

**Week 4: Networks and Careers In Technology**

For a class of 12 students, grades 6-9

**Materials Needed**

Check In Sheet

Student Nametags

Week 4 Slides displayed on projector

For classroom portion:

5-6 Triage stations set up around the room (TV or monitor, VGA, power, keyboard, mouse)

12 pens or pencils

The 12 computers OS Loaded last week (for Final Test Activity) - clean these first

12 sets of Final Test Instructions

For workshop portion:

For Triage/OS Load/Final Test: 12 identical computers, pre-tested, with separate optical drives, hard drives, and RAM

Additional OS Loaded computers ready for Final Test (from Final Test pallet)

**Note: Students will be paired up to work on the in-class and in-workshop activities**

**2:45 - Volunteer Assistants Arrive**

* Volunteers should sign in to timeclock and wear name badges

**3:15 - 3:30 - Student Check In**

* Students sign in at front desk and pick up nametag, then go to classroom

**3:30 - Classroom Portion Begins**

Start Week 4 Slides presentation

Introductions - Instructors and Volunteers

Review Classroom rules

Follow along with the instructors, don’t skip ahead

Questions are encouraged

**3:30 - 3:45 Special Guest -** Srinivas Cheemalapati from IBM

Srinivas Cheemalapati is a Cloud Advisor at IBM. Among other things, he has designed motherboards for computer equipment. He’ll talk about hardware design and answer questions from the students.

Any questions about Week 3: Software?

**Careers in Computer and Information Technology**

The field of computers and electronic devices used to create and share information is called “information technology”.

This is a big field with lots of different jobs. It’s more than just personal computers. Some jobs just involve *using* computers and programs, others create programs, and still others create the hardware everyone uses.

**What Tech Jobs are available?**

Within the Information Technology or IT field, there are many job and career options. Some careers require lots of school and training. Others have lower requirements.

**>> What’s the difference between a job and a career?**

Explain that a job is your current employment, a career is the progression or path of jobs you take in an industry or field.

Most people will have many different jobs in their lifetime, and many people switch careers. As you pursue a career in technology, you will probably switch companies, take on new responsibilities, and learn new skills to improve yourself and get better jobs. You may even start your own company if you have a great idea that other people want to invest in.

**>> What technology jobs have you heard of?**

**What kinds of jobs are available in the technology industry?**

IT is a huge field, so there are lots of different jobs. Even jobs with the same title, like a programmer or “software developer”, can be very different depending on what company you work for or what type of software you’re programming.

We’re going to go through a few different types of jobs in the technology field.

Software Programmer / Developer - work on programs and operating systems. Can specialize in many different programming languages and OSes. Includes game developers, website developer

IT Support (tech support or help desk) - answer questions and troubleshoot problems. Involves both hardware and software

Hardware Engineer / Designer - create hardware components, from motherboards, computer components, other devices

Hardware Technician - Repair and maintain computer and other electronic hardware

Network Engineer / Administrator - creating computer networks, running the servers that move data around the Internet

Information Management - database managers, data analysts

Creative Design - webpage designers, digital artists, audio editors, 3D modelers, animators

Project Managers - run teams of developers, engineers, technicians, and support staff on big projects

Others: Sales, Quality Assurance and Testing (or QA), Technical Writing

**How to prepare for a Tech Job**

Before you graduate from high school, learn as much as you can. Take technology elective classes at school, do afterschool classes and programs in other places like Kramden, do extra-curricular activities like programming events and robotics clubs. Ask you parents to find technology-related events to attend like fairs and camps. Many are available for free or low cost.

**College Degrees**

You don’t have to have a four-year degree to work in tech, but it can be a big boost. Most four-year colleges offer several technology degrees. There are a few different technology-related degrees you can get in college.

* Information Technology / Information Systems: study how to meet the computer technology needs of business, government, healthcare, schools, and other kinds of organizations.
* Computer Science: studies the range of computer technology from theory through programming to cutting-edge development of computing solutions.
* Computer Engineering: study digital hardware and software systems including communications systems, computers and devices that contain computers.
* Software Engineering: study how to develop and maintain software systems
* Information Science - study how to store, managing, and analyze data

Many community colleges offer similar degrees on a less intense schedule and for less money.

**Certification Programs**

Certification programs are classes you take with tests at the end that demonstrate you’ve learned particular skills. They are very important to companies because certifications tell them that you know specific things and have basic skills they are looking for.

Common certifications are A+, Network+, and Security+

A+ is general computer hardware and software

Network+ is basic networking

Security+ is how to secure computers and networks from hackers

There are also many certifications specific to different servers, pieces of hardware, and software

**Other training classes**

If you need a specific skill for a job, like learning a new programming language, you may want to take a class just for that. There are many places that offer individual classes, like training centers and community colleges.

**>> Writing Assignment**

Write down a technology jobs you'd like and 2 sentences about why

**Networks**

Local Networks

Computers can be connected directly to each other with cables. They send signals to each other over the wire to transmit data. This is called an “peer to peer” network.

These signals are encoded like the activity last week, but much more complex. They are sent back and forth millions of times a second.

On a network every computer has to have a unique name. This can be a alphabetical name or a numerical name, or **address**.

Creating networks

In addition to plugging one computer into another, you can add a central device that helps the computers communicate. They are different types of these, called hubs, switchers, and routers.

Routers are the most advanced. They are tiny computers themselves. They control how the computers on the network talk to each other.

Some computers on a network are called **servers**. Servers are computers that are dedicated to a particular job. They are usually running special software programs and often a special OS too. They are usually different hardware from personal computers.

Computers on a network connect to these servers. This is called a “client-server” network.

It's like being at a restaurant. You are the client, you order your food from the server. The server gets that food and brings it to you

**Types of Servers**

The jobs that servers do on the network depends on what software they have and how they were set up. A single server could do mulitple jobs or just one. Types of servers include:

File servers are the most common. They share files on a network, you connect to a hard drive on the server similiar to using a hard drive on your own computer. But everyone in he office can get to those files too

Other types of servers on a local network include: email , print, database, media.

**>> ACTIVITY: Create a network**

**Visit Kramden’s server room**

**The class will run a very long network cable back to the classroom**

**Set up a swtich in the classroom**

**Run shrter cables to each comptuer station in the classroom**

**Internet Servers**

On the internet every connected computer has an IP address. That is is unique name.

Local networks connect their client computers to the Internet.

“Spiderweb” model of server connections

Connected computers that have web pages on them also have to have a Domain Name

**Hardware you need to connect to a network**

Wired network, or Ethernet, port on the motherboard.

Ethernet cable

Router and gateway/modem

OR for wireless:

wireless network card or plug-in adapter

and a wireless router

ISP connection required, ISPs are....

**>> Internet Server Networking Activity**

In teams of 2 at computer stations

Make a list of 3 websites

Open a Terminal window

Terminal is a command-line interface to run very simple programs. These programs don’t have a graphical interface, and don’t use the mouse, just the keyboard.

This is called a “command line interface” - all computers used to look like this before programs had graphics

Home address

Ping 127.0.0.1

Now pick 3 websites

Use nslookup for the 3 websites to get their IP addresses

MTR to do a traceroute to see how your connection to a website actually goes through multiple servers on the way there.

**>> Ubermix programs overview**

Follow along with the instructor as you talk about some of the programs that are already installed on Ubermix.

> Describe categories, point out major programs

* Kramden User Guide, LibreOffice, web browsers, GIMP, Audacity, Files and Folders

**Adding new programs**

Use the Ubuntu Software Center

You have to be connected to the Internet for the Software Center to work

**>> Ubuntu Software Center activity**

Add the “Periodic Table” program from the Software Center to the computer you’re working on.

**>> Final Test Activity**

Follow instructor through Final Test steps on one computer

Each time does Final Test on another computer.

**4:30 - Break time**

Snacks and Bathroom break

**4:45 - Workshop Portion begins**

Lead class to Warehouse Final Test area - Far left benches

**(5:00 - Wednesday Work Night volunteers will enter work area)**

In the same teams, students will triage, OS load, and do Final Test on 2 additional computers in the workshop. If time permits, they can do the Final Test process on more computers from the Final Test queue. Reinforce the Triage and Troubleshooting steps if there are problems.

**Triage computer 3, OS Load, then do Final Test**

**Triage computer 4, OS Load, then do Final Test**

**Optional - Final Test additional computers**

If time permits, the students can do Final Test on more computers.

At the end of class, remind students that the computers they tested today will be donated to other students.

**EXTRAS / NOTES**

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