Building an Intel computer

Introduction

To build a computer you need the parts to build one in the first place, this is NOT a guide, on how to pick out your parts *proper compatibility is assumed.* Please use https://pcpartpicker.com/ to pick your parts out and check for compatibility issues.

Here are the minimum components you would need to build a computer. By the end of this guide you will know enough to build and do some basic troubleshooting.

Components:

- CPU
  - The CPU cooler should have come with the CPU you ordered
- Compatible motherboard
- RAM sticks
- Graphics card (can be optional*)
- Storage drive either hard drive or SSD
- Power supply
- Computer case

Tools:

- Monitor
  - HDMI cable
- Philips head screwdriver
- Flat head screwdriver
- Flat working surface ie: table
- Mouse and keyboard
- Bowls for organizing screws
- Thermal Paste

Warnings:

- How to not fry your electronics:
  - DO NOT wear jackets avoid layering clothes, shoes, or anything to rub your feet while walking
  - DO NOT work in a carpeted area
  - Wear anti-static wristbands
  - Plug your power supply in and touch it before touching any electronic parts
- Watch for sharp edges.
- Build on a solid surface
- **You should not at any point plug this PC into the wall until you have finished building.**

Glossary:

- <u>CPU</u> - (Central Processing Unit) is a processor that can be found inside a box labeled either Intel or AMD and typically comes with a cooler.

- <u>RAM</u> - (Random Access Memory) stores temporary data that is lost when power is shut off or lost.

- <u>Graphics card</u> - also known as GPU (Graphics Processing Unit), provides most of the computer's power for graphics and is a major factor in FPS (Frames Per Second) limitations in most games.

- <u>HDD</u> - (Hard Disk Drive) is a spinning platter that stores gigabytes and terabytes of data as a more permanent storage solution.

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- <u>SSD</u> - Solid State Drive, a permanent method of storage with no moving parts. This method of storage is faster than HDDs
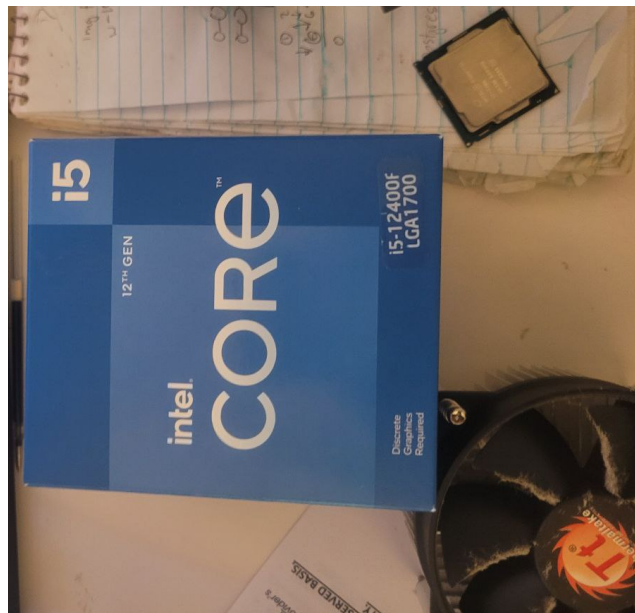
- <u>Power Supply</u> - Supplies power to each of the electrical components in a PC with Cables.
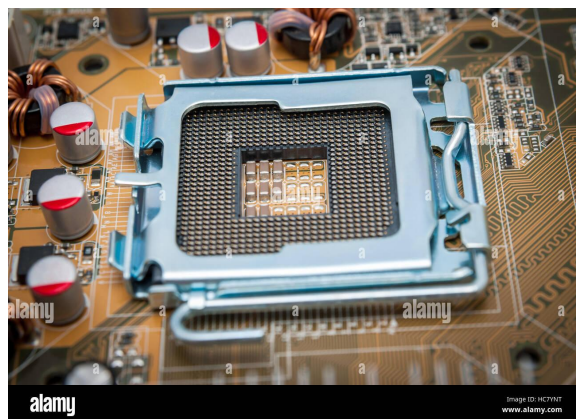
Building Steps:

Phase 1: building into the motherboard

CPU installation

1. Remove the CPU and cooler from the CPU box, take the motherboard out of its box, and open the CPU socket.
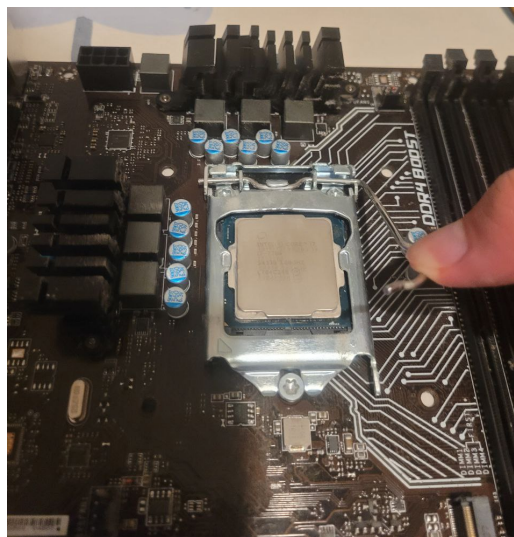
2. line up the golden triangle around the edge of the CPU with the triangle on the Socket. And insert the CPU
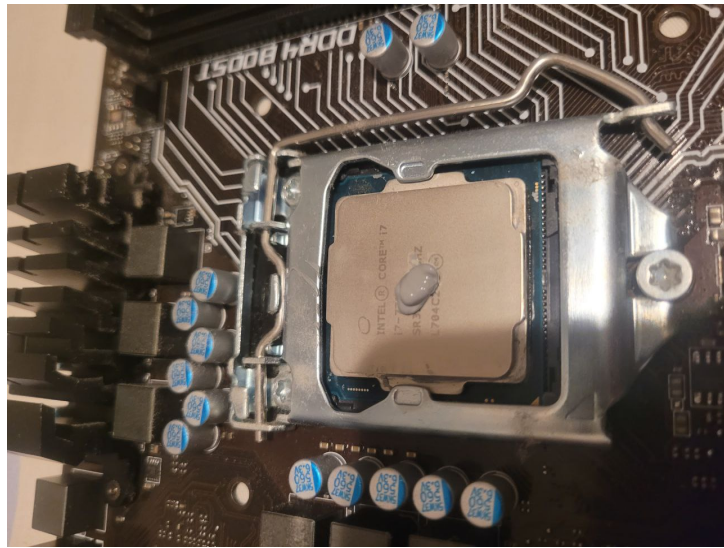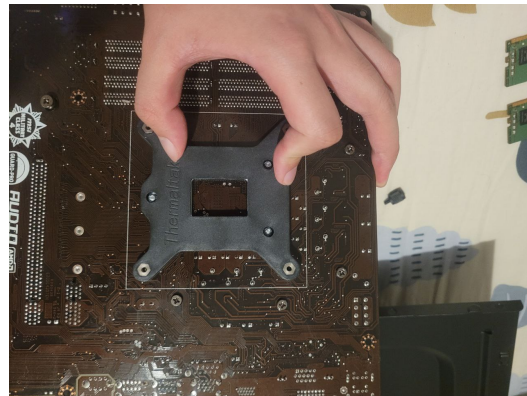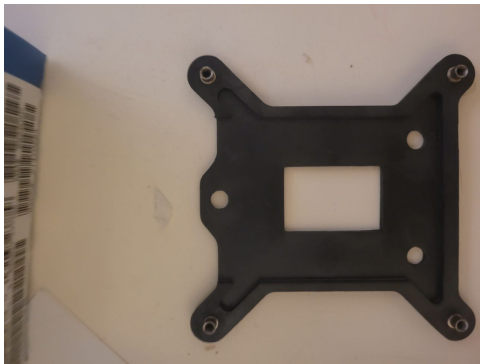

Triangle on the cover

3. Close the latch by securing the cover under the screw and pushing down on the lever until it hooks under the cover appendage this should be the result.

4. Next, take thermal paste and apply a rice-sized amount to the CPU..

5. Take the CPU cooler backplate and hold it against the 4 holes around the CPU mount of the back of the motherboard.

6. Remove plastic from the CPU cooler heatsink and align with 4 holes on the backplate mount when placing it on the CPU.
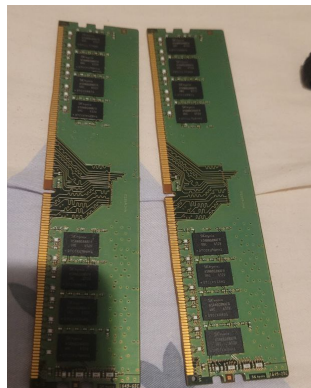
7. Screw in cooler screws diagonally, starting at opposite corners and working around until tight. **Do not over-tighten.**
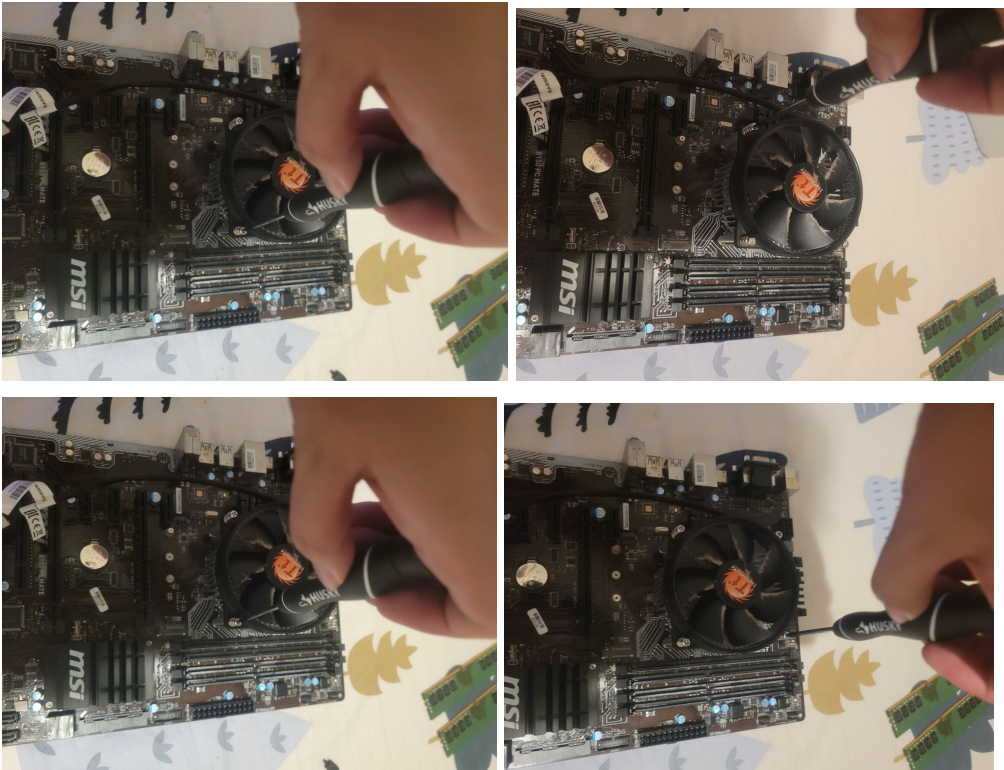
Picture order is left->right, top->bottom

Ram Installation

1. Remove the RAM from the packaging and consult the motherboard manual for correct slot usage.

2. Insert RAM sticks onto the motherboard, ensure that the sides match, and **these pins are not even so orientation matters.**

Result: **be sure to press hard until there is a click.**

Checkpoint

Phase 2: Building into the case

1. Take the case, the power supply, and the graphics card out of their boxes

2. Install the power supply with the fan facing downward and the switch/wall plug facing outside the case through the designated hole.

3. Screw in the power supply

4. Ensure that there are 4 important types of cables, the 24-pin motherboard power, 8-pin CPU power, 6-8 pin GPU power, and then hard disk power.

5. Install the IO shield following the motherboard manual instructions. Consider installing from outside of the case.
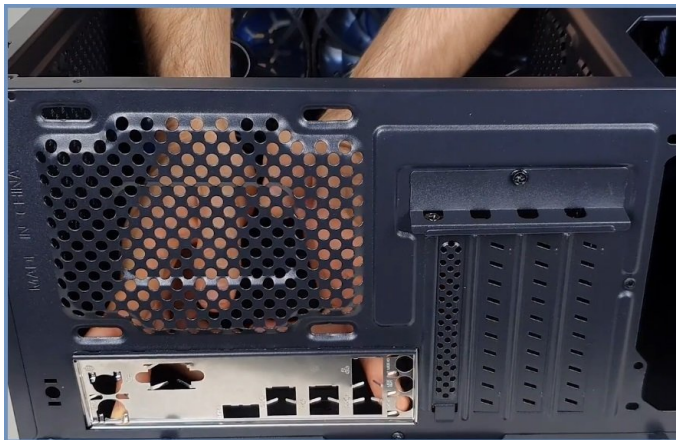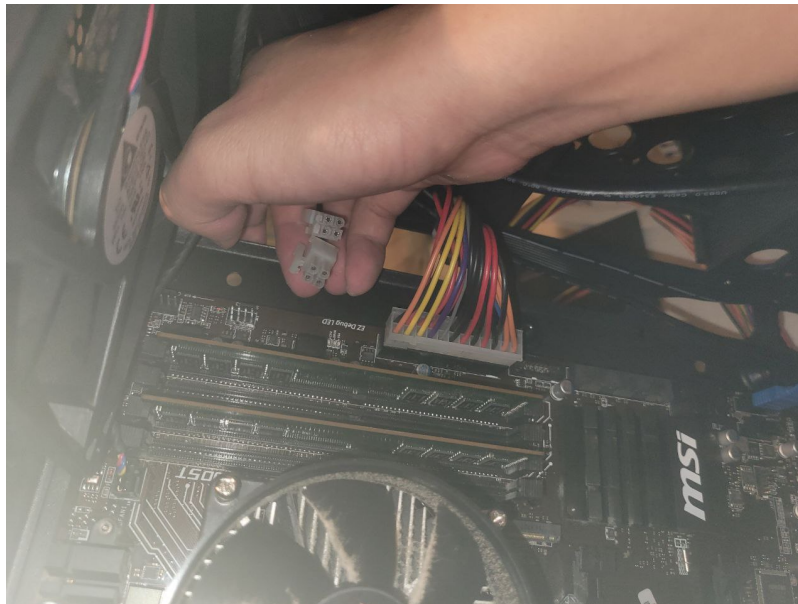
Motherboard Installation

1. Insert the motherboard into the case and make sure the holes line up.
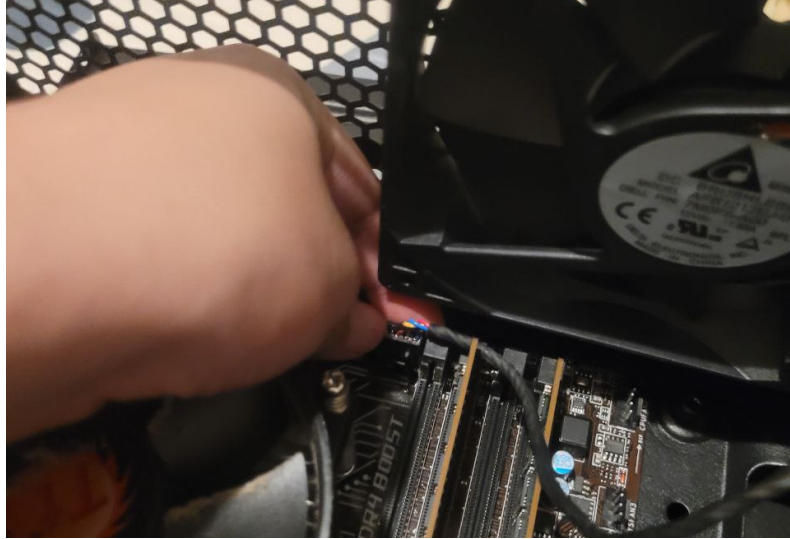2. Screw the motherboard into your case.
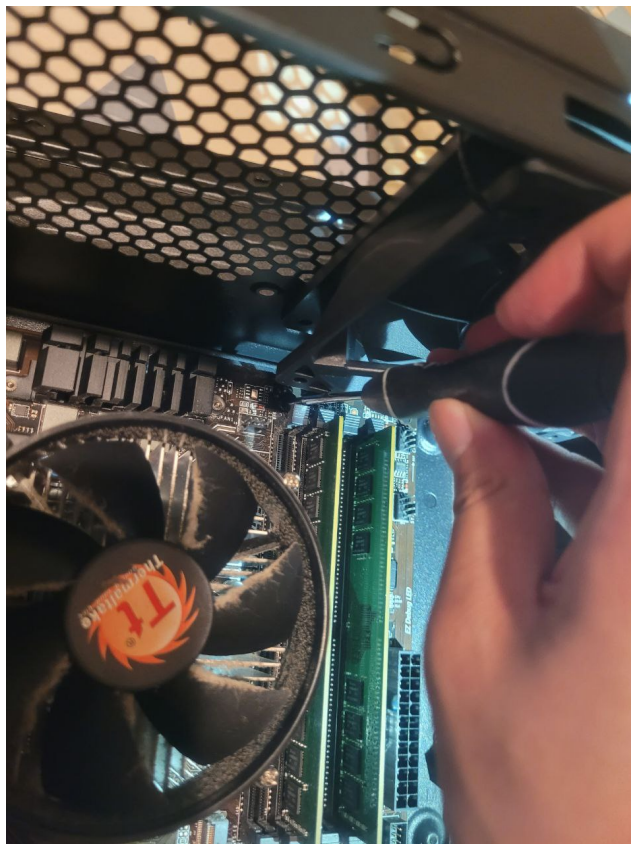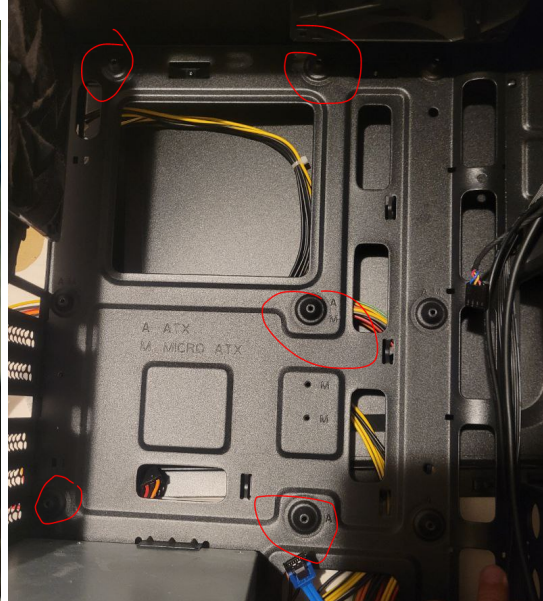
Screwing in the motherboard to the case, there should be holes that line up.

3. Find and plug the 24-pin motherboard power and 8-pin CPU power cables into the motherboard.
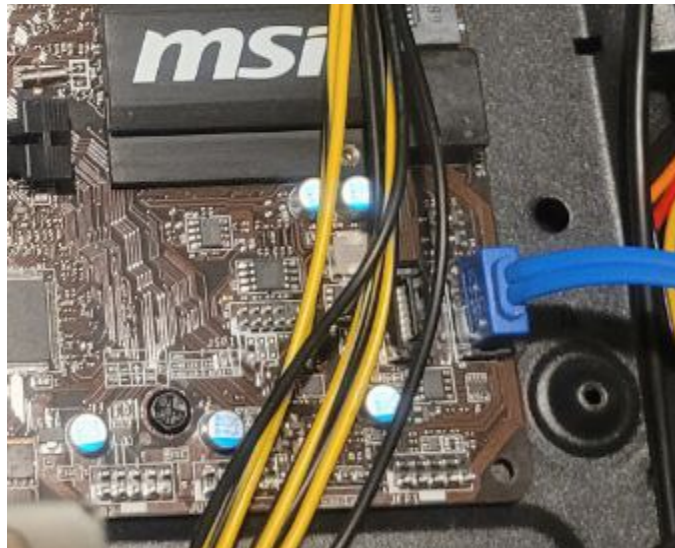

Make sure the cables are plugged in tight, I am holding an 8-pin cable
4. Plug in the fan cables, **consult the manual for the locations**

Phase 3: Connecting your storage drives

1. Plug the SATAcable into the respective SATA slots (blue cable), **consult the**

manual

This motherboard has 3 SATA connections, one is facing horizontally, and the other 2 are vertically.
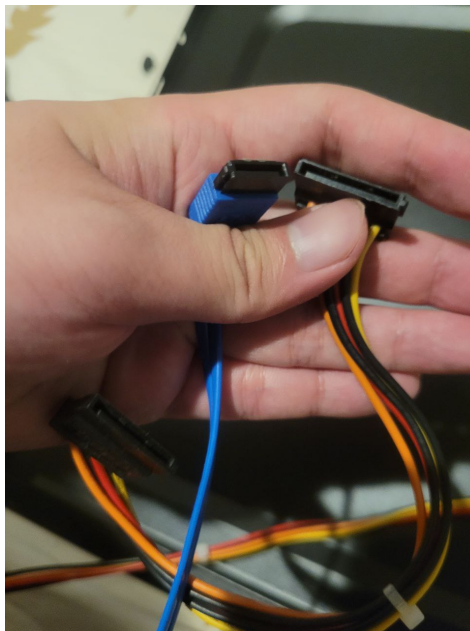
2. Take out the hard drive tray and clip it onto the hard drive from the side with the holes
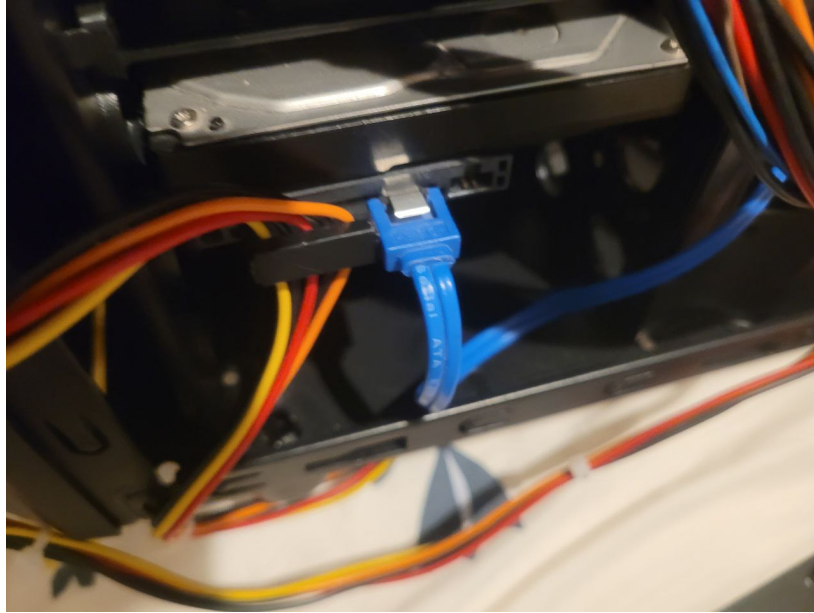
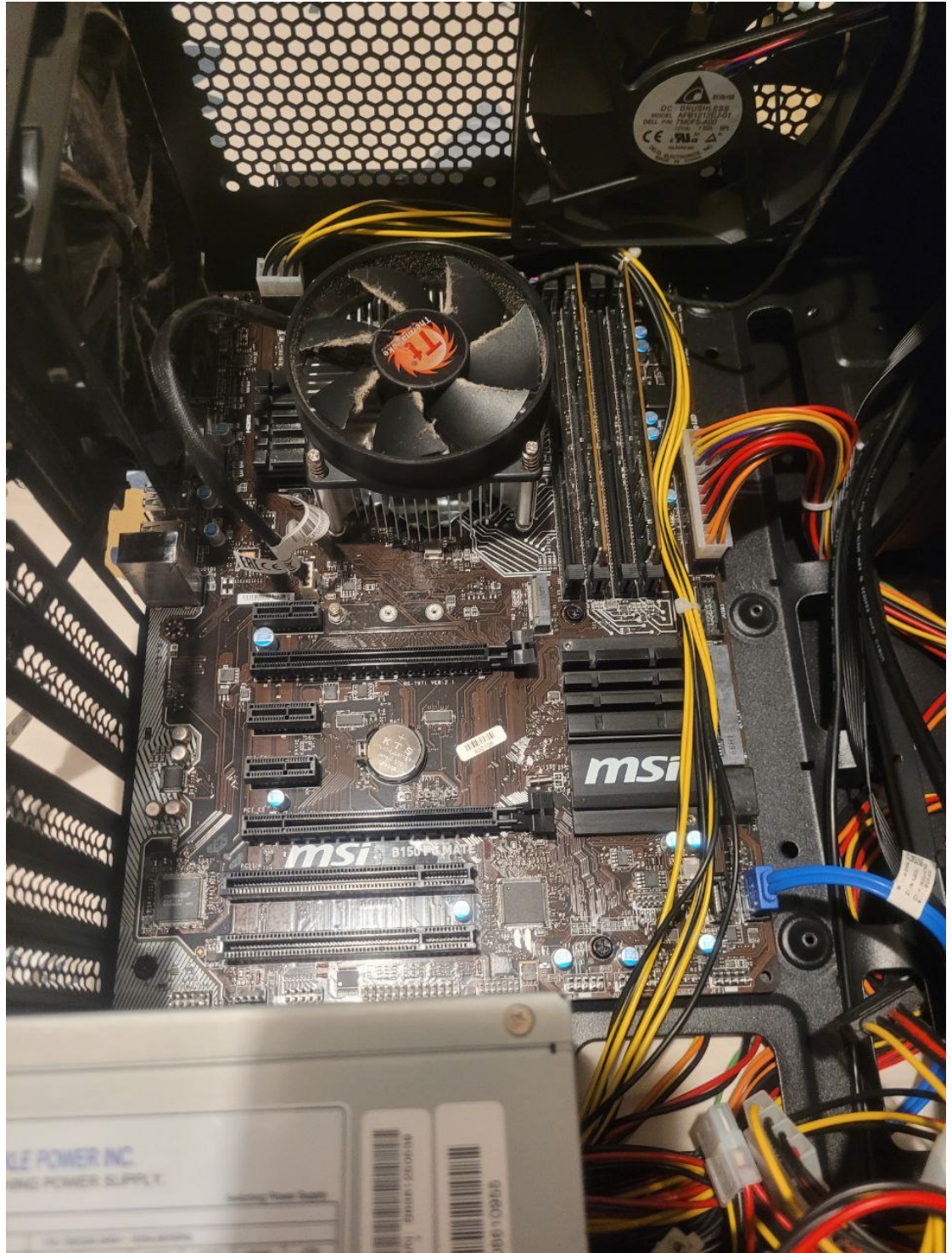3. Insert the drive tray into the hard drive slot

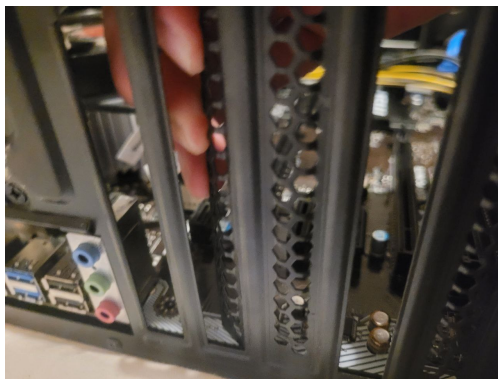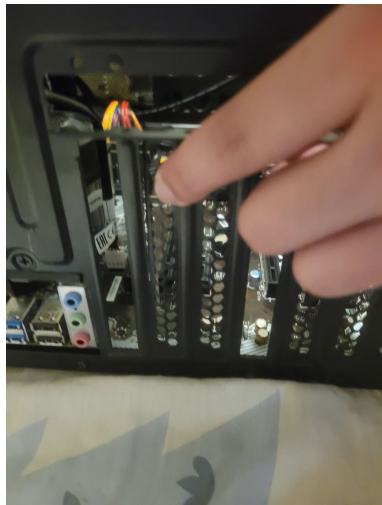4. Connect the required cables, SATA(blue), and power to the drive.

Result

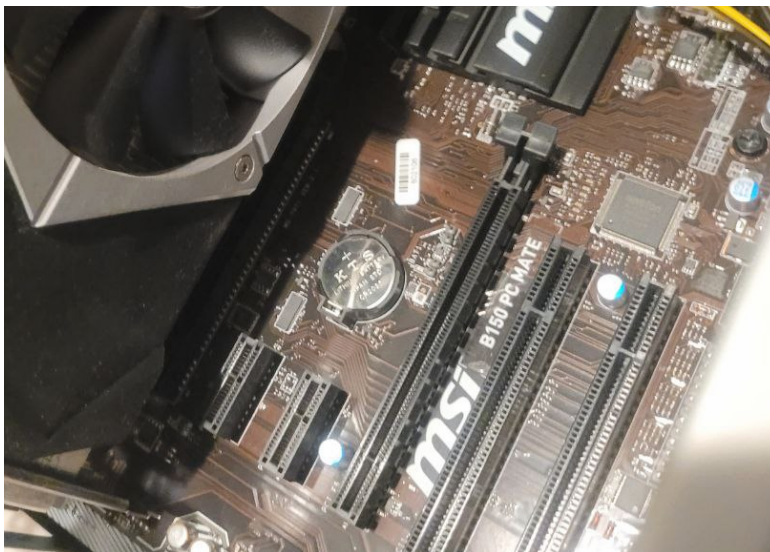Checkpoint

Phase 4: GPU installation

1. Determine GPU height and remove the top slot plus the necessary space. Typically, height is 2 slots, but measure to confirm.
2. Take the brackets from the back of the case out.

3. Wiggle the brackets out

4. **Ensure that the notch is in the open position!!**
   Be sure to use the top slot, the other slots run slower.

5. Carefully insert GPU into the slot until there is a click.

Image is taken from above the GPU when installing

6. Refer to the manual for specific IO/Power button header connections, as the location of the pins on the bottom of the motherboard may vary.

Result!

Conclusion:

Building a PC can be scary but it is not broken down into chunks. And with a bit of reading and cable knowledge, you can build one too.

Common Mistakes:

1. To troubleshoot properly, **isolate** variables using the scientific method and test components and subsystems **individually**.
2. Ensure correct thermal paste application and heatsink plastic removal, and maintain idle temperatures of 30C - 50C.

3. If the fans spin but there is no display double-check that you have:
   a. Plugged your display cable into the GPU if you have one installed
   b. Double-check that every single connection is plugged in properly this includes:
      i.   24-pin Motherboard
      ii. 8-pin CPU
      iii. RAM slots
      iv. GPU slot
      v.   Power button header
      vi. Power cables from the power supply (if you have a modular power supply)
      vii. Connection from a wall outlet to your computer