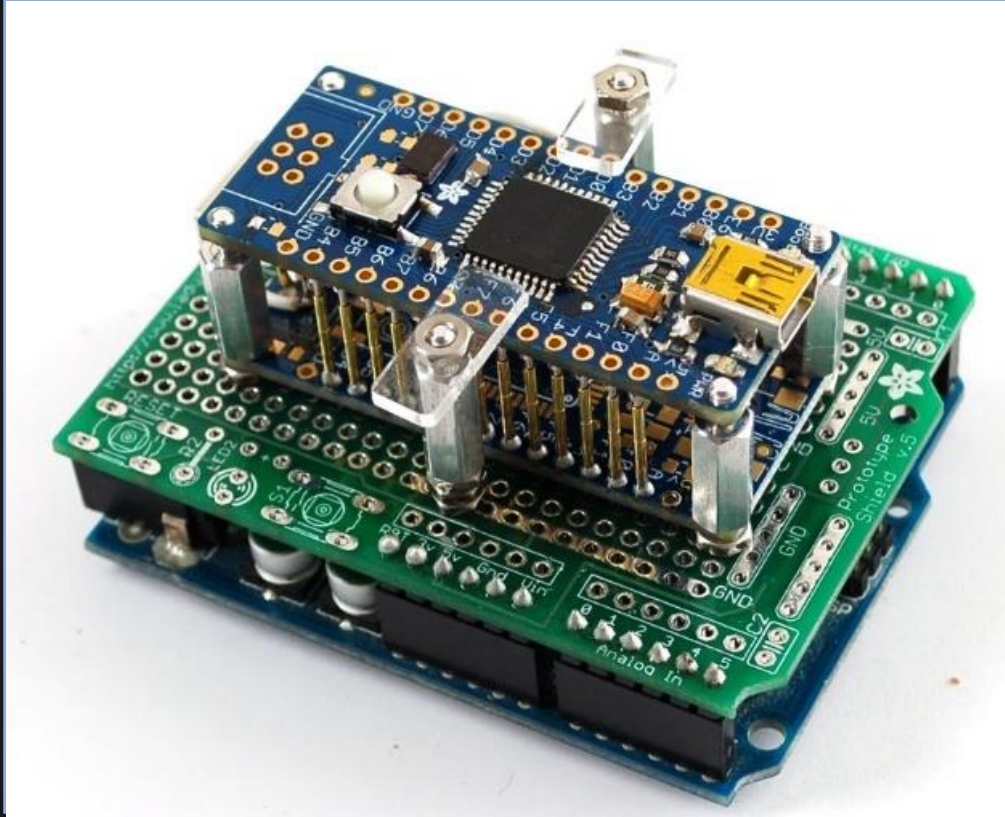


3D Printer

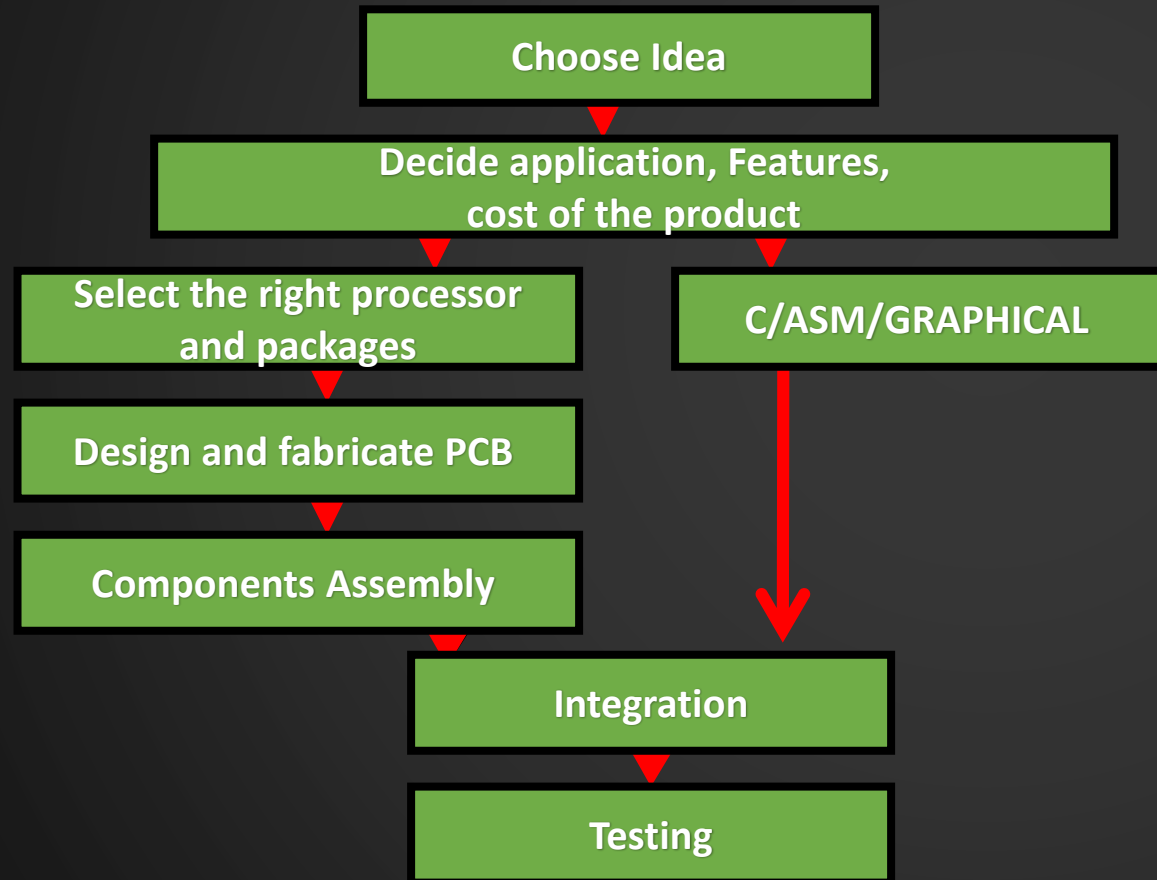


Laser cutting CNC

Test JIG



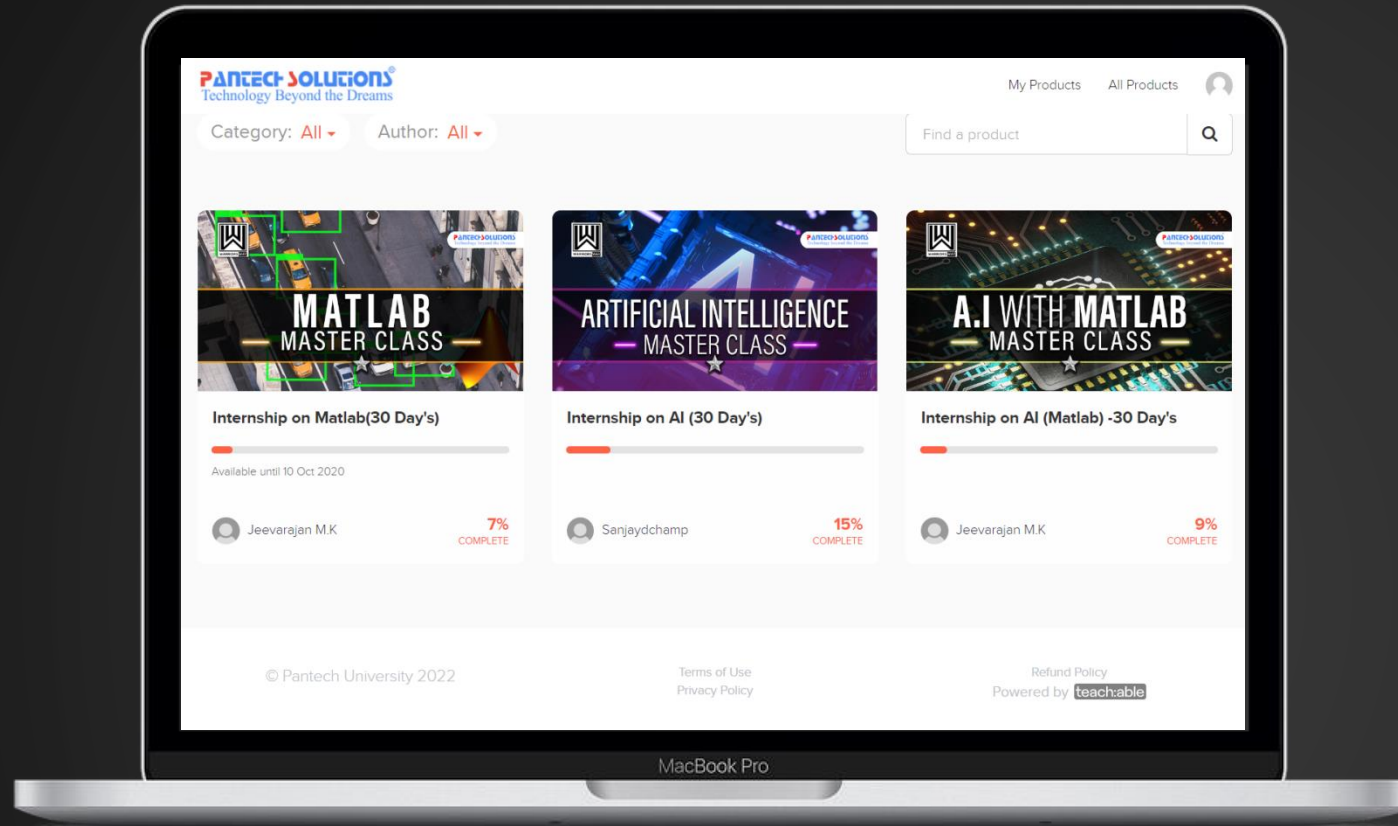
Recap of Designing Embedded System



Difference between Free and 3 Month

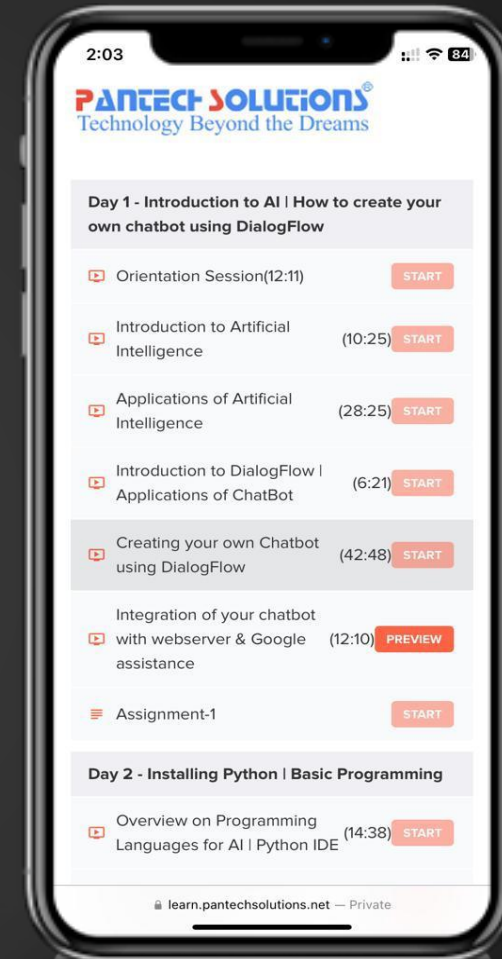
Comparison B/W YouTube & 3 Months Internship Program

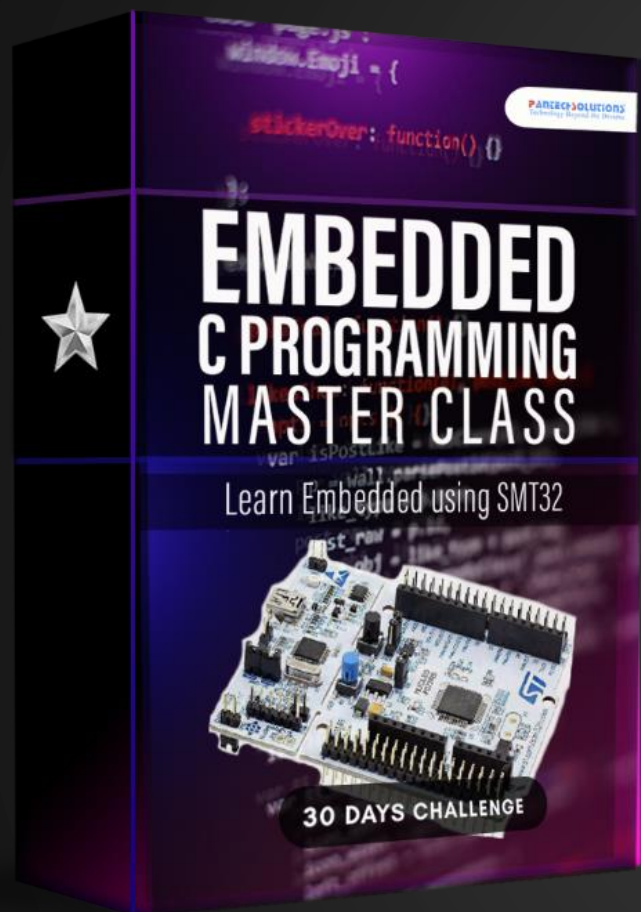
	YouTube Internship	3 Months Internship Program
No. of Course	1	4
Course List	ESD & IOT	Embedded C, ESD&IOT, IOT, PCB Design
Course Recordings	No	Yes
Platform	YouTube	LMS Portal learn.pantechsolutions.net
Attendance	Have to Submit during Live(28 Days)	No need to submit on Live
Source Code	Only based on task completion	Yes
Material	Only based on task completion	Yes
Private Community	No	Yes
Live session – Unlimited Weekends	No	Yes
Validity	Max. 3 Days on each day	Lifetime
Certificate	ESD Internship Certificate	3 Months Internship Certificate
	Rs 0 (\$0)	Rs 1999(24\$)



Get Your Personal Login & Password

Learn On The Go On Your Mobile Phone !





Embedded C Master Class

30 Days Challenge

5+ Projects

₹1499 VALUE



ESD & IOT Master Class

30 Days Challenge

₹1499 VALUE



Embedded System ARM Cortex M4 Master Class

30 Days Challenge • 5+ Peripherals 2+ Projects

₹1499 VALUE



IOT Master Class

30 Days Challenge • 5+ Projects

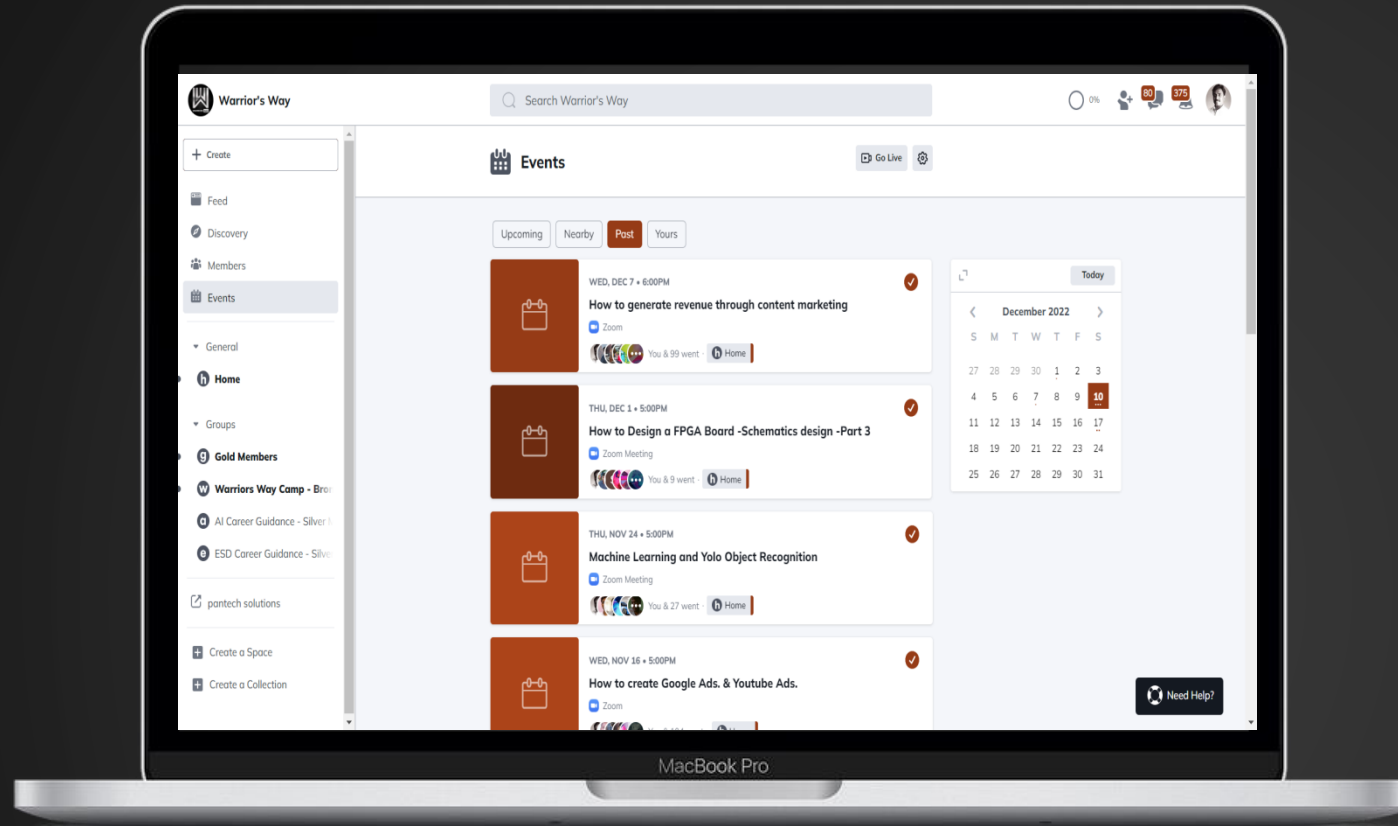
₹1499 VALUE

Private Social Network Access

ACTUAL VALUE

~~₹5996/Yr~~

Rs 1999+GST



Connect with 1,000+ Active Members

LOCATION BASED TAGGING

PRIVATE NETWORK ACCESS

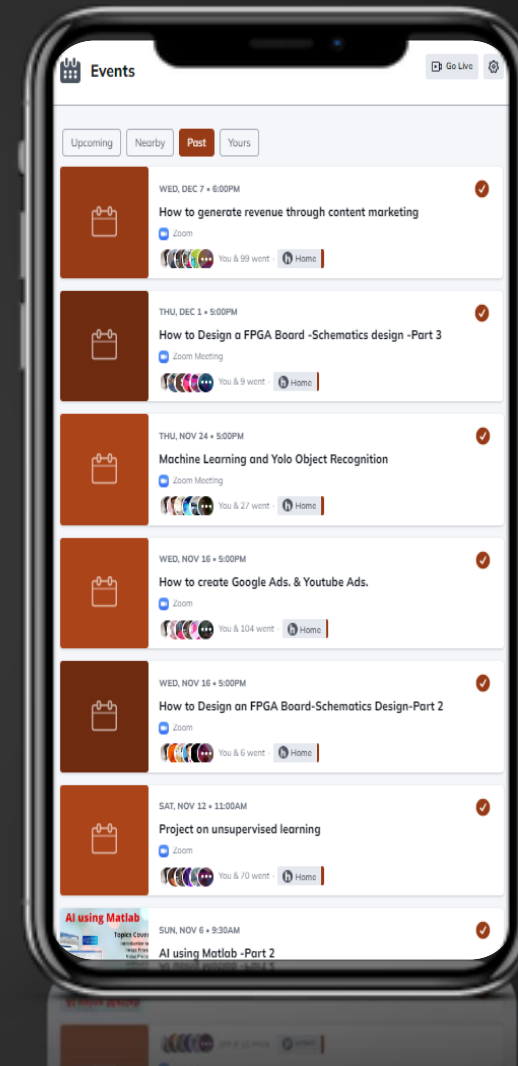


Weekly Master Mind

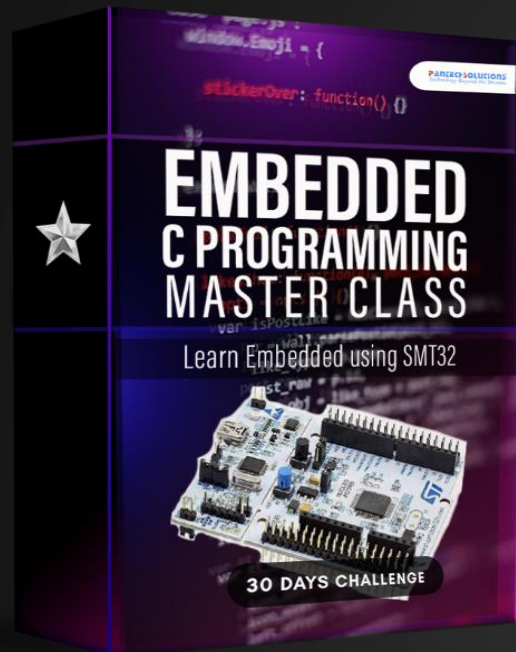
Weekend

FREE

Attend Weekly Inner Circle Master Minds Mobile Phone !



Internship+Community



₹5996 VALUE



SPECIAL OFFER

OFFER PRICE

₹5996

₹1999 +GST

(LIFETIME VALIDITY)

ONLY FOR 30 MINS

**LIMITED
TIME
OFFER**

Pantechsolutions (pantech.ai)

[Get more reviews](#)

4.7 ★★★★★ 12,310 reviews ⓘ

4.7 STAR RATING

12,310+ REVIEWS

Top Notch Customer Feedback



Launch offer (4 Courses)120+ Hours

- ✓ 120 Days of Learning
- ✓ Life time Community access (Coaching in Mindset ,Technical and SoftSkills)(hub.warriorsway.in)
- ✓ Entrepreneurs Coaching on Warriorsway Hub
- ✓ 3 Months Internship Certificate
- ✓ Hackathons on Every Week –ZOOM PLATFORM- (LIFE TIME ACCESS-No Recording or Replay)
- ✓ 500+Embedded Interview Questions(End of the Challenge)

**ONLY ₹999 + GST(LIFETIME
VALIDITY)**
TOTAL VALUE ~~₹5996~~

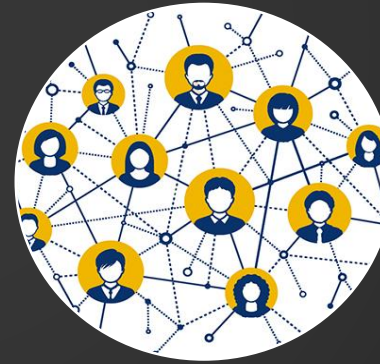
SPECIAL OFFER

TOTAL VALUE

~~₹5996~~



4 Courses



Network & Coaching

SPECIAL OFFER

RETAIL PRICE

~~₹5996~~

**LIMITED
TIME
OFFER**

₹999 +GST ONLY

**ONLY FOR 30 MINS
(LIFETIME VALIDITY)**

Activity & Assignment DISCORD

Brain Computer
Interface

□ Time for ATTENDANCE □

2 Minutes

Fill up the Attendance, Link given in live chat

My Turning Point

My Turning Point

- ✓ 2004 (Pantechsolutions) -2.5 Lakhs -18 Lakhs Revenue
- ✓ 2005 -Launch Madurai Branch -40 Lakh Revenue
- ✓ 2006 -Launch Hyderabad and Kovai -1.2 Cr Revenue
- ✓ 2007 -Launch Pune and Cochin -2.2 Cr Revenue
- ✓ 2008 -3.2 Cr Revenue
- ✓ 2009 Launch Vijayawada -3.8 Cr Revenue
- ✓ 2010 -4.2 Cr Revenue
- ✓ 2011 Launch Manufacturing unit -6.2 Cr Revenue
- ✓ 2013 -8 Cr Revenue



- ✓ 18+Years of Experience
- ✓ Build 300+ Products
- ✓ Generated 45+Crores of Revenue
- ✓ Top 5 Innovation Products in India (Brainsense - NAASCOM)

<https://www.linkedin.com/in/jeevarajan/>

My Turning Point



<https://www.linkedin.com/in/jeevarajan/>

Why You Want to be Life long
Learner?

Stronger the Will , Sooner You find
the Way.

Stronger the WHY , Easier the How

Mindset Lesson

- ✓ Have a Definite Goal . Goal without Deadline is a dream.
- ✓ Prepare a Goal Card



MY GOAL BY _____ 20____

Mindset Activity

- ✓ Write Down Your Top 10 Goals.(1 Mark)
- ✓ Write Down Your Top 10 Ideas to Achieve Your Goal.(1 Mark)
- ✓ 30 Minutes for Workout (5000-7000 Steps a Day)(2 Mark).
- ✓ 15 Minutes to Meditate (2 Mark)
- ✓ 10 Minutes to Visualize of Achieving Your Goals(1)
- ✓ 10 Minutes to Focus on the Day Plan (1)
- ✓ 2 Hr's for Learning and Take Notes. (2 Mark)



10/10

<https://www.facebook.com/groups/embeddedsystemsandiot/>

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mUXQfVfW4Knv7e3XhHVG](https://link.growthflow.ai/widget/form/mUXQfVfW4Knv7e3XhHVG)**

□ Gold Membership Showcase – Job Oriented Training

Register for upcoming Zoom Event on our Gold Membership - FREE

https://zoom.us/webinar/register/WN_ockhOPX6SsmQTB4_8VoNNQ

4 Internship+Community



~~₹5996~~

₹999+GST

(LIFETIME VALIDITY)
ONLY FOR 30 MINS

HOW TO CONTACT US?

Q&A

Q&A

ONLY FOR 30 MINS

THANK YOU