UNIVERSITI TEKNOLOGI MALAYSIA

SCHOOL OF COMPUTING
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SECP1513
Section 07

Technology & Information System
Step by Step Basic PC Assembly

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Subject: Technology and Information Systems (SECP1513)
Section: 07
Assignment: Step by step PC Assembly

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Part A: Tools Needed to Assemble a PC

1. SCREWDRIVER:

PC components are held in place with screws and fortunately, the most common type of screw that are used in PC is of Phillips-head. Therefore, the main tool for PC assembly is the Phillips-head screwdriver, to screw and unscrew PC compnents. A long shaft additionally helps in keeping the handle far removed when working in restricted spaces—it's smart to keep a short screwdriver around too, for the very same reason.

Flat bladed screwdrivers ordinarily aren't used a lot in unscrewing PC as most of the job is done by Philips-head screwdriver. However, they might be used for prying things and separate them. PC dis-gathering frequently requires a slender "ice pick" flat-bladed screwdrivers to isolate the plastic lodging. A hex driver may be similarly helpful for deadlock screws on hexameter motherboards or some CPU cooler screws but stability should be taken out or introduced at once. Most gaming-grade cases are pre-familiar with stagnation. It is additionally fixed when various screws are embedded.

Additionally, magnetic screwdrivers are more preferred in PC assembling due to the majority of the screws are tiny. Without the magnetic feature, the screws may be hard to position and fix on the screw hole, and it may easily come off and drop somewhere in the tightening process.

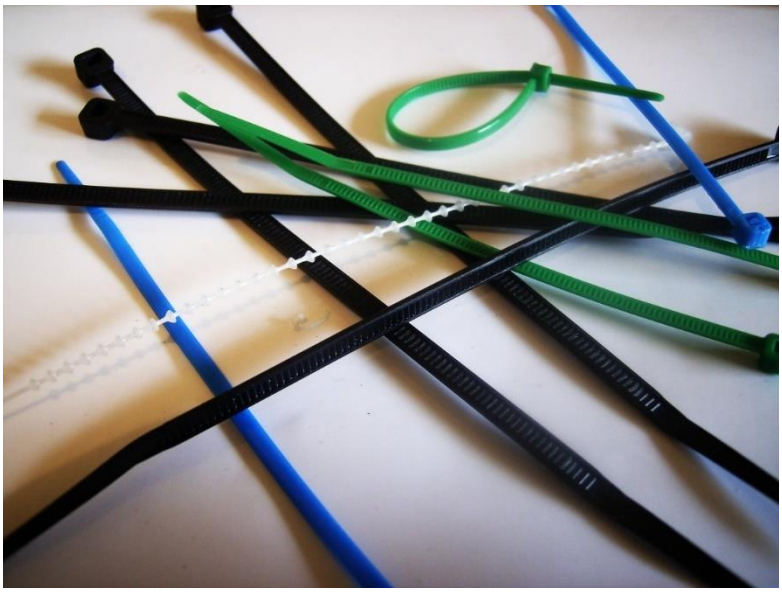
2. PLIERS:

Unfortunately, some of the time the heads of screws may have its pattern worn and snatched away. At the point when this occurs, the main tool is to utilize a few pairs of pliers.

Needle-nose pliers have a wide assortment of uses. They frequently incorporate a wire shaper, which can be utilized to cut the wire insulation and cable ties

Pliers are manual tools for holding and grasping small articles and also for bending and cutting wires.

3. Zip or Cable ties:



It is important to manage the wires to make the inside of PC spacious, to lower the chance of dust accumulating and allow for a high amount of airflow. More importantly, it will make the inside of the PC arranged and look good. Cable tie is the best way to keep the cables sorted in one place. Cables removed in the future can be cleaned with a black band that is practically invisible, almost safe and easy to remove.

This allows the cable and conductor to be connected both during and after the cable installation.

4. Anti-static equipment (Wristband):

Anti-static equipment like Anti-static wristband should be utilized for serious PC assembly. Contacting a grounded case or another grounded metal item is adequate to eliminate the danger of electrostatic release and damaging the PC components. However, it is best to be as cautious as possible by wearing anti-static equipments.

The main purpose of these tools is to protect the worker from releasing static electricity and prevent damage to PC components.

5. Source of Lighting:

PC cases are full of blind zones. Tiny screws may end up in one of the dark corners. A bright desk lamp with a long neck is effective for lighting, but a headlamp is the best tool for direct lighening. A headlamp always point in front of us and does not require our hands to hold it. A flashlight does the job, but it will make multitasking even tougher as we have to hold the flashlight using our hands. Therefore a headlight may be the best choice in terms of light sources.

6. Thermal Paste:

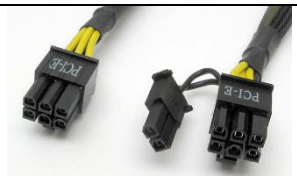
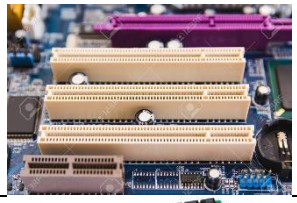
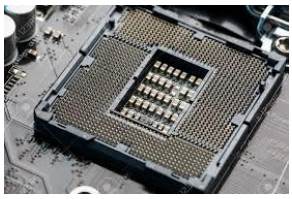
A thermal paste is usually applied to a processor before installing the cooling solution. Without thermal paste, there is still a lot of spaces between the heat sink and the CPU itself on the microscopic level. The main function of thermal paste is to fill in the air holes or spaces between the CPU and the heat sink so that they are fully in contact and heat can be transferred easily.

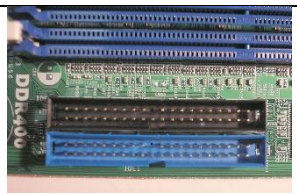
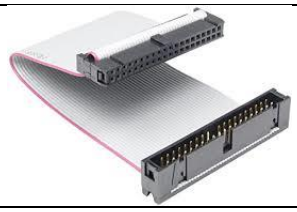
Thermal paste is essential since it fills in the minuscule defects that in any case trap air particles between the CPU and the heat-sink, preventing the CPU from appropriately cooling.

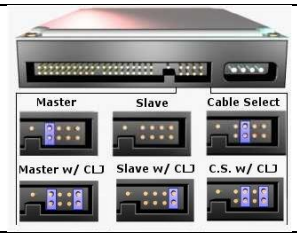
7. A can of compressed air:

A can of compressed air works by pressing air into a container. Then the air is forced through an opening in the tank, where pressure is created.

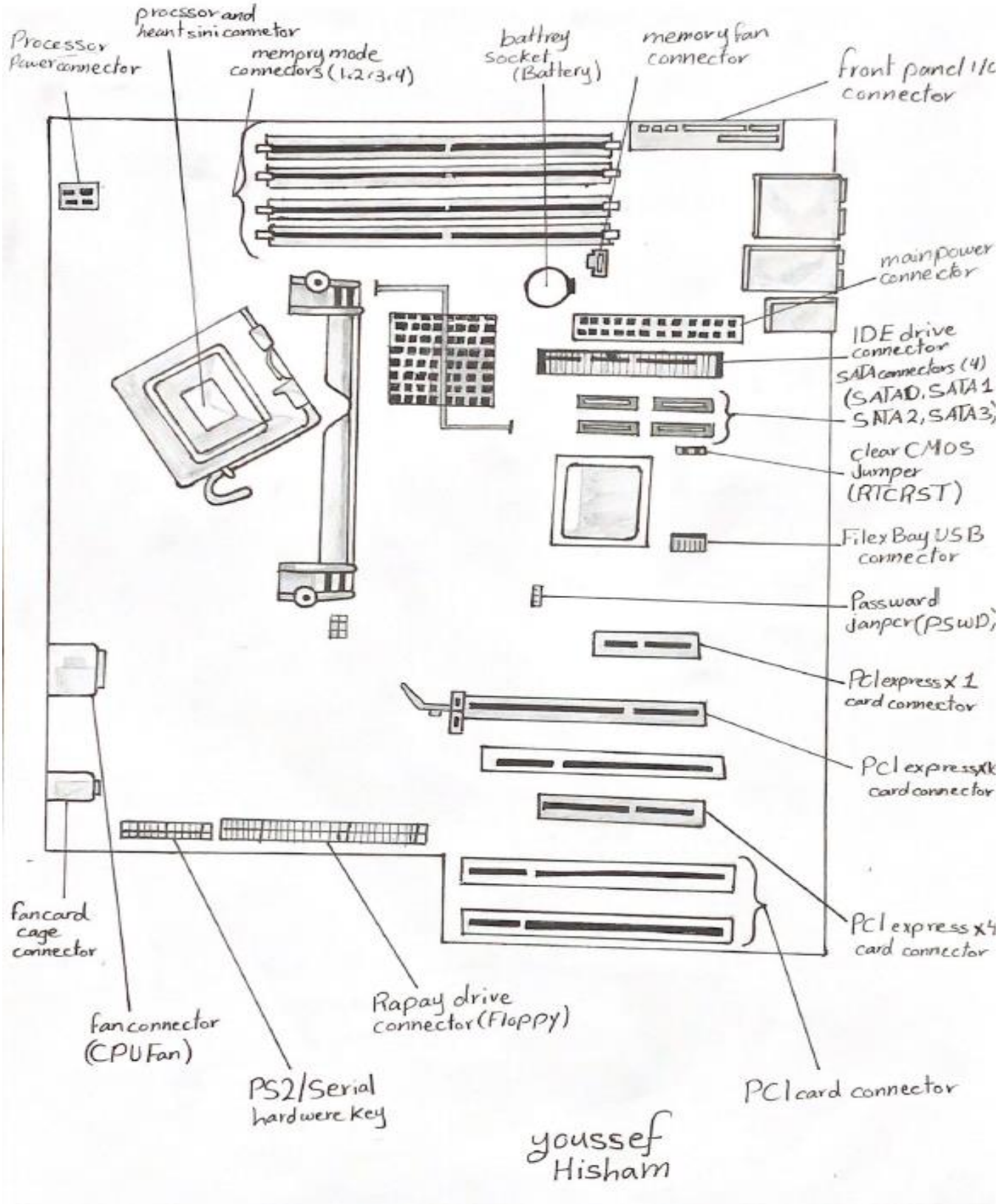
Generally, this compressed air is used to clean the dust of PC where people cannot reach.

Component	Photo	Feature	Types
Processor Power Connector/ CPU Connector		Allows electrical current to pass through to provide power to a device.	4 Pin Peripheral Power Connector, ATX 20 Pin Power Connector, 6 Pin PCI Express Power Connector etc.
Heatsink		Transfers the heat produced by an electronic or a mechanical device (Especially CPU) to a fluid medium (usually air cooling, more advanced – water cooling) where it is let out from the device to maintain the temperature of the device. Has large surface area to ensure efficient cooling	Passive Heat Sink, Active Heat Sink, Aluminium Heat Sink, Copper Heat Sink, Solid Metal Heatsink, Pumped Liquid Heatsink.
PCI / Peripheral Component Interconnect		Interface for connecting additional internal components like graphics card, Wifi card or SSD to a desktop computer.	PCI, AGP, PCI Express.
Memory Module/ RAM (Random Access Memory)		Volatile memory. Stores temporary data while the computer is on or running. Data is lost when the computer is powered off	TransFlash Memory Module, SIMM (single in-line memory module), DIMM, (dual in-line memory module), Rambus memory, SO-DIMM (small outline DIMM).
CPU Socket		Provides mechanical and electrical connection between the microprocessor and printed circuit board (PCB) and allows for placing and replacing the central processing unit (CPU) without soldering.	Pin grid array (PGA), Staggered Pin Grid Array (SPGA), Plastic Pin Grid Array (PPGA), Micro Pin Grid Array (µPGA), Flip Chip Ball Grid Array (FCBGA), Land Grid Array (LGA)

IDE(Integrated Drive Electronics)		An electronic interface between the computer motherboard's data paths or bus and the computer's disk storage devices. Older than SATA standard	
IDE(Integrated Drive Electronics) cable		Used to connect some hard drives and optical drives to the motherboard. Older than SATA standard	34-pin cable, 40-pin cable etc.
Graphics Card		Renders the image on a monitor; responsible for rendering images to the monitor by converting data into a signal that monitor can understand. Usually process thousands of cores since image rendering is best ran parallel.	Types: PCI, AGP, and PCI Express. Models: Nvidia GeForce RTX 2080 Super, AMD Radeon VII, Nvidia Quadro RTX 4000 etc.
CPU(Central Processing Unit) / Processor		Receives to and processes the basic instructions that allows a computer to function; Responsible for interpreting and calculation of most computers commands.	Types: Microcontroller, Microprocessor, Embedded Processor, DSP and Media Processor. Models: AMD Ryzen 9 3950X, Intel Core i5-10600K, AMD Athlon 300GE.
PSU (Power Supply Unit)		Converts mains AC to a lower-voltage regulated DC power for the proper powering of internal components in a computer.	

CD ROM		Type of computer memory in the form of a compact disc that is read by optical means.	Types: standard manufactured CDs (CD-DA), CD-R (recordable) and CD-RW (rewriteable).
USB cable		Interface mostly used to connect computers to peripheral devices such as mouses, keyboards, cameras, printers and scanners.	USB-A, USB-B, Mini-USB, Micro-USB, USB C, Lightning Cable etc.
Serial Advanced Technology Attachment / SATA cable		Serial ATA cables are used to connect devices in computer cable assemblies. Newer and faster than older IDE interface.	Micro SATA, SATA Bracket, SATA Bridge, SATA Power etc.
Hardware Disk Jumper		used to enable specific types of **settings**.	

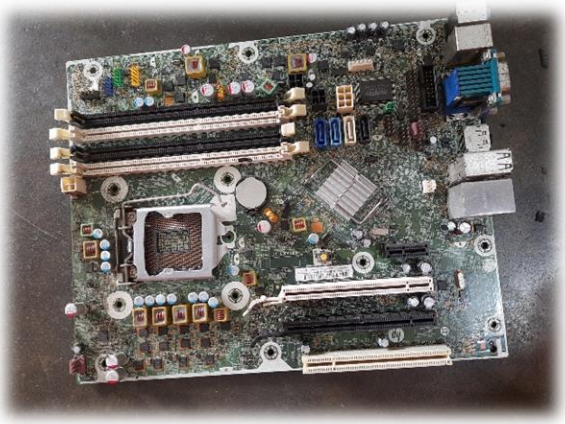
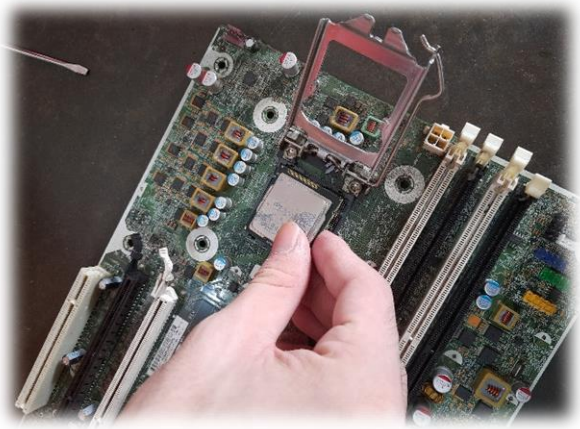
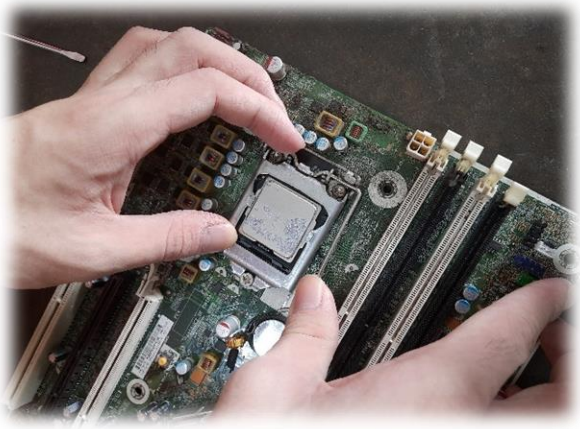
PART B – Sketch of a mother board layout

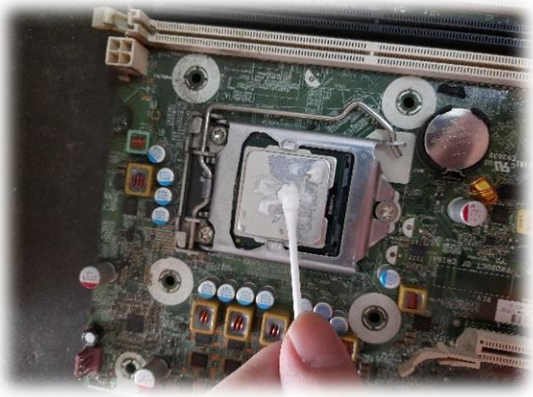


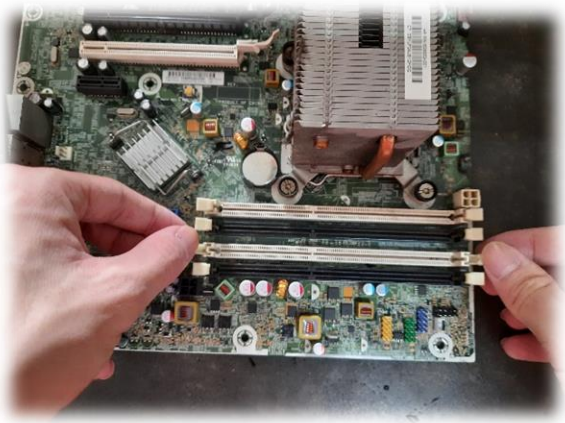
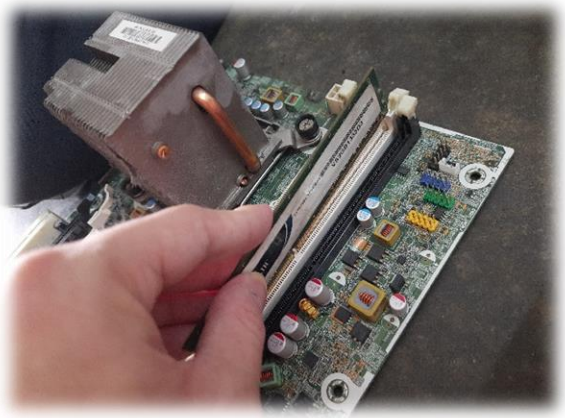
Part C: Step by Step PC Assembly

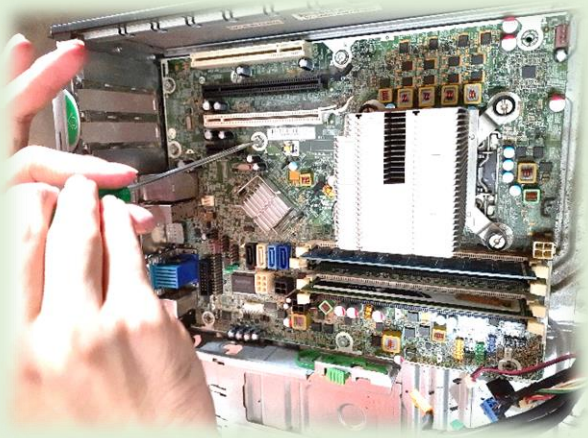
PC Used: HP Compaq Elite Small Form Factor Desktop

Photo	Step	Description
  	Opening the Computer casing	1. The side cover has to be unscrewed first (if any). Place the side cover to lay on a flat surface. *PS: The computer that we use has the side cover fixed by thumbscrew. Therefore, it is easily unscrewed by hand. The casing is easily opened with a provided handle*

  	Motherboard (Processor / CPU)	1. The latch lever of the CPU socket is first lifted. 2. The processor is then placed gently, lining up the alignment notch of the processor with the triangle marked on the processor socket to ensure correct orientation. 3. Slowly, the CPU latch lever is lowered to hold and lock the processor in place. 4. Apply thermal paste to ensure contact of processor with heat sink to prevent overheating

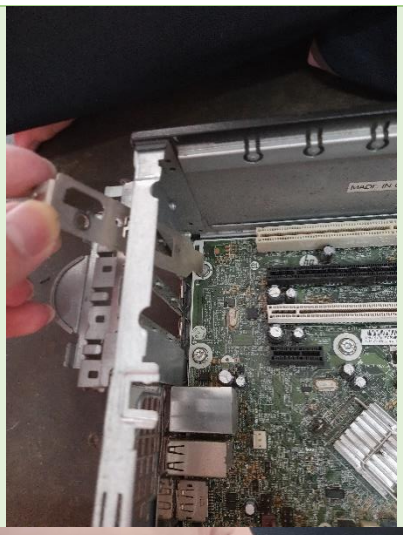
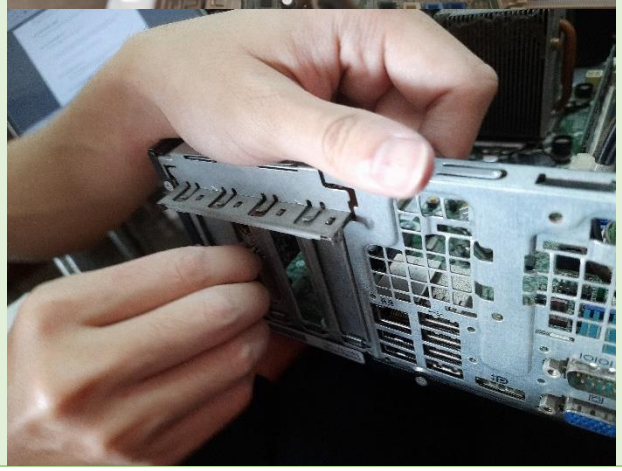
 		
 	Motherboard (Heat Sink)	1. With the thermal paste applied, we can install the heat sink now. 2. Place the heat sink with correct orientation on top of the processor socket. 3. Screw tight the four screws of the heat sink to fix it in place *PS: The PC of this model has the heat sink cooler fan came built-in on the front side of the computer. The heat sink will be connected to the fan through a plastic 'tunnel' that will be installed later*

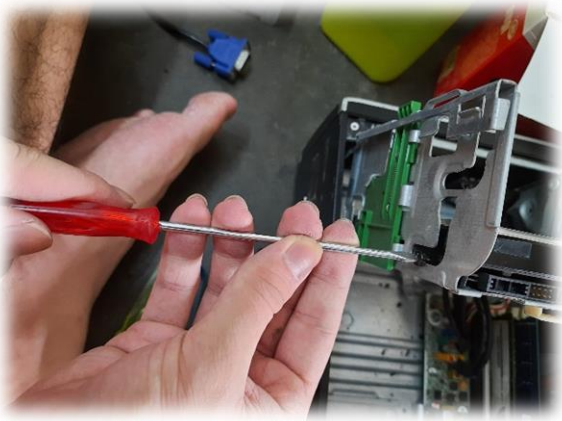
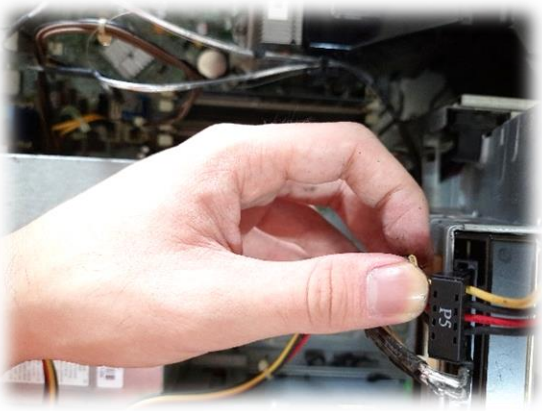
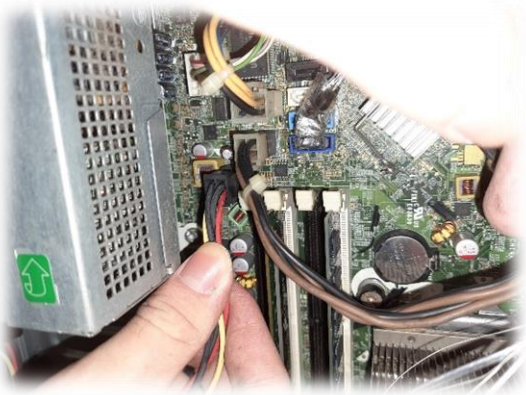
 	Random Access Memory (RAM)	1. Both the clips of the RAM mounting slot are opened easily using hand. 2. Ensure the RAM is in correct alignment by looking at the notch from the RAM and the slot itself. 3. Press down to fit the RAM into the slot until a ‘click’ sound from the mounting slot is heard, indicating the RAM is locked by the clips onto the slot

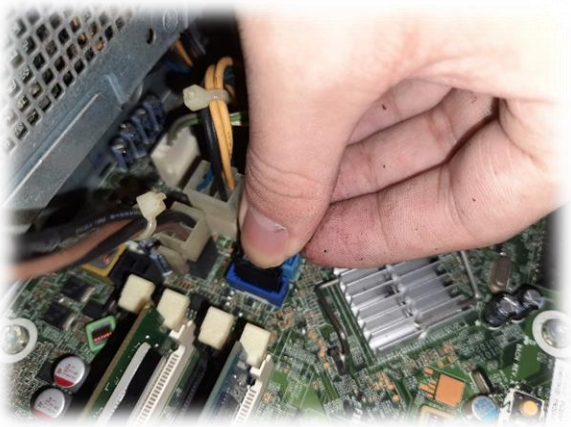
 	Mounting Motherboard onto the Computer Case	1. Place the motherboard into the computer case with the correct orientation, mainly based on the I/O plate ports and the mounting screw holes. 2. Screw the motherboard to fix it in place. Ensure the I/O ports are oriented correctly on the back of the casing 3. Connect the cables of the front PC I/O (Power buttons, audio ports…) and the cooling fan (Depending on model of PC) power cable to the motherboard connector through the cable that comes withs the casing

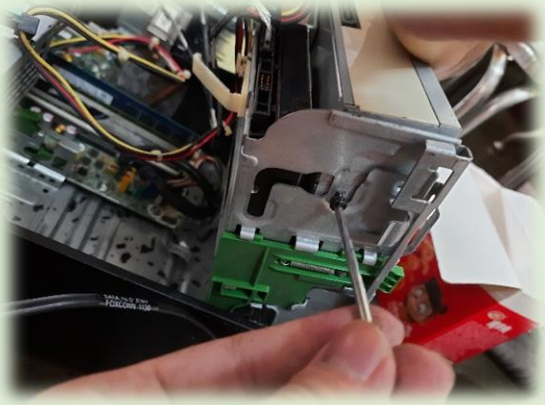
 		

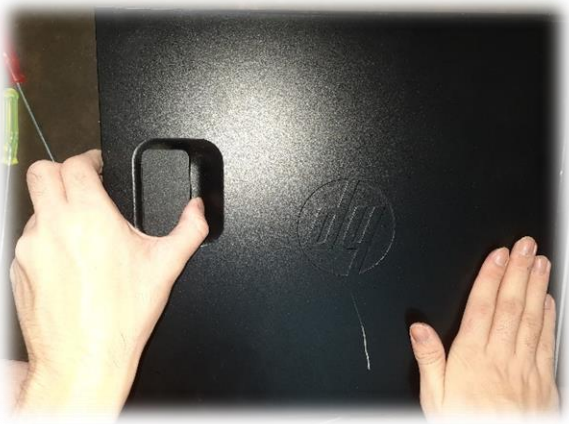
 	Power Supply	1. Place the power supply (Commonly at the upper back of the computer case) and screw as needed to fix it in place. 2. Connect the power supply's cable (2 x 4 pin connector in this case) to the motherboard so that the motherboard is power supplied properly.

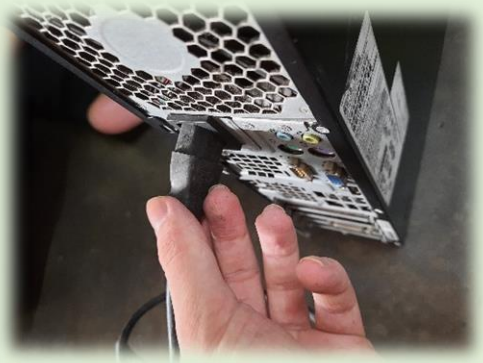
  	Graphic Card (Nvidia GT 1030 2GB Low Profile)	1. Install the bracket that comes with the graphic card on the back side of the computer 2. Line up the graphic card with the PCI expansion slot on the motherboard. Press down gently to fit the graphic card 3. Screw to fix the graphic card in position *PS: Some higher-powered GPU may require higher power. In that case the GPU will require to connect the power supply cable to the graphic card directly*

   	Disk Drives	1. Place the hard disk in the case drive bays. 2. Screw through the case frame into the case mounting holes on the storage drive to fix the disk drive in place 3. Connect the hard disk with the power. 4. Connect the hard disk to the motherboard through SATA cable *PS: Older models may use IDE cables instead*

   	CD ROM	1. Place the CD ROM in the case panel correctly, with the CD reader interface in the front side of the computer. 2. Screw through the case frame into the case mounting holes of CD ROM to fix it in place 3. Connect the CD ROM with the power cable 4. Connect the CD ROM with SATA cable and the other end with respective port on the motherboard

		
 	Closing the Case	1. Place the side cover back 2. Screw back to fix the side cover

   	Connecting Peripherals	1. Connect the CPU with wall power socket with power cable 2. Connect CPU with monitor by plugging into display ports like VGA, DVI, DisplayPort or HDMI 3. Connect peripheral devices including keyboard, mouse, wireless network dongle, printer and webcams with the PC through USB port 4. Connect speakers and microphone with 2.5mm sockets.