Building a Computer

A guide to choose components

What do you need?

- Focusing on putting the tower together
- You need:
  - Tower case
  - Power supply (could be *optional* if case comes with one)
  - Motherboard
  - CPU + heat sink + fan
  - RAM (memory module)
  - Video card (could be *optional* if motherboard has an integrated video)
  - Hard drive
  - Optical drive (DVD drive or Blu-Ray)
  - Case fan (if your case does not come with one)

Case

- All components are mounted in the case
- Decide on a design, size, colour
- Construction of the case matters
  - Thicker and heavier materials absorbs shocks and sound
- Size of the tower case will affect the size of motherboard and power supply
- Some cases include power supplies

Examples of Cases

Power Supply

- Provides adequate power to <u>all components</u>
- Check with your CPU manufacturer
- Depends on physical size restrictions
- Normal usage 350W and up
- Power vs. Environment
- Ventilation

Examples of Power Supplies

Motherboard

- Provides the circuitry to connect all components
- Completely dependant on the CPU
  - Intel vs. AMD
  - LGAxxx for Intel
  - AM2, AM3 for AMD
- Also consider physical size
  - ATX, microATX
- Other features
  - Built-in graphics? Number of memory banks?

Example of motherboard (Intel)

- **ATX**
- **LGA1150**
- **Z87 (northbridge)**
- **DDR3**
- **2 PCI-E**
- **GBLAN**
- **CrossFireX**
- **SLI**
- **USB3.0**
- **SATA3**

Example of motherboard (AMD)

- **mATX**
- **AM3+**
- **760G**
- **DDR3**
- **1xPCI-E**
- **1xPCI-E16**
- **DVI**
- **HDMI**
- **Sound**
- **SATA2**
- **GBLAN**

CPU

- Two main companies
  - Intel and AMD
  - Both support 64-bit computing
  - Both have single-core, dual-core, and quad-core options
- Intel
  - Generally more expensive
  - Cooler
  - Faster in some cases

CPU

- AMD
  - Competitive performance
  - Generally cheaper (better bang for the buck)
  - Tend to generate more heat
- Which company to choose?
  - Your choice of CPU will affect your options on motherboards and RAM
  - Personal preference
  - Budget

CPU Heat Sinks and Fans

- Depending on the CPU
- Different sizes
- Don't buy a large heat sink and fan if you're going for a smaller case
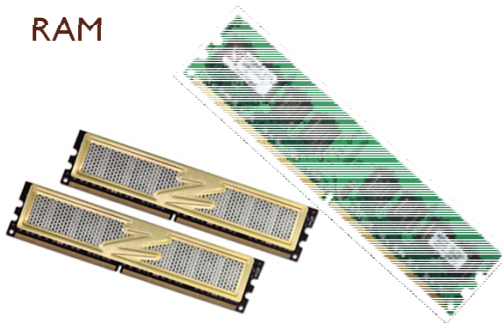- Some CPU packages come with a standard heat sink and fan

Examples of heat sinks and fans

RAM

- Again, depending on the CPU/motherboard
- DDR2 for slightly slower/older CPUs
- Judging by CPU socket type on the motherboard
  - AMD's AM2
  - Intel's LGA775
- DDR3 is the newer, faster standard
  - AMD's AM3+
  - Intel's 1150 and 1155

RAM

How much RAM do I need?

- Windows minimum: 1 GB (really sluggish)
- I would build with at least 4 GB for Windows 8.1
- 4 GB and more is recommended if you want better, smoother computing experience.
- *** 32-bit Windows will only accept maximum of 4 GB of RAM !!!

Video cards

- On-board graphics
  - Sufficient for normal daily computing
- Upgrade for gaming and 3D modeling or other graphics-intensive applications
  - PCI-Express x8 or x16 (faster transfer rate)
- Two main competitors
  - nVidia and ATI
  - SLI and Crossfire

Why is a dedicated video card better?

- A separate GPU (graphics processing unit)
  - Takes load off CPU
- Fast interface
  - PCI-Express x16
- Extra dedicated memory for graphics
  - Free up system's main memory (RAM)
  - 512 MB, 1 GB, and more
  - Memory chips on graphics card are faster than RAM
- Do you really need a dedicated video card?

Video Card

Hard drive

- IDE is the old interface / connector type
  ◦ Slower transfer speed; 133 MB/s
  ◦ Phased out
- SATA is the newer standard
  ◦ Smaller connector, thinner cable
  ◦ SATAII and SATA3 are available now
  ◦ Faster transfer speed
  ◦ SATA: 1.5 Gb/s, SATA2: 3 Gb/s, SATA3: 6 Gb/s

Hard drive

- Connection interface speed does not dictate the performance of the drive
- Rotational speed (RPM) affect your computer's performance greatly
- 10,000 RPM (servers, enterprise computers)
- 7200 RPM (desktop computers)
- 5400 RPM (notebook computers)

Hard drive

Optical Drives

- CD/DVD drives
  ◦ Readers only CD-Rom, DVD-Rom, Blu-Ray
  ◦ Writers CD-R, DVD-R
- Fairly universal
- Watch out for interface
  ◦ IDE(PATA) vs. SATA

DVD Writer

Case Fan

- Consider getting a case fan for the tower
- 80mm ~ 120mm fan diameter
- Attach to the back of the case on the inside
- Airflow blows OUTWARD to draw hot air out of the case

Case fan