<u>**Team 1140z**</u>

<u>**Introduction of the device:**</u> I chose a Hewlett Packard DV4000 laptop for the Texas Instraments (TI) Challenge. It is a multimedia notebook equiped with a DVD player and a 15.4 inch screen.

<u>**Why:**</u> I selected this device as it gives me an oppurtunity to have insight into laptops that we use in our daily life. Also, computer systems are an intergral part of robotics. First-hand knoweldge of these parts helps me understand computer components and its integration in a better way.
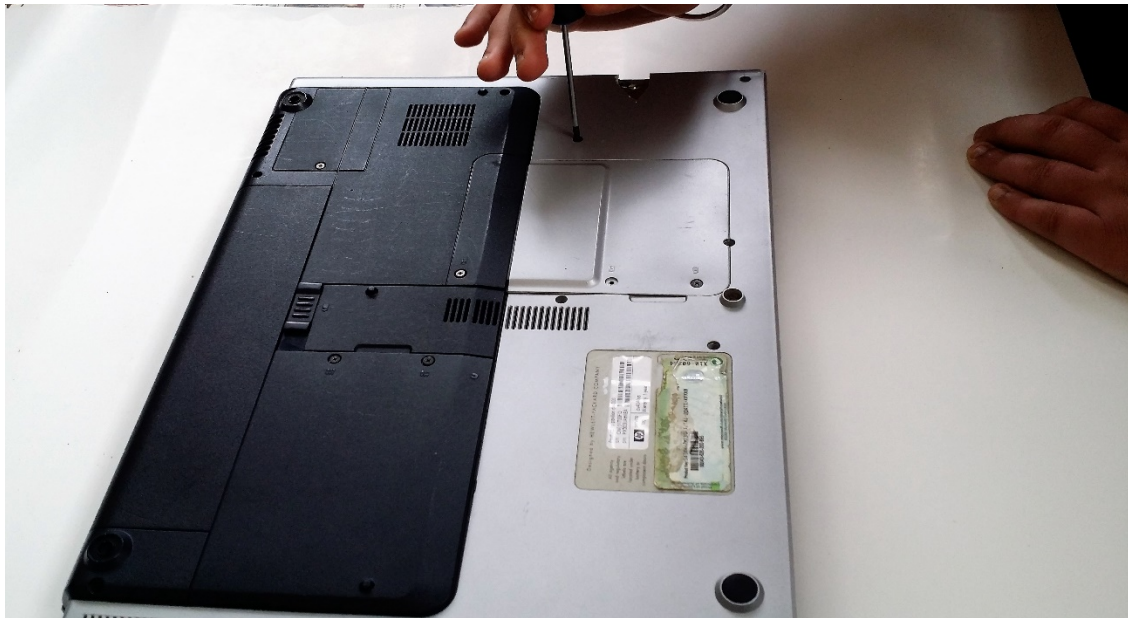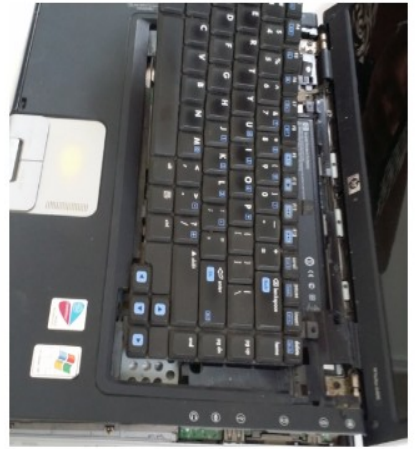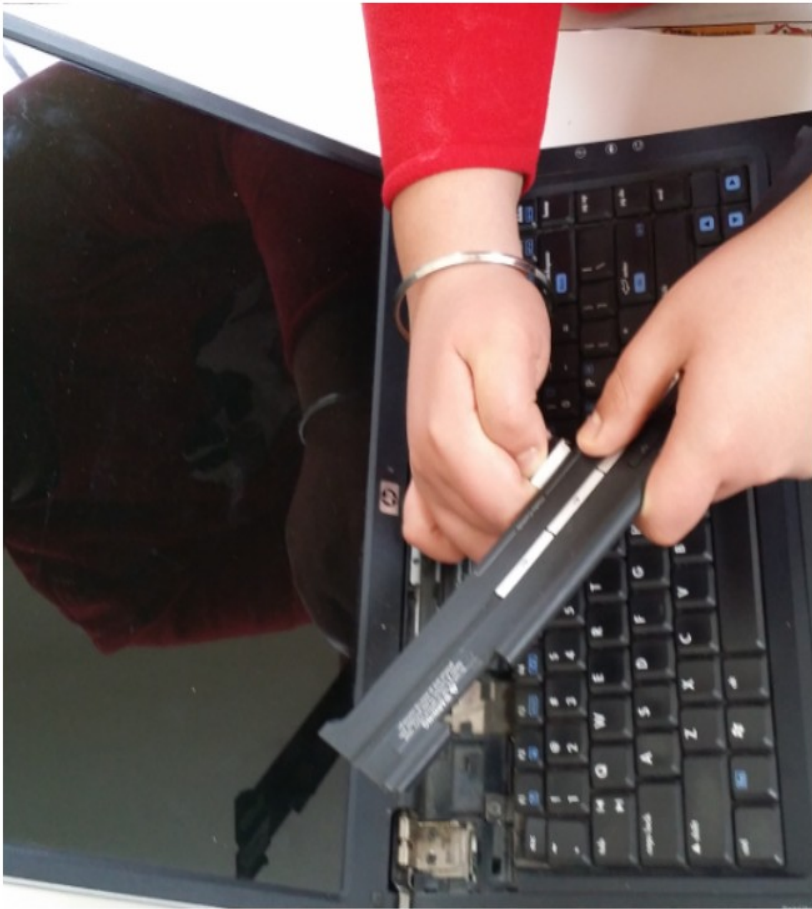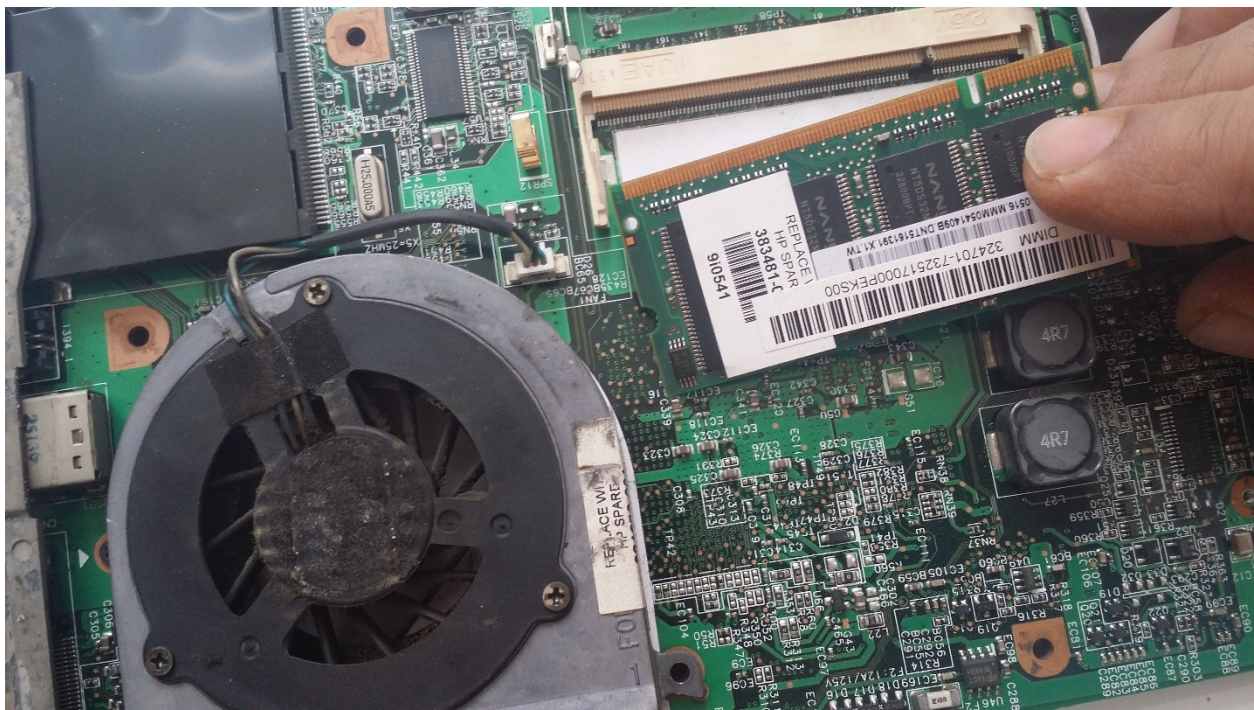
Summary chips and components found inside

1. **Memory**

   Two Dual inline memory modules (DIMM) by Nanya Technology Corporation
   Each chip has 2 GB of memory (4 x 512 MB) for total of 4 GB (2 X 2 GB)

Part #: NT5DS32M16BT-6K

Part Category: Memory ICs
Manufacturer: Nanya Technology Corporation
Description: 32MX16 DDR DRAM, 0.7ns, PDSO66

SPECIFICATIONS

Mfr Package Description	0.400 INCH, PLASTIC, TSOP2-66
REACH Compliant	Yes
Status	Active
Sub Category	DRAMs
Access Mode	FOUR BANK PAGE BURST
Access Time-Max	0.7 ns
Clock Frequency-Max (fCLK)	166.0 MHz
Interleaved Burst Length	2,4,8
I/O Type	COMMON
JESD-30 Code	R-PDSO-G66

NANYA Component Part Numbering Guide

NT	XX	X	XXXXXX	X	X	—	XXX	X

NANYA Technology

Product Family
5S = SDRAM
5D = DDR SDRAM
5T = DDR2 SDRAM
5C = DDR3 SDRAM

Interface & Power (VDD & VDDQ)
V = LVTTL (3.3V, 3.3V)
E = LVTTL (2.5V, 2.5V)
S = SSTL-2 (2.5V, 2.5V)
M = LVTTL (1.8V, 1.8V)
U = SSTL_18 (1.8V, 1.8V)
B = SSTL_15 (1.5V, 1.5V)
A = SSTL_18 (2.0V, 2.0V)
C = SSTL_15 (1.35V, 1.35V)

Organization (Depth, Width)
4M16 = 8M8 = 64Mb
8M16 = 16M8 = 128Mb
16M16 = 32M8 = 64M4 = 256Mb
32M16 = 64M8 = 128M4 = 512Mb
64M16 = 128M8 = 256M4 = 1Gb
128M16 = 256M8 = 512M4 = 2Gb
256M16 = 512M8 = 1024M4 = 4Gb
Note: M=Mono

Device Version
A = 1st Version   B = 2nd Version
C = 3rd Version   D = 4th Version
E = 5th Version   F = 6th Version
G = 7th Version   H = 8th Version

Special Type Option
I: Industrial Temp

Speed

SDRAM
75B = PC-133   3-3-3
6K = PC-166   3-3-3

DDR SDRAM
6K = DDR - 333   2.5-3-3
5T = DDR - 400   3-3-3
4C = DDR - 500   3-4-4

DDR2 SDRAM
5A = DDR2 - 400   3-3-3
37B = DDR2 - 533   4-4-4
3C = DDR2 - 667   5-5-5
25C/AC = DDR2 - 800   5-5-5
25D/AD = DDR2 - 800   6-6-6
BE = DDR2-1066   7-7-7
BD = DDR2-1066   6-6-6

DDR3 SDRAM
AC = DDR3 - 800   5-5-5
AD = DDR3 - 800   6-6-6
BE = DDR3 - 1066   7-7-7
BF = DDR3 - 1066   8-8-8
CF = DDR3 - 1333   8-8-8
CG = DDR3 - 1333   9-9-9
DH = DDR3 - 1600   10-10-10
DI = DDR3 - 1600   11-11-11
EJ = DDR3 - 1866   12-12-12
EK = DDR3 - 1866   13-13-13

Package Code
RoHS + Halogen Free
S=TSOP (II)
N=78-Ball BGA
P=96-Ball BGA
E=60-Ball BGA
J=68-Ball BGA
M=92-Ball BGA
U=71-Ball BGA

2. **Integrated wireless Chip for Mini PCI IEEE 802.11b/g WLAN device-Wireless LAN card**

This adds wireless connectivity to a laptop

IBM PC compatible computers with a Microsoft Windows operating system.

Intel® PRO/Wireless 2200BG
Network Connection

Product Description:
An embedded 802.11b/g MiniPCI type 3B adapter operating in the 2.4 GHz spectrum. This solution is based on the MiniPCI Type 3B form factor designed to meet the space and size requirements for thin and light notebook PCs.

Key Features:

- IEEE 802.11b/g standard dual-mode Wi-Fi CERTIFIED* Wireless LAN support (2.4GHz)¹
- Up to 54 Mbps at 2.4 GHz (Note: 802.11b up to 11Mbps and 802.11g up to 54 Mbps throughput)
- Industry standard wireless LAN security support is available (802.1X, WEP, WPA²) and upgradeable support for AES with enabling software implementation ¹·²
- Cisco* Compatible Extensions (such as LEAP and CKIP) support available on certain models. Check with your PC manufacturer for Cisco security support.³
- Support for antenna diversity enables optimized WLAN performance for multi-antenna systems.
- Intel® Wireless Coexistence System capability enables Bluetooth* co-existence
- Support for Wireless Multimedia Extensions (WME)⁴

Technical Specifications

| Model Name	Intel® PRO/Wireless 2200BG Network Connection (WM3B2200BG)
Dimensions (H x W x D)	1.75 in x 2.35 in x 0.19 in (44.60 mm x 59.75 mm x 4.9 mm)
Weight	12g
Antenna Interface Connector	Hirose* U.FL-R-SMT mates with cable connector U.FL-LP-066
Dual Diversity Antenna	On-board dual diversity switching support for systems designed with two antennas
Radio ON/OFF control⁵	Supported by both hardware and software
Connector Interface	MiniPCI Type III edge connector
LEDs output	Link, Activity
Operating Temperature	0 to +80° Celsius
Humidity Non-Operating	50 to 90 % RH ... (... 25°C to 80°C)

3. Mini-PCI Modem card
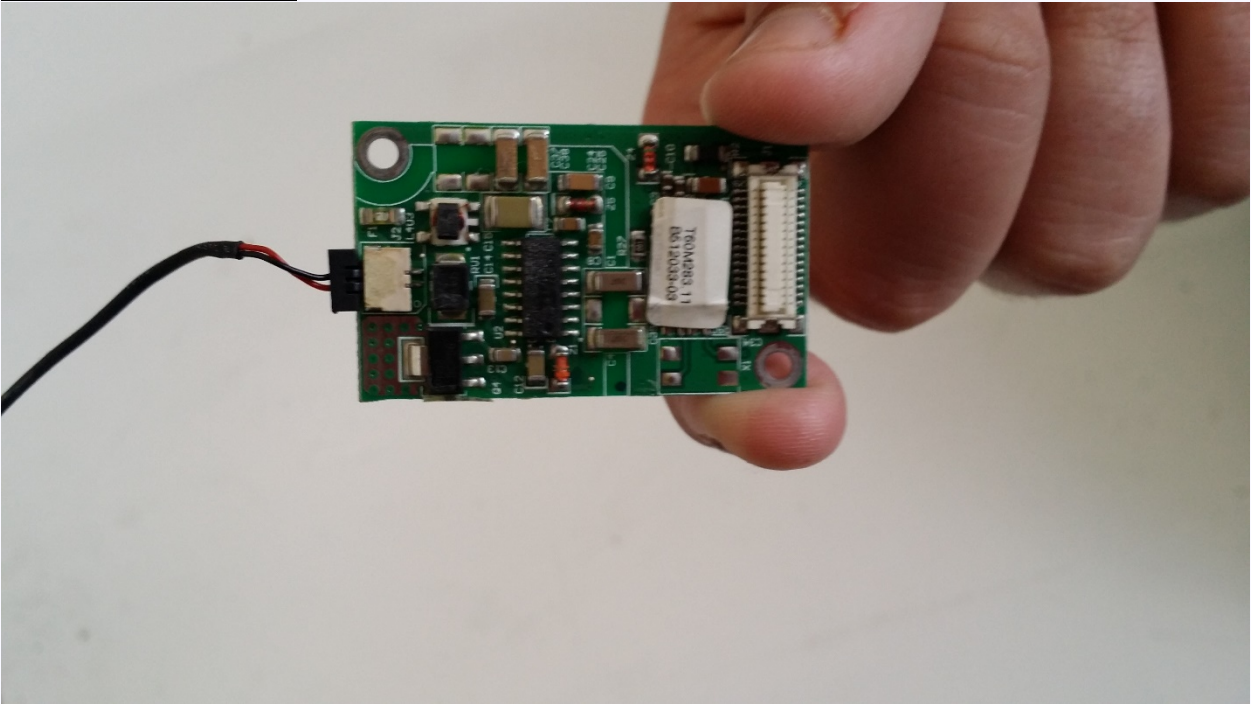
This is a 56 K Mini-PCI Modem that is attached by an adapter and is installed in a Mini-PCI slot.

Chipset -made by Ambit

This modem is with minimal hardware & uses software running on the host computer and the computer's resources (CPU, RAM) in place of hardware in a conventional modem.
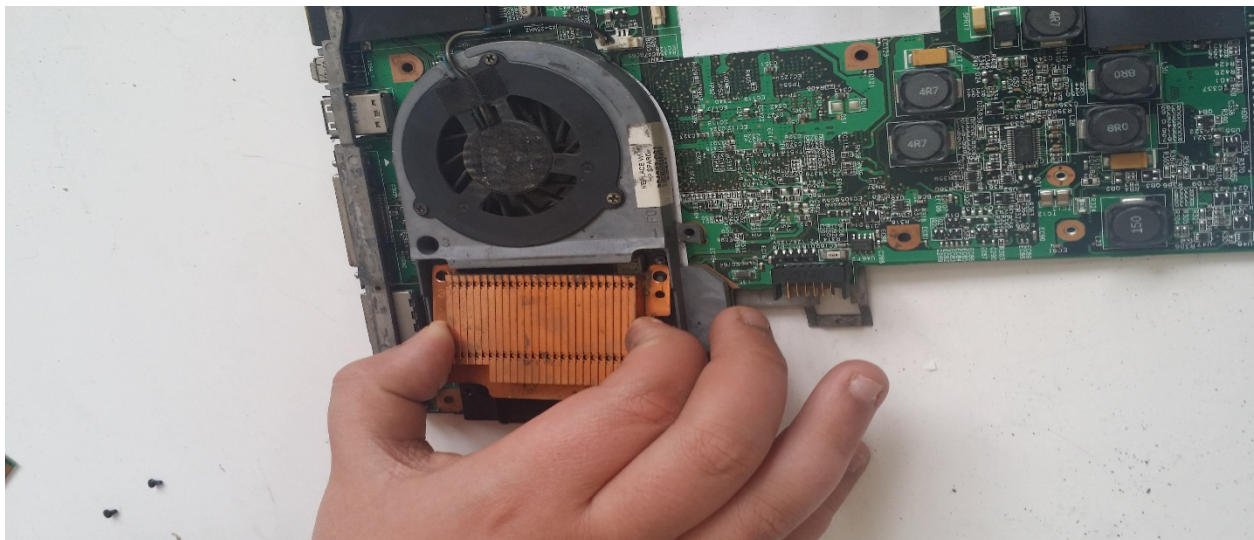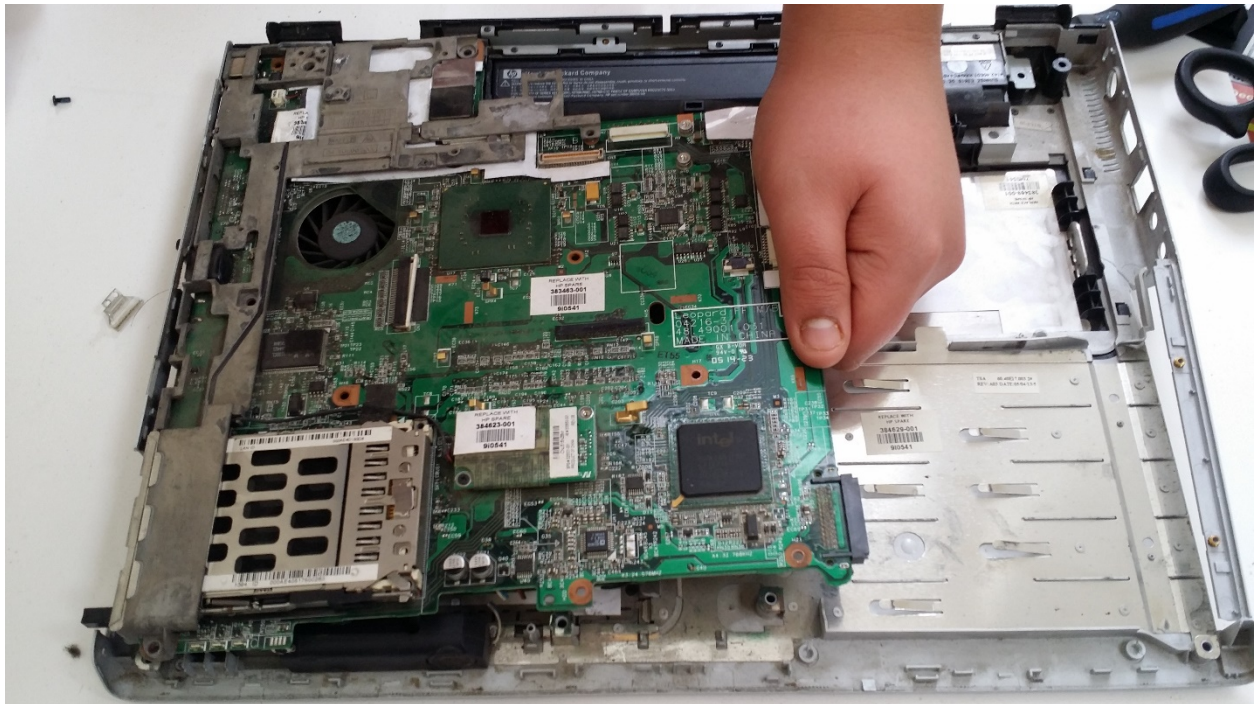
---

4. **Daughterboard**
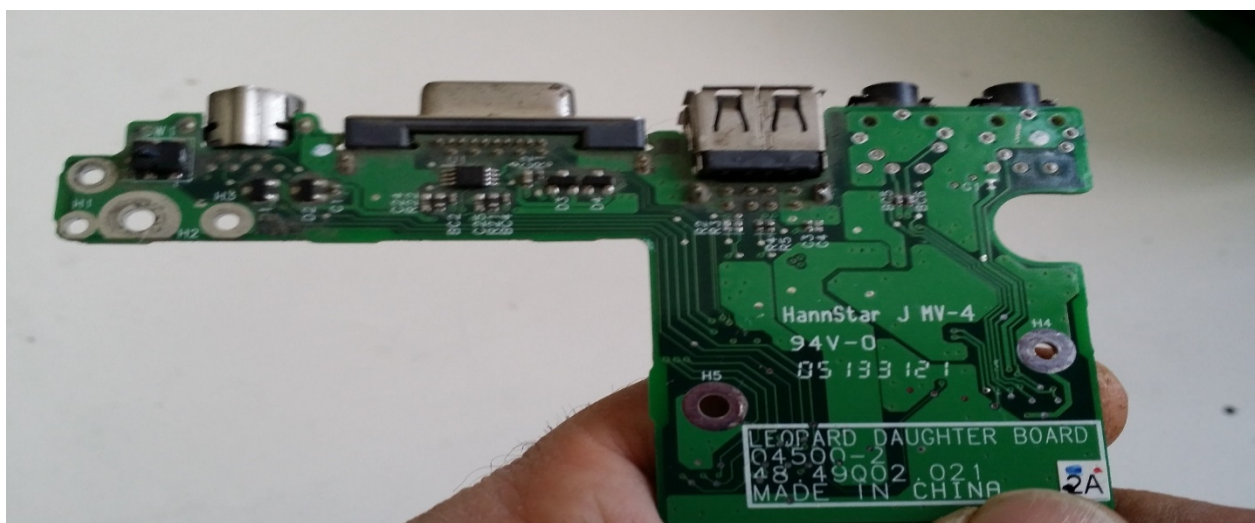
A daughterboard is an extension of a motherboard & have plugs, sockets, pins, connectors, or other attachments for other boards.

5. **Mother Board**—

Leopard FF M/B 04216-3

A motherboard is the main printed circuit board (PCB) that holds & allows communication between many of the electronic components of Laptop, such as CPU & memory, & provides connectors for other peripherals.

6. Intel Pentium M Centrino

Features of this processor are 32-KB instruction cache, frequency of 2.0GHz, 2MB L2 cache, 533MHz Front Side Bus (FSB)

Conclusion:

Got knowledge of Laptops parts and its integration.