**Build Your Own Computer**

**Course Description:**

This course allows students to build their very own computer, from the ground up. Students will learn about the function and importance of key hardware components before putting that knowledge to use during assembly. Throughout the course, and during computer construction, students will be studying content relevant to the CompTIA IT Fundamentals exam in preparation of taking the exam on the last day.

After mastering computer construction, students will install an operating system of their choice and configure their computer to personal preference. The class will then focus on good computing practices and maintenance while furthering their knowledge regarding the Windows operating system.

**Prerequisites:**

No previous courses are required—though a desire to know more about how a computer and its operating system work will help retain interest in the course and test preparation after the computer has been completed.

**Skills:**

Heavy use of screwdrivers and the handling/installation of sensitive electronic parts, students should be very patient and careful when working in this class. Following the teacher’s instructions will be critical to the success of the student’s build. Additionally, this class tests a student's creativity and ability to research problems or tasks on the internet.

**Difficulty Level: Moderate**

This class is very hands on and requires students to be particularly careful around fragile hardware. Students with patience, and a desire to study for the IT Fundamentals exam will benefit the most from this course, earning an IT certification in the process.

**Course Overview:**

* Day 1:
  + Introductions
  + Chapter 1
  + Chapter 2
* Day 2:
  + Build the computer in pairs\*
* Day 3:
  + Build the computer in pairs\*
  + Check computers and recap hardware
* Day 4:
  + Install OS
  + Chapter 3
* Day 5:
  + Chapter 4
* Day 6:
  + Chapter 5
  + Chapter 6
* Day 7:
  + Chapter 7
  + Chapter 8
* Day 8:
  + Review
  + Exam

\*pairs have proven to be a better method for building the computers for a few reasons:

Forced social element

Getting to build a full computer *twice*

Experiencing the difference in speed/confidence from the first build to the second (*this helps*

*to highlights what they’ve already learned*)

\*\*remind the pairs that depending on whose computer is being built—that student should be doing the bulk of the work. The other student should be providing help holding cables, organizing screws etc. They will trade roles on the next day.

**Day 1:**

**Class Goals:**

* Introduce instructor and students
  + We all love computers here, we're all a bit nerdy, I like to show video clips of either games or movies that feature computers (usually hacking) and point out errors or other hilarious inconsistencies—this makes for a great group cohesion/ice breaker activity as it allows everyone to be in on the same joke throughout the rest of the class. Show NCIS video, and Far Cry 3 (5:34-9:02). Discuss. (videos)
* Introduce all computer components
* Explain the purpose of all computer components

**Suggested Daily Activities:**

* Introduce yourself
* Have each student tell the class what he or she knows about computers, what they do with them on a daily basis, and what they hope to learn.
* Discuss the history of personal computers. (slides)
  + Charles Babbage's difference engine is a great choice.
* Discuss chapter 1 of the textbook.
  + Students may be familiar with several components, but stress the importance of the correct terminology and jargon, this will be important for the exam at the end of the course
  + Don’t forget the newer storage options such as NVMe (it isn’t listed in the book)
  + Identify Types of Computing Devices & Activity 1-1 (20m)
    - Have students discuss their answers and why one device might be better than another
  + Identify Internal Computer Components & Activity 1-2 (20m)
    - If possible, use a prop computer to assist with the activity, this can be a good opportunity to show the different types of power/data connections
  + Common Computer Connector Types & Activity 1-3 (30m)
  + Identify Common Peripheral Devices & Activity 1-4 (20m)
* Discuss chapter 2 of the textbook.
  + Compare Function and Features of Common Operating Systems & Activity 2-1 (25m)
  + Identify Application Software & Activity 2-2 (25m)
* Discuss the schedule for Build Your Own Computer, tell students about the computers they will be building tomorrow and tell them it does NOT include a copy of Windows or a monitor.
  + *They can bring in whichever parts you feel comfortable helping them install.*
  + *Tell students to wear short sleeve shirts (if the class is cold, bring a removable jacket), shoes with rubber soles, and to bring a screwdriver.*

**Day 2:**

**Class Goals:**

* Build a computer
  + *Students should be paired up and work as a team building one computer. This will be one of the pair's computer, and whoever they agree upon should do most of the work. The other student will help, getting tools or screws, moving wires out of the way, whatever. The same pairs will build again tomorrow with reversed roles.*
  + *As you build reemphasize parts and their roles.*

**Suggested Daily Activities:**

* Pairs should acquire computer parts together, enough for one computer.
  + Have the students set out all their component boxes in an organized and spacious manner.
  + Constantly stress the discharging of static electricity.
* Demonstrate each step before the students attempt on their own.
  + Remind students: if they break something, it is their responsibility.
  + Display a PowerPoint with assembly steps, if available.
* After most steps, or major items have been mounted, it is advised that you inspect each

computer to confirm stability, accuracy, and connectivity.

* + *This should be easier with pairs, fewer computers to inspect.*

**Critical Errors:**

* Make sure the golden mounting screws are installed! Students in the past have just screwed the motherboard directly to the case, smashing the underside of the motherboard.
  + Case > Golden Screw > Motherboard > Washer > Screw
* Make sure the RAM clips are in the open position before installing.

Make sure the RAM notch is lined up correctly before installing.

* Confirm that the CPU lever is up and open before students install the CPU, failure to do so can easily bend the connection pins and ruin the CPU.
* Make sure the CPU is lined up correctly (it will only fit one way) failure to do so can easily bend the connection pins and ruin the CPU.
* Watch where students connect power cables from the Power Supply, students have connected “extra” cables onto the motherboard resulting in shorts.

**Day 3:**

**Class Goals:**

* + This is basically a repeat of day 2. It will go *much* faster today. Use the extra time to emphasize how much more comfortable the students are with the computer parts now, and to review hardware used and unused—printers or web cams, what else can the class think of?
  + Use the remaining time to troubleshoot any errors or problems.
* Build a computer
  + *Students should be paired up and work with the same pair as yesterday. Reverse roles, whoever was helping yesterday will now be doing most of the work.*
  + *As you build, again, re-reemphasize parts and their roles.*

**Suggested Daily Activities:**

* Pairs should acquire computer parts together, enough for one computer.
  + Have the students set out all their component boxes in an organized and spacious manner.
  + Constantly stress the discharging of static electricity.
* Demonstrate each step before the students attempt on their own.
  + Remind students: if they break something, it is their responsibility.
  + Display a PowerPoint with assembly steps, if available.
* After most steps, or major items have been mounted, it is advised that you inspect each

computer to confirm stability, accuracy, and connectivity.

* + *This should be easier with pairs, fewer computers to inspect.*
* Once all computers are finished proceed through Chapter 3 in the textbook as well as the class is able.
* Skip windows updates, this will take far too much time.
* Install whichever OS has been provided, which means skipping sections of Ch.3 that deal with Windows 8.1, though do continue to do universal activities such as configuring accessibility options
  + *If the students complain about why they need to know about on-screen magnification remind them of grandma and also the IT Fundamentals exam (which will certainly cover this content)*

**Critical Errors:**

* Keep an eye out for the same potential mistakes as yesterday.

**Day 4:**

**Class Goals:**

* Continue to troubleshoot any outstanding errors from the previous two days
* Install an OS
  + *An entire day has been slated for this activity as generally only a handful of OS cds are available and students must take turns*

**Suggested Daily Activities:**

* Progress through Chapter 3 and the activities with the class, using their own computers, as best you are able.
* Install the OS
  + Do **NOT** let students begin to configure their OS to their preference or jump ahead
  + Very important to keep the class together while moving through the textbook
* Install drivers that came with their components
  + You can choose to skip this if you plan on using something like SlimDrivers later. Though in order to get on the internet to being with you'll likely need to install a LAN driver at least.
* No one should be getting on the internet today.
  + If you brought a flash drive with old DOS games or something—that could be great.
* If this day finishes very early (either because of extra install CDs or whatever), just proceed through the syllabus/book.

**Day 5:**

**Class Goals:**

* Chapter 4
* Discuss different types of networks, and network hardware.
* *Create network cables (optional*)

**Suggested Daily Activities:**

* Discuss chapter 4 of the textbook.
  + Network Connection Types & Activity 4-1 (35m)
  + Install and Configure a SOHO Router & Activity 4-2 (50m)
  + Network and Alternative Technologies & Activity 4-3 (35m)
  + Sharing and Storage Methods & Activity 4-4 (35m)
* Activity 4-2 is invaluable, try your best to get basic internet working
  + Cable/DSL modem, dial-up modem, router, switch
  + Explore other router options beyond just the SOHO activity
  + Showcase port forwarding
* Create network cables (optional)
* Install some basic software from the pre-downloaded software
  + WinAMP, VLC, MSE, OpenOffice, etc

**Day 6:**

**Class Goals:**

* Exploring files and the explorer
* Compression
* Wireless Devices

**Extra Suggested Daily Activities:**

* Discuss chapter 5 of the textbook.
  + Create Files & Activity 5-1 (30m)
  + Navigating a File Structure & Activity 5-2 (30m)
  + Manage Files and Folders & Activity 5-3 + 5-4 (30m)
  + Compress and Extract Files & Activity 5-5 (30m)
  + Create Screen Captures & Activity 5-6 (30m)
* Discuss chapter 6 of the textbook.
  + Configuring Wireless Devices (20m)
  + Use Wireless Devices (20m)
* Use different types of compression software, WinZIP, WinRAR, 7zip
* Explore a program such as GIMP and its ability to resize images and save to different file types.
  + Compare the quality of a Mspaint .bmp to a GIMP .jpg

**Day 7:**

**Class Goals:**

* Chapter 7
* Chapter 8
* Discuss internet safety and social media

**Suggested Daily Activities:**

* Discuss chapter 7 of the textbook.
  + Identify Security Threats & Activity 7-1 (30m)
  + Apply Security Best Practices & Activity 7-2 5-2 (30m)
  + Preform Secure Web Browsing & Activity 7-3 (30m)
* Discuss chapter 8 of the textbook.
  + Environmental and Safety Concepts & Activity 8-1 (20m)
  + Back Up and Restore Data (20m)
  + Restoration Methods
  + Manage Software & Activity 8-4
  + Implement Basic Support Measures & Activity 8-5

**Day 8:**

**Class Goals:**

* Review IT Fundamentals information
* Earn IT Fundamentals Certification

**Suggested Daily Activities:**

* Review for Exam
* Take Exam

Extra Notes:

Troubleshooting will never end, this will be on going from the moment the students get their computers. Either hardware or software troubleshooting will constantly demand your attention for the rest of the class.

Be very cautious of Windows Update! The moment students connect to the internet it's possible, based on their settings, windows will begin downloading updates. Many of the first large batch updates can take well over an hour to successfully install after a shutdown. Allow enough time for students to shut down and have the updates finish—pulling the plug during an update is NOT advised.