Lecture 05

Computer Assembly

CT4005NI - Computer Hardware and Software Architectures

Lecture 05's Objectives

- Identify the **required** and **recommended** components to **build a basic PC**
- Describe the correct procedure to **assemble a desktop computer**

Assembled PC

- An assembled computer is built by purchasing or collecting components for it from different manufacturers
- These components then need to be fit together to create a complete computer system.

Assembling a computer

- One of the most crucial and critical jobs for a computer technician, as correct techniques and procedures need to be followed.
- We will learn how to assemble a computer in a methodical manner

Components needed to build a basic PC

Case

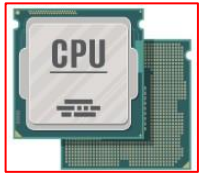
Power Supply Unit

Storage drives

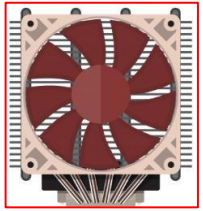
Adapter Cards

Motherboard

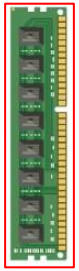
Monitor



CPU



Fan assembly



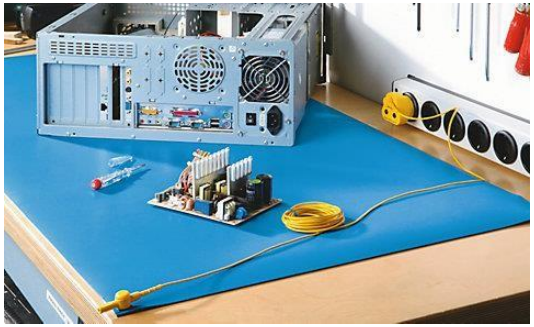
RAM

Recommended components for a basic assembled computer

- Case, power supply unit and motherboard of the **mATX** form factor of any brand or manufacturer
- **Processor** of at least **intel i5** or equivalent
- **RAM** of at least **8 GB** as per the **DDR slot** on the motherboard
- **Fan set** cooling system
- **SATA hard disk** of at least 500 GB and **SSD** of at least 128GB
- **18.5-inch LCD or LED monitor** of any brand
- **Multimedia keyboard** and **mouse** of any manufacturer

Prepare the workspace

- There should be adequate lighting, good ventilation, and a comfortable room temperature in the workspace
- Anti-static mat will help prevent ESD damage

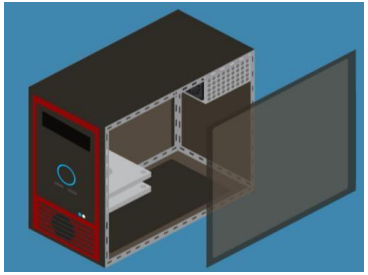


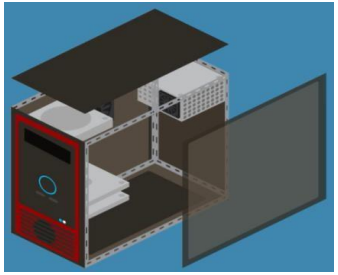
Assembling a computer - Steps

- Open the case
- Install the power supply unit
- Install the CPU, heat sink and the fan assembly Install RAM
- Install motherboard Install internal drives
- Install optical drive
- Install adapter cards
- Install cables
- Boot the computer for the first time

Assembling a computer - Open the case

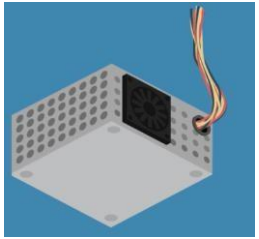
- Most of the computer cases are opened from **only one side**
- Some other computer cases can be opened from
  - **The top or the side**
  - **The top first and then from the side**
- Consult the case's documentation to learn how to open a particular case

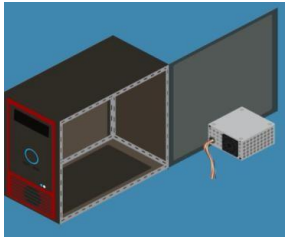




Assembling a computer - Install the power supply unit

- Most power supply units can only be fitted in one way in the computer case, fitting it in **upside down** might not be **supported**.
- Steps
  - Identify the correct side for installation Insert the power supply unit into the case
  - Align the holes of the power supply unit with the holes in the
  - Fit the power supply in the case using the proper screws

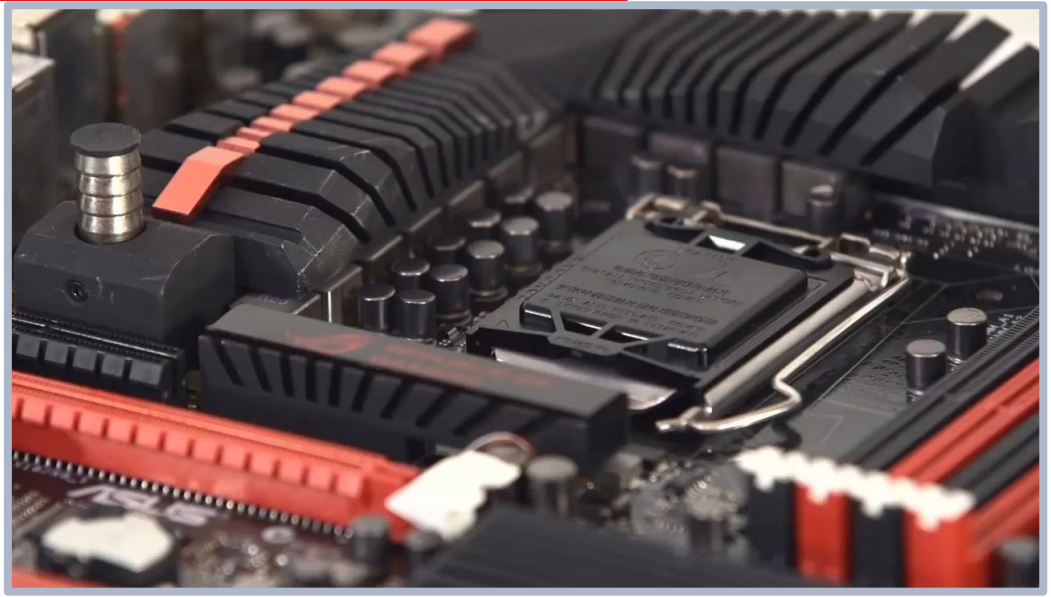




Assembling a computer - Install the CPU & cooling system

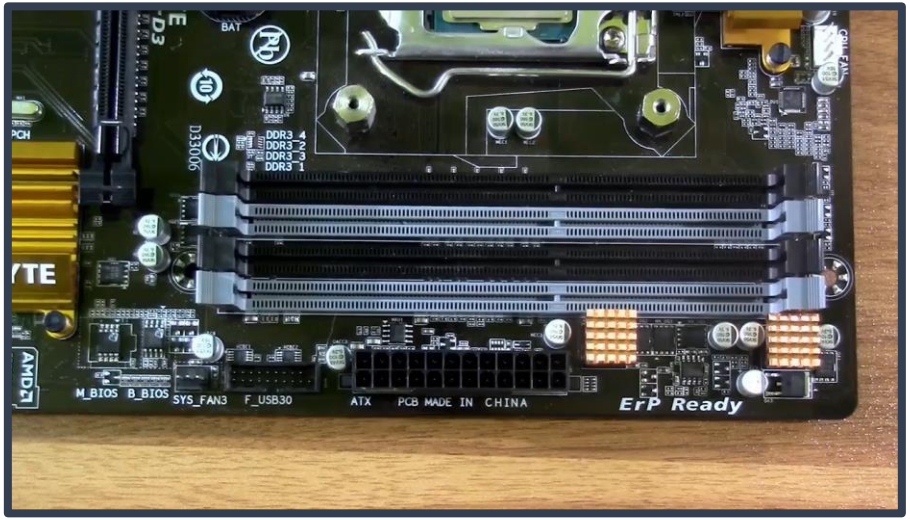
- Install the CPU, heat sink and fan assembly on the motherboard before the motherboard is placed in the computer case.
- CPU and motherboard are highly sensitive to ESD.
- Use the markings on the CPU and motherboard to properly align and install the CPU
- Install the CPU in the **CPU socket using the ZIF mechanism** and matching the notches
- Apply thermal compound.
- Thermal compound help dissipate CPU heat.
- Clean CPU first if necessary, with isopropyl alcohol
- Align the heat sink and fan and install them correctly

Assembling a computer - Install CPU & cooling system



Assembling a computer – Install RAM

- **Unlock the locks of the RAM slot** if they aren't yet unlocked
- **Install the RAM,** matching the notch RAM is designed to install in one specific direction
- Make sure to check the markings before applying pressure

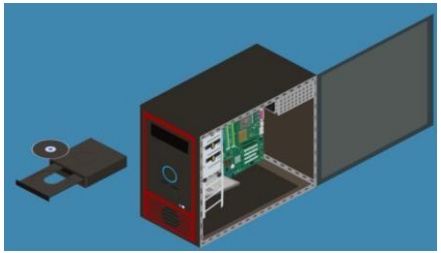


Assembling a computer - Install Motherboard

- Use proper plastic standoffs to securely install the motherboard in the case and avoid short circuits
- The I/O connectors on the back of the motherboard should be aligned with the openings in the I/O plate

Assembling a computer - Install internal drives

- Internal drives are installed in empty bay. The empty bay must match the drive's size. Leave some space between the drives when installing multiple drives
- The drive's metal plate should face up to allow better heat dissipation
- Install the Optical Drive.
- These are commonly installed in 5.25 inch (13.34 cm.) drive bays.
- Optical drives are accessed from the front of the case.



Assembling a computer – Install internal drives

Assembling a computer – Install adapter cards

- Commonly use PCI or PCIe expansion slots or USB connectors
- Locate an empty expansion slot and follow the manufacturer instructions for proper installation
- Install a Video Adapter Card Commonly uses PCI, AGP or PCIe expansion slots
- Many video cards require an external power supply in the form of two 8-pin power connectors
- Due to their cooling systems, modern video cards take more space inside the case. Be sure to plan for the extra space needed.

Assembling a computer - Install adapter cards

Assembling a computer – Install internal cables

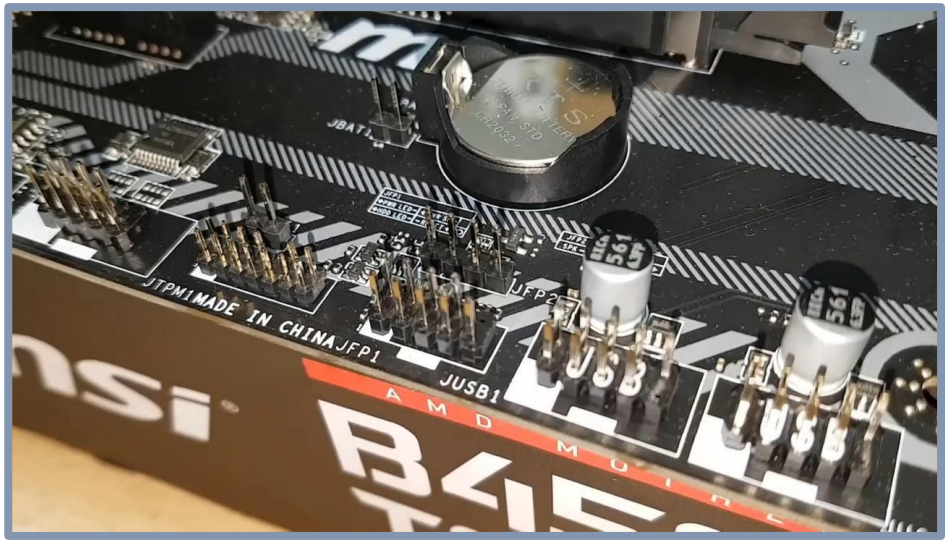
- Connect Power to Motherboard. Motherboards require power to operate.
- Motherboards also relay power to components and adapter cards.
- Refer to the motherboard and power supply documentation to ensure compatibility of power supply and motherboard connectors.
- Modern motherboards require two power connectors for operation—P1 24-pin connector and 4-pin CPU voltage regulator Align the proper connectors and press it down against the motherboard.

Assembling a computer - Install internal cables

- Connect Power to the internal drives and case fans
- 4-pin Molex and 15-pin SATA are common hard drive connectors
- Align the proper connectors and gently press it against the other end
- Fans also need power and use 3-pin or 4-pin connectors

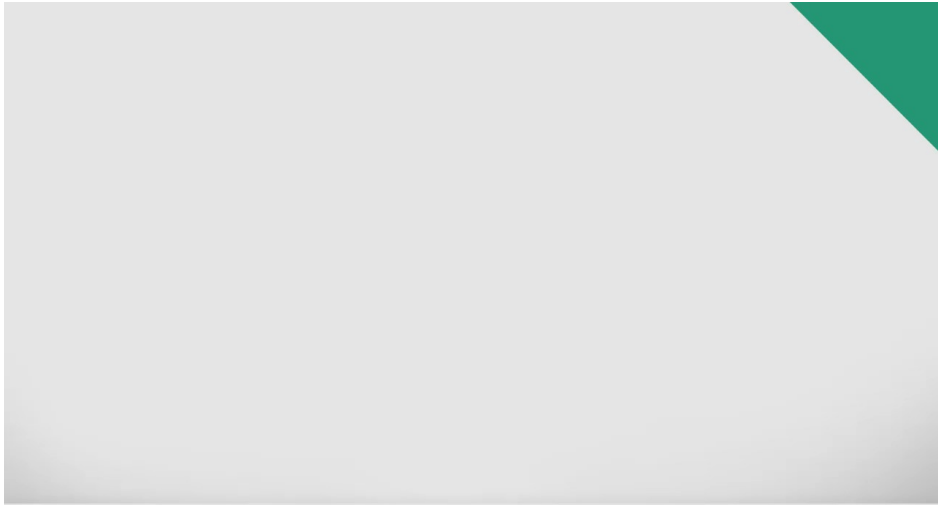
Assembling a computer - Install front panel cables

- Plug the reset switch, power switch, HDD-LED, speaker and power LED connectors into the motherboard, all label facing upwards



Assembling a computer - Reassemble the case

- Close the side/top panels Secure case cover screws
- Watch for small wires hanging off the case to avoid pinching them
- Connect external cables
- Boot the computer



End of Lecture for week 05

Any question ?