

- 1) One morning your computer fails to boot into its graphical operating system, but you manage to access a command line subsystem that allows you to troubleshoot your computer. What pieces of hardware will be most useful to you in your troubleshooting efforts? (Select two)
- a. Printer
 - b. Monitor
 - c. Keyboard
 - d. Mouse
- 2) Your friend has expressed interest in getting on the Internet, but his parents can't afford to get him a new computer. You found some old hardware at a local thrift shop, and now you just need to find an operating system for your friend. Given your friend's financial difficulties, which operating system do you recommend?
- a. Microsoft Windows
 - b. Max OSX
 - c. iOS
 - d. Linux
- 3) By increasing the amount of _____, you reduce the amount of _____.
- a. RAM, page swapping
 - b. CDs, disk space
 - c. paper, print spoolers
 - d. monitors, pixels
- 4) While browsing the Internet, your neighborhood suffers a blackout and your computer loses power. What should you worry about the most?
- a. The pictures you took with a digital camera 2 minutes ago
 - b. The document you were typing 4 minutes ago
 - c. The spreadsheet you saved to your disk 6 minutes ago
 - d. The music you burned to CD 8 minutes ago

- 5) Your friend bought a new 2TB hard drive, but even after completely repartitioning and reformatting the hard drive, he is still saying that he can only see around 1.8TB of usable space. What is your advice?
- It's probably defective... Return the drive!
 - Don't worry... Windows sees 1024 bytes in every kilobyte!
 - Low-level format the drive... That'll get all the hidden partitions!
 - It must be a virus... Better clean the drive!
- 6) With regard to web browsers on Mac and Windows, _____ is to Internet Explorer as _____ is to Chrome.
- Netscape, Midori
 - Safari, Firefox
 - Konquerer, Opera
 - Lynx, Webbie
- 7) Using a calculator on the computer, you add two very large numbers together, but the results aren't what you expected. Where do you think the problem lies?
- RAM
 - Hard Disk
 - CPU
 - Input/Output
- 8) You want to store a lot of data in a place that is easy to sort, filter, and query from various software applications. Where do you want to store the data?
- Text file
 - HTML Webpage
 - Spreadsheet
 - Database
- 9) You want to ensure that no one but you can access sensitive files on your computer, including another user in your household. Which file systems will support this? (Choose three)
- NTFS
 - FAT
 - HFS Plus
 - Ext3

- 10) You need _____ before you can get on the Internet.
- a web server
 - an email address
 - a domain name
 - an IP address
- 11) Your friend notices that his computer at school and his computer at home both have network addresses that start with the same few numbers (192.168), and he wonders if it would be possible to copy files from his computer at home to his computer at school. What is your advice?
- They both have private network addresses, so they probably aren't on the same network.
 - They're on the same network, but you shouldn't copy files between the computers.
 - Your home computer is on the INTRANET, and the school computer is on the INTERNET, and that's why they have similar network addresses.
 - They're on the same network, but you should get permission before you copy the files.
- 12) What allows your web browser to connect to WWW.GOOGLE.COM without knowing the physical location of Google's servers?
- HTTP
 - DHCP
 - FTP
 - DNS
- 13) Your friend has recently noticed that many sites now have HTTPS in their addresses, and is curious what the difference is between HTTP and HTTPS. What is your answer?
- The S is for SPEEDY, because HTTPS sites load faster than HTTP sites.
 - The S is for STYLE, because HTTPS sites use CSS to stylize the normal HTML.
 - The S is for SECURE, because HTTPS uses Secure Sockets Layer for transmission.
 - The S is for SERVER, because HTTPS uses Server Side extensions to dynamically change the webpages.

14) When referencing the frequency with which a computer checks a digital signal, what terms do you use for measurements? (Select two)

- a. Minutes
- b. MHz
- c. Seconds
- d. GHz

15) You want to connect to your friend's Wi-Fi hotspot at his house, but you don't see it when you browse the available networks. What information do you need to get to access the Wi-Fi hotspot?

- a. SSID
- b. Username
- c. Password
- d. IP Address

- 1) One morning your computer fails to boot into its graphical operating system, but you manage to access a command line subsystem that allows you to troubleshoot your computer. What pieces of hardware will be most useful to you in your troubleshooting efforts? (Select two)
- a. Printer
 - b. Monitor**
 - c. Keyboard**
 - d. Mouse

***Explanation:** Without a graphical operating system (like Windows), you are essentially operating in a command-line environment (like DOS), which will have minimal support for a mouse or printer. Although these devices may be useful in a few very rare cases, you will need a keyboard and monitor first and foremost for navigating a command-line environment.*

- 2) Your friend has expressed interest in getting on the Internet, but his parents can't afford to get him a new computer. You found some old hardware at a local thrift shop, and now you just need to find an operating system for your friend. Given your friend's financial difficulties, which operating system do you recommend?
- a. Microsoft Windows
 - b. Max OSX
 - c. iOS
 - d. Linux**

***Explanation:** Linux is a freely available operating system capable of running on almost any hardware. Although some distributions aren't the most user friendly, almost all are free from the hardware and licensing requirements of the more popular operating systems.*

- 3) By increasing the amount of _____, you reduce the amount of _____.

- a. RAM, page swapping**
- b. CDs, disk space
- c. paper, print spoolers
- d. monitors, pixels

***Explanation:** All modern operating systems make use of virtual memory to "page" less-used information to the hard disk, freeing up space in running RAM. By increasing the physical RAM in the computer, you reduce the need for the operating system to swap "pages" between the hard drive and RAM.*

- 4) While browsing the Internet, your neighborhood suffers a blackout and your computer loses power. What should you worry about the most?
- a. The pictures you took with a digital camera 2 minutes ago
 - b. The document you were typing 4 minutes ago**
 - c. The spreadsheet you saved to your disk 6 minutes ago
 - d. The music you burned to CD 8 minutes ago

***Explanation:** Although most modern word processors have an auto-save feature, there is no indication in the question or answers that it is enabled, therefore anything in the document is only saved in RAM, and unfortunately susceptible to loss during a power failure.*

- 5) Your friend bought a new 2TB hard drive, but even after completely repartitioning and reformatting the hard drive, he is still saying that he can only see around 1.8TB of usable space. What is your advice?
- a. It's probably defective... Return the drive!
 - b. Don't worry... Windows sees 1024 bytes in every kilobyte!**
 - c. Low-level format the drive... That'll get all the hidden partitions!
 - d. It must be a virus... Better clean the drive!

***Explanation:** There is a difference between the hard drive manufacturer and the operating system. While there may be 2 billion bytes on the physical hard drive, the operating system is base 2 (binary), so it uses 1024 bytes instead of 1000. This "loss" is more pronounced the larger the hard drive.*

- 6) With regard to web browsers on Mac and Windows, _____ is to Internet Explorer as _____ is to Chrome.
- a. Netscape, Midori
 - b. Safari, Firefox**
 - c. Konquerer, Opera
 - d. Lynx, Webbie

***Explanation:** Safari and Internet Explorer are both built-in web browsers, for Mac OSX and Windows respectively. Firefox and Chrome are both add-on browsers that aren't part of the original operating system install.*

- 7) Using a calculator on the computer, you add two very large numbers together, but the results aren't what you expected. Where do you think the problem lies?
- a. RAM
 - b. Hard Disk
 - c. CPU**
 - d. Input/Output

Explanation: *The CPU architecture (32 or 64-bit) determines size of the variables (float, double, long, etc.), and therefore the accuracy of the mathematical computations that can be done (i.e. early Intel Pentium chips, and their problems with floating-point arithmetic).*

- 8) You want to store a lot of data in a place that is easy to sort, filter, and query from various software applications. Where do you want to store the data?
- a. Text file
 - b. HTML Webpage
 - c. Spreadsheet
 - d. Database**

Explanation: *While data can be stored in all the available options, the ability to "store a lot" and "sort, filter, and query from various software applications" narrows the options down to a database. The question was also deliberately vendor-neutral to reduce comparisons between MS Excel and MS Access.*

- 9) You want to ensure that no one but you can access sensitive files on your computer, including another user in your household. Which file systems will support this? (Choose three)
- a. NTFS**
 - b. FAT
 - c. HFS Plus**
 - d. Ext3**

Explanation: *NTFS (Windows XP and newer), HFS Plus (Mac OSX), and Ext3 (Linux) all support user permissions that can restrict files based on who is logged in. The FAT file system does not support this, which is why it is a useful cross-platform file system.*

10) You need _____ before you can get on the Internet.

- a. a web server
- b. an email address
- c. a domain name
- d. an IP address**

Explanation: Internet Service Providers (ISPs) will provide IP addresses to their customers so they can access the Internet. Although they may provide the other items as well, and IP address is what required to communicate with other servers on the Internet.

11) Your friend notices that his computer at school and his computer at home both have network addresses that start with the same few numbers (192.168), and he wonders if it would be possible to copy files from his computer at home to his computer at school. What is your advice?

- a. They both have private network addresses, so they probably aren't on the same network.**
- b. They're on the same network, but you shouldn't copy files between the computers.
- c. Your home computer is on the INTRANET, and the school computer is on the INTERNET, and that's why they have similar network addresses.
- d. They're on the same network, but you should get permission before you copy the files.

Explanation: 192.168 is a private network range, usually used with Network Address Translation (NAT), so they are most likely not on the same network. And while an intranet is commonly used within an organization, especially considering NAT, home users almost never use it.

12) What allows your web browser to connect to WWW.GOOGLE.COM without knowing the physical location of Google's servers?

- a. HTTP
- b. DHCP
- c. FTP
- d. DNS**

Explanation: Domain Name Service (DNS) is used to translate between Fully Qualified Domain Names (FQDN), like *www.google.com*, and the IP addresses associated with those servers. Once computers have the IP address for the server, computers can then communicate directly with that server.

13) Your friend has recently noticed that many sites now have HTTPS in their addresses, and is curious what the difference is between HTTP and HTTPS. What is your answer?

- a. The S is for SPEEDY, because HTTPS sites load faster than HTTP sites.
- b. The S is for STYLE, because HTTPS sites use CSS to stylize the normal HTML.
- c. The S is for SECURE, because HTTPS uses Secure Sockets Layer for transmission.**
- d. The S is for SERVER, because HTTPS uses Server Side extensions to dynamically change the webpages.

***Explanation:** Although SSL has been replaced with Transport Layer Security (TLS), the S still stands for Secure. All other options are distractors.*

14) When referencing the frequency with which a computer checks a digital signal, what terms do you use for measurements? (Select two)

- a. Minutes
- b. MHz**
- c. Seconds
- d. GHz**

***Explanation:** The computer's clock-speed is what determines how often the CPU checks a digital signal to see if it has changed, however this clock is measured in Hertz (Hz), and more recently in MHz and GHz.*

15) You want to connect to your friend's Wi-Fi hotspot at his house, but you don't see it when you browse the available networks. What information do you need to get to access the Wi-Fi hotspot?

- a. SSID**
- b. Username
- c. Password
- d. IP Address

***Explanation:** If the Wi-Fi network isn't visible when you browse for it, the SSID broadcast for the hotspot has most likely been disabled. You can manually configure a wireless connection if you know the SSID.*

This assessment was based on the following standards:

ISTE Standards for Computer Science Educators

- 1c) Demonstrate knowledge of digital devices, systems, and networks
 - i. Demonstrate an understanding of data representation at the machine level
 - ii. Demonstrate an understanding of machine- level components and related issues of complexity
 - iii. Demonstrate an understanding of operating systems and networking in a structured computer system
 - iv. Demonstrate an understanding of the operation of computer networks and mobile computing devices

Answer the following question using complete sentences. Your responses should be between 200 and 400 words, contain at least 2 paragraphs, and be relatively free of grammatical errors.

- 1) Improvements in computing technologies have opened up new opportunities for people with disabilities to communicate with other people. Identify at least three (3) specific hardware, software, or networking technologies, describe how each technology has changed over the course of time, and finally explain how these three improved technologies now work together to allow people with disabilities to communicate more easily.

Answer the following question using complete sentences. Your responses should be between 200 and 400 words, contain at least 2 paragraphs, and be relatively free of grammatical errors.

- 2) While there has been a major push to provide Internet to all areas of the country, there are still certain areas that either don't have Internet, or have very slow access. Additionally, even some families in certain large cities are unable to afford the cost of Internet access, or unable to afford a computer in their house. Given those statements, do you feel schools should put more classwork and homework online? Provide at least three (3) examples of technological benefits or shortfalls that support your reasoning.

Answer the following question using complete sentences. Your responses should be between 200 and 400 words, contain at least 2 paragraphs, and be relatively free of grammatical errors.

3) Are the following devices the same or different?



Identify at least five (5) elements of software or hardware to support your argument.

- 1) Improvements in computing technologies have opened up new opportunities for people with disabilities to communicate with other people. Identify at least three (3) specific hardware, software, or networking technologies, describe how each technology has changed over the course of time, and finally explain how these three improved technologies now work together to allow people with disabilities to communicate more easily.

Sample Response (341 words)

When I think about improvements for disabled people using the Internet, my first thoughts go to improvements in speech recognition, which allows people who have difficulty moving or typing to use a computer like anyone else. And although this technology has been around for quite some time in some form or another, it's only recently gained enough popularity where these technologies are now being placed in almost every device and computer. When you look at Apple's Siri or Microsoft's Cortana, you can see a push to for these technologies to become mainstream. But this push couldn't come without tremendous improvements to the underlying technologies.

To recognize speech accurately, there needs to be software to properly decode and identify specific audio sounds so that it can properly categorize what is speech and what isn't. This software would have to have a large sampling of sounds already categorized, and then need to be able to match any new sounds to its existing sample library fairly quickly in order to be of practical use. This would require very fast computer processors, in addition to a large, quickly searchable database, which is why we've probably seen these technologies really explode in recent years as processor speeds have reached the gigahertz speeds, and hyper threading and multicore processors have become commonplace. The media containing the library of sounds would also have to be very fast to facilitate searches, which is why improvements in the speed and capacity of hard drives have probably contributed to these technologies, along with the growth and adoption of solid-state hard drives.

With the latest releases of Microsoft Windows and Max OSX, each operating system now has personal assistants built into the OS itself. These personal assistants can be left in a "standby-state," where they are continuously monitoring for a user to call out to them. For a disabled person, this means that the person only needs to call out "hey Siri, open Facebook and post I'm enjoying my new computer," and the computer will do the rest, without any typing required.

- 2) While there has been a major push to provide Internet to all areas of the country, there are still certain areas that either don't have Internet, or have very slow access. Additionally, even some families in certain large cities are unable to afford the cost of Internet access, or unable to afford a computer in their house. Given those statements, do you feel schools should put more classwork and homework online? Provide at least three (3) examples of technological benefits or shortfalls that support your reasoning.

Sample Response (363 words)

I feel that more classwork and homework should be put online. The fact that students have to carry around several heavy books to and from school, and the fact that many companies print new books every few years, is a waste of resources and effort. By placing these resources online, the companies that produce the texts can save money on manufacturing costs, and the students that carry the books will no longer need to worry about losing, misplacing, or forgetting their textbooks.

While putting the materials online may initially seem to create an issue with access, especially given the statements in the question, many schools (ours in particular) provide laptops and computers for the students to access the Internet. While the students are unable to take these computers home, the students are free to access those computers before, during, and after class. There are also additional resources available in our school library, and there are several computers available in the city's public libraries.

Furthermore, by encouraging students to go to areas where there are publicly available computer resources, this can help promote group work and cooperative learning activities. If the schools and communities can put additional resources into these areas, and possibly even ask for volunteers, these areas may be able to improve the academic performance of struggling students by providing them positive role models and peer groups to interact with.

Lastly, by placing much of the coursework online, this will make it easier for teachers to grade the work, and allow the students to get feedback on assignments more quickly. With traditional pencil and paper responses, students have to turn in the assignments to the teacher, who then has to check the responses, calculate the grade, and then return the assignment to the student (sometimes with only a grade, and no feedback). Many online systems make generating online homework and quizzes easy, and allows the teacher to program in automatic feedback and responses in the case of wrong answers. Although the initial startup phase may be more involved, once the teachers and students are used to the process and online system, the advantages provide a win-win situation for both students and teachers.

3) Are the following devices the same or different?



Identify at least five (5) elements of software or hardware to support your argument.

Sample Response (301 words)

The two devices in the example are the same because they allow the user to perform very similar functions. The device on the left is a modern-day smartphone, and the device on the right is a personal computer from several decades ago. Both devices allow the user to manipulate electronic documents using software such as text editors and painting programs, and when both devices are connected to the Internet, they allow the user to communicate via email software. And while the methods for connecting to the Internet differ, that is only because the hardware technologies have changed so much in the past few decades.

Going beyond the application software that makes the two devices similar, both devices have an operating system that uses a similar user interface, allowing users to launch applications by using icons on the screen. The operating system and the applications also have access to a file system that allows the user to create, edit, save, and delete files. And while modern smartphone operating systems may not allow access to as many files as the older desktop operating system, this is only because of an increased awareness of computer security in recent years.

Lastly, the types of hardware the both devices use are also very similar. Both devices have a display that functions as output devices, a processor that performs mathematical and computational tasks, and RAM for storage space for the operating system and executing applications. And although the devices both have input hardware, the interface paradigm for the smartphone is drastically different from the classic desktop computer due to the size differences. The secondary storage hardware for both devices also follows a drastically different paradigm, with the smartphone maintaining all of its storage internally, while the older computer allowed for sharing of files via removable secondary media.

Question 1 Rubric (15 points maximum)

Indicators	3 points	2 points	1 point	0 points	Score
Identifies at least 3 examples of hardware or software technologies	Identifies at least 3 examples	Identifies only 2 examples	Identifies only 1 example	Fails to identify any examples	
Identifies improvements or changes in technologies	Identifies changes for all 3 examples	Identifies changes for only 2 examples	Identifies changes for only 1 example	Fails to identify any changes	
Describes how all 3 technologies work together to support users with disabilities	Describes all 3 examples working together to support disabled users	Describes only 2 examples working together to support disabled users	Describes only a single example supporting disabled users	Fails to describe how technologies support disabled users	
Grammar <ul style="list-style-type: none"> • Complete sentences • Free of grammatical errors 	Contains only complete sentences, and no grammar errors	Contains 3 or less incomplete sentences or grammar errors	Contains 9 or less incomplete sentences or grammar errors	Contains 10 or more incomplete sentences or grammar errors	
Length <ul style="list-style-type: none"> • Length is between 200 and 400 words • Contains at least 2 paragraphs 	Response is 200-400 words in length and 2 or more paragraphs	Response is 50 or less words outside of 200-400 word limit and 2 or more paragraphs	Response is 100 or less words outside of 200-400 word limit or only paragraph	Response is less than 100 words or fails to use any paragraphs	

Question 2 Rubric (15 points maximum)

Indicators	3 points	2 points	1 point	0 points	Score
Identifies a clear stance for or against putting more classwork and homework online	Identifies a clear stance for or against			Fails to identify a stance	
Describes 3 examples of technology benefits or shortfalls	Provides at least 3 examples	Provides only 2 examples	Provides only 1 example	Fails to identify any changes	
All 3 examples support student's identified stance OR All 3 examples are consistent <i>(if student fails to identify a clear stance)</i>	All 3 examples support student's stance	Only 2 examples support the student's stance	Only 1 example supports the student's stance	None of the examples support the student's stance	
Grammar <ul style="list-style-type: none"> • Complete sentences • Free of grammatical errors 	Contains only complete sentences, and no grammar errors	Contains 3 or less incomplete sentences or grammar errors	Contains 9 or less incomplete sentences or grammar errors	Contains 10 or more incomplete sentences or grammar errors	
Length <ul style="list-style-type: none"> • Length is between 200 and 400 words • Contains at least 2 paragraphs 	Response is 200-400 words in length and 2 or more paragraphs	Response is 50 or less words outside of 200-400 word limit and 2 or more paragraphs	Response is 100 or less words outside of 200-400 word limit or only paragraph	Response is less than 100 words or fails to use any paragraphs	

Question 3 Rubric (15 points maximum)

Indicators	3 points	2 points	1 point	0 points	Score
Identifies clearly whether the devices are similar or different	Identifies clearly that the devices are similar or different			Fails to identify whether the devices are similar or different	
Identifies at least 5 examples of hardware or software elements	Provides at least 5 examples	Provides only 3 or 4 examples	Provides only 1 or 2 examples	Fails to provide any examples	
All 5 examples support student's identified stance OR All 5 examples are consistent <i>(if student fails to identify a clear stance)</i>	All 5 examples support student's stance	Only 3 or 4 examples support the student's stance	Only 1 or 2 examples supports the student's stance	None of the examples support the student's stance	
Grammar <ul style="list-style-type: none"> • Complete sentences • Free of grammatical errors 	Contains only complete sentences, and no grammar errors	Contains 3 or less incomplete sentences or grammar errors	Contains 9 or less incomplete sentences or grammar errors	Contains 10 or more incomplete sentences or grammar errors	
Length <ul style="list-style-type: none"> • Length is between 200 and 400 words • Contains at least 2 paragraphs 	Response is 200-400 words in length and 2 or more paragraphs	Response is 50 or less words outside of 200-400 word limit and 2 or more paragraphs	Response is 100 or less words outside of 200-400 word limit or only paragraph	Response is less than 100 words or fails to use any paragraphs	

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1c) Demonstrate knowledge of digital devices, systems, and networks

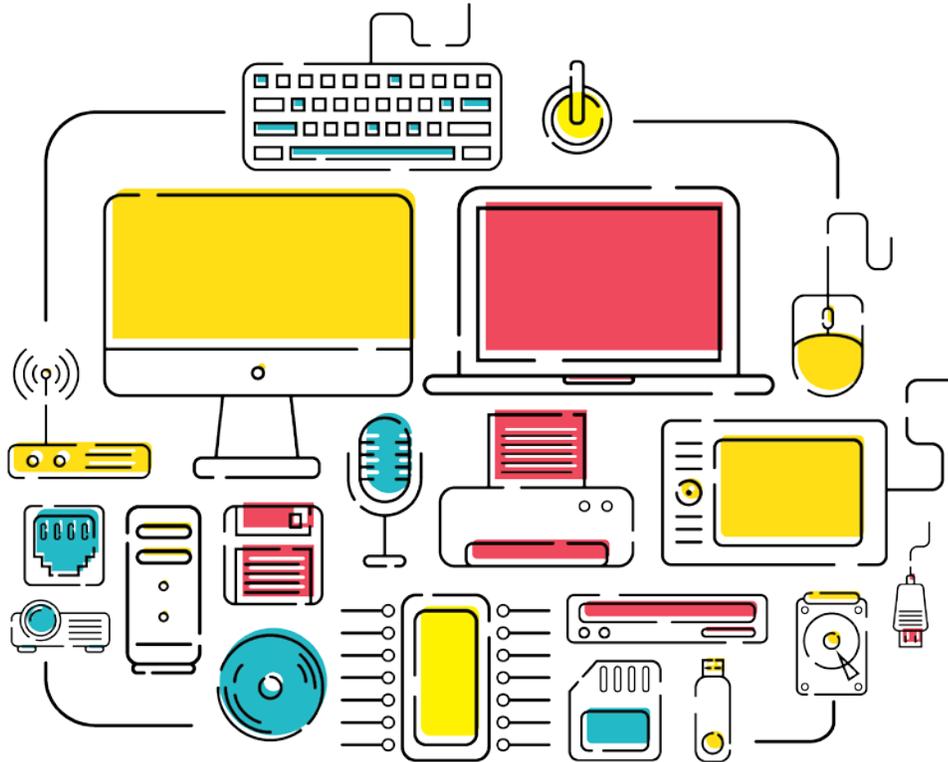
- i. Demonstrate an understanding of data representation at the machine level
- ii. Demonstrate an understanding of machine- level components and related issues of complexity
- iii. Demonstrate an understanding of operating systems and networking in a structured computer system
- iv. Demonstrate an understanding of the operation of computer networks and mobile computing devices

1d) Demonstrate an understanding of the role computer science plays and its impact in the modern world

- i. Demonstrate an understanding of the social, ethical, and legal issues and impacts of computing, and attendant responsibilities of computer scientists and users
- ii. Analyze the contributions of computer science to current and future innovations in sciences, humanities, the arts, and commerce

This group exercise will serve as a final review before taking your unit exam. Ensure that all sections are filled out by all group members, and do your best to ensure the accuracy of your answers.

The final exam will contain essay questions based on the below information!



<p>Element Examples <i>(at least 3)</i></p>	<p>Element Changes <i>(i.e. 15 years ago vs. now)</i></p>	<p>Element Effects <i>(benefits or changes to society)</i></p>
<p><u>Input Devices</u></p>		
<p><u>Output Devices</u></p>		

<u>Processors</u>		
<u>Main Memory</u>		
<u>Secondary Storage</u>		
<u>Operating Systems</u>		
<u>Application Software</u>		
<u>Networking Technologies</u>		

Foundations Unit**Unit Review****(Cooperative Learning Rubric)****Purpose and method**

This activity uses the Jigsaw method, and will be used as a final review prior to taking the summative unit assessment.

The entire class will be broken up into small groups, with the group size being dependent on the overall size of the class. Each member of the group will be assigned a particular “expert” role, and will be responsible for researching critical elements of a particular technology category. Once expert roles have been assigned to all group members, the group members will split up and go to their assigned “expert groups,” where they will research their assigned technologies. While in their expert groups, each student is responsible for filling out their assigned categories on the worksheet provided.

If the number of groups doesn’t support a separate expert group for each of the eight categories, then certain expert groups will have to double-up on the categories (i.e. input and output, operating system and application software, etc.).

Participation Rubric (8 points maximum)

	2 points	1 point	0 points	Score
Expert Group	Student is participating in expert group discussions AND Student is actively taking notes	Student isn’t participating in expert group discussions BUT Student is actively taking notes	Student is inattentive to expert group discussions OR Student is distracting other students in expert group	
Jigsaw Group	Student presents expert topic to Jigsaw group AND Student ensures all group members take notes	Student fails to present expert topic to Jigsaw group BUT Student ensures all group members copy notes from expert group	Student fails to present or provide information to Jigsaw group OR Student is distracting other student in Jigsaw group	
Jigsaw Group	Student is participating in Jigsaw group discussions AND Student is actively taking notes	Student isn’t participating in Jigsaw group discussions BUT Student is actively taking notes	Student is inattentive to Jigsaw group discussions OR Student is distracting other students in Jigsaw group	
Individual	Student completes over 75% of the worksheet	Student completes at least 50% of the worksheet	Student completes less than 50% of the worksheet	

This assessment was based on the following standards:

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1d) Demonstrate an understanding of the role computer science plays and its impact in the modern world

- i. Demonstrate an understanding of the social, ethical, and legal issues and impacts of computing, and attendant responsibilities of computer scientists and users
- ii. Analyze the contributions of computer science to current and future innovations in sciences, humanities, the arts, and commerce