



Digital Technology Merit Badge

Troop344/9344
Pemberville, OH



Digital Technology Requirements

1. View the Personal Safety Awareness "Digital Safety" video (with your parent or guardian's permission).
2. Do the following:
 - a. Give a brief history of the changes in digital technology over time. Discuss with your counselor how digital technology in your lifetime compares with that of your parent's, grandparent's, or other adult's lifetime.
 - b. Describe what kinds of computers or devices you imagine might be available when you are an adult.
3. Do the following:
 - a. Explain to your counselor how text, sound, pictures, and videos are digitized for storage.
 - b. Describe the difference between lossy and lossless data compression, and give an example where each might be used.
 - c. Describe two digital devices and how they are made more useful by their programming.
 - d. Discuss the similarities and differences between computers, mobile devices, and gaming consoles.
 - e. Explain what a computer network is and describe the network's purpose.



Digital Technology Requirements

4. Do the following:

- a. Explain what a program or software application or "app" is and how it is created.
- b. Name four software programs or mobile apps you or your family use, and explain how each one helps you.
- c. Describe what malware is, and explain how to protect your digital devices and the information stored on them.

5. Do the following:

- a. Describe how digital devices are connected to the internet.
- b. Using an internet search engine (with your parent or guardian's permission), find ideas from at least three different websites about how to conduct a troop court of honor or campfire program. Present the ideas to your counselor, and explain how you used a search engine to find this information.
- c. Use a web browser to connect to an HTTPS (secure) website (with your parent's permission). Explain to your counselor how to tell whether the site's security certificate can be trusted, and what it means to use this kind of connection.



Digital Technology Requirements

6. Do THREE of the following. For each project you complete, copy the files to a backup device and share the finished projects with your counselor.
 - a. Using a spreadsheet or database program, develop a food budget for a patrol weekend campout OR create a troop roster that includes the name, rank, patrol, and telephone number of each Scout. Show your counselor that you can sort the roster by each of the following categories: rank, patrol, and alphabetically by name.
 - b. Using a word processor, write a draft letter to the parents of your troop's Scouts, inviting them to a troop event.
 - c. Using a graphics program, design and draw a campsite plan for your troop OR create a flier for an upcoming troop event, incorporating text and some type of visual such as a photograph or an illustration.
 - d. Using a presentation software program, develop a report about a topic approved by your counselor. For your presentation, create at least five slides, with each one incorporating text and some type of visual such as a photograph or an illustration.
 - e. Using a digital device, take a picture of a troop activity. Send or transfer this image to a device where it can be shared with your counselor.
 - f. Make a digital recording of your voice, transfer the file to a different device, and have your counselor play back the recording.
 - g. Create a blog and use it as an online journal of your Scouting activities, including group discussions and meetings, campouts, and other events. Include at least five entries and two photographs or illustrations. Share your blog with your counselor. You need not post the blog to the internet; however, if you choose to go live with your blog, you must first share it with your parents AND counselor AND get their approval.
 - h. Create a web page for your troop, patrol, school, or place of worship. Include at least three articles and two photographs or illustrations. Include at least one link to a website of interest to your audience. You need not post the page to the internet; however, if you decide to do so, you must first share the web page with your parents AND counselor AND get their approval.



Digital Technology Requirements

7. Do the following:

- a. Explain to your counselor each of these protections and why they exist: copyright, patents, trademarks, trade secrets.
- b. Explain when it is permissible to accept a free copy of a program from a friend.
- c. Discuss with your counselor an article or a news report about a recent legal case involving an intellectual property dispute.

8. Do TWO of the following:

- a. Describe why it is important to properly dispose of digital technology. List at least three dangerous chemicals that could be used to create digital devices or used inside a digital device.
- b. Explain to your counselor what is required to become a certified recycler of digital technology hardware or devices.
- c. Do an internet search for an organization that collects discarded digital technology hardware or devices for repurposing or recycling. Find out what happens to that waste. Share with your counselor what you found.
- d. Visit a recycling center that disposes of digital technology hardware or devices. Find out what happens to that waste. Share what you learned with your counselor.
- e. Find a battery recycling center near you and find out what it does to recycle batteries. Share what you have learned with your counselor about the proper methods for recycling batteries.

9. Do ONE of the following:

- a. Investigate three career opportunities that involve digital technology. Pick one and find out the education, training, and experience required for this profession. Discuss this with your counselor, and explain why this profession might interest you.
- b. Visit a business or an industrial facility that uses digital technology. Describe four ways digital technology is being used there. Share what you learned with your counselor.

Requirement 1



View the [Personal Safety Awareness "Digital Safety" video](#) (with your parent or guardian's permission). It may only play properly in the latest version of Chrome or Edge browsers.



Requirement 2



info

Do the following:

- a. Give a brief history of the changes in digital technology over time. Discuss with your counselor how digital technology in your lifetime compares with that of your parent's, grandparent's, or other adult's lifetime.
- b. Describe what kinds of computers or devices you imagine might be available when you are an adult.

What is Digital Technology

- Digital technologies are electronic tools, systems, devices and resources that generate, store or process data.
 - Well known examples include social media, online games, multimedia and mobile phones.
- When information is stored, transmitted or forwarded in digital format, it is converted into binary code.
- **Binary code** is based on a binary number system in which there are only two possible states, off and on, usually symbolized by 0 and 1.
- Computers interpret and translate complex binary strings into meaningful code, letters and numbers.
 - ASCII is the term referring to recognizable characters such as numbers, letters and symbols.
 - These characters are equal to Binary groups of eight 1s and 0s per character
 - A in Binary is 01000001
 - 5 in Binary is 00110101
 - # in Binary is 00100011

History of Digital Technology

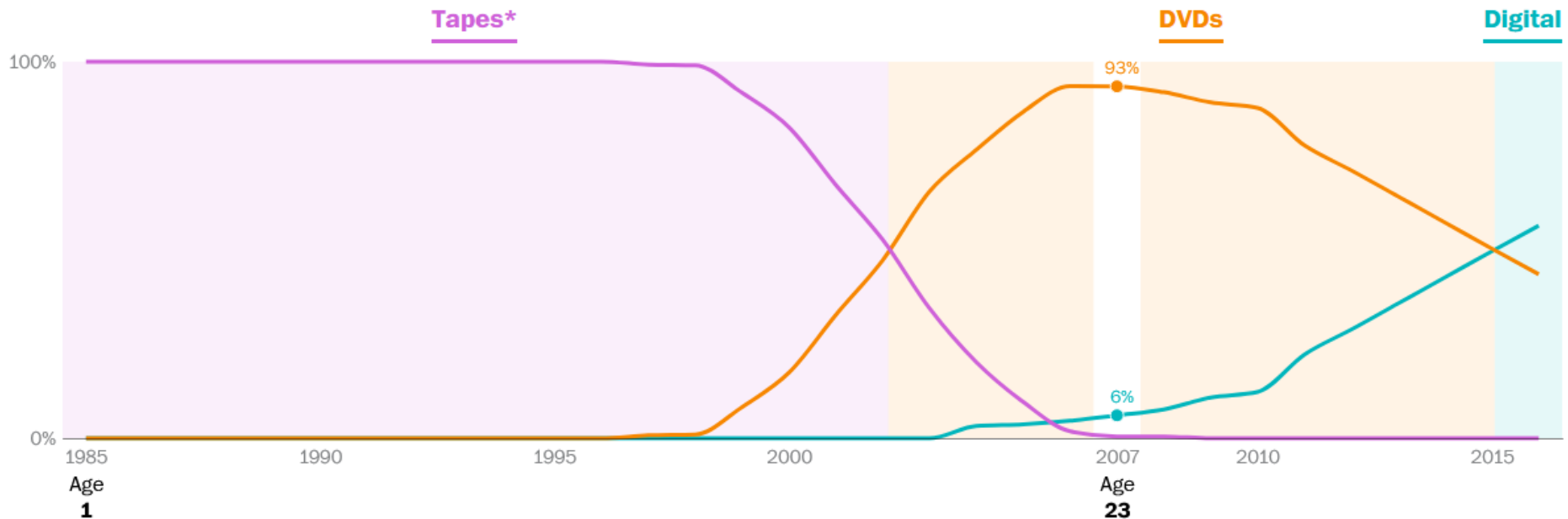
- In the past three decades, the United States has seen staggering technological changes.
- In 1984, just 8 percent of households had a personal computer, the World Wide Web was still five years away, and cell phones were enormous.
- The following slides show how some key parts of our technological lives have shifted for those born in 1984.

Vintage vs. Modern



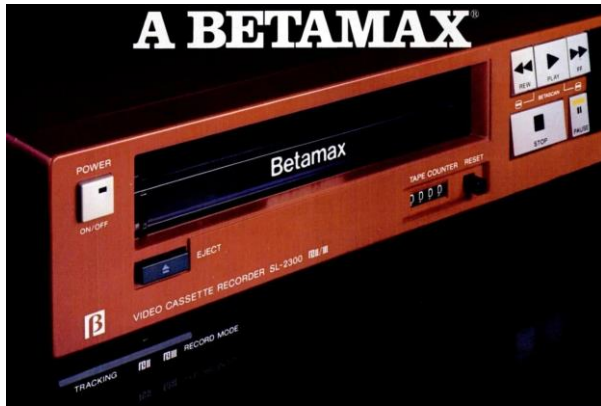
How did people watch videos?

- Share of U.S. home entertainment spending by format:



- When you were 18 in 2002, 53% of U.S. home entertainment spending was Tapes, and the top movie in theaters was Spider-Man.
- When you were 1 in 1985, most of U.S. home entertainment spending was Tapes, and the top movie in theaters was Back to the Future.

History of Home Videos



Betamax - 1975



VHS - 1976



LaserDisc - 1978



DVD - 1996



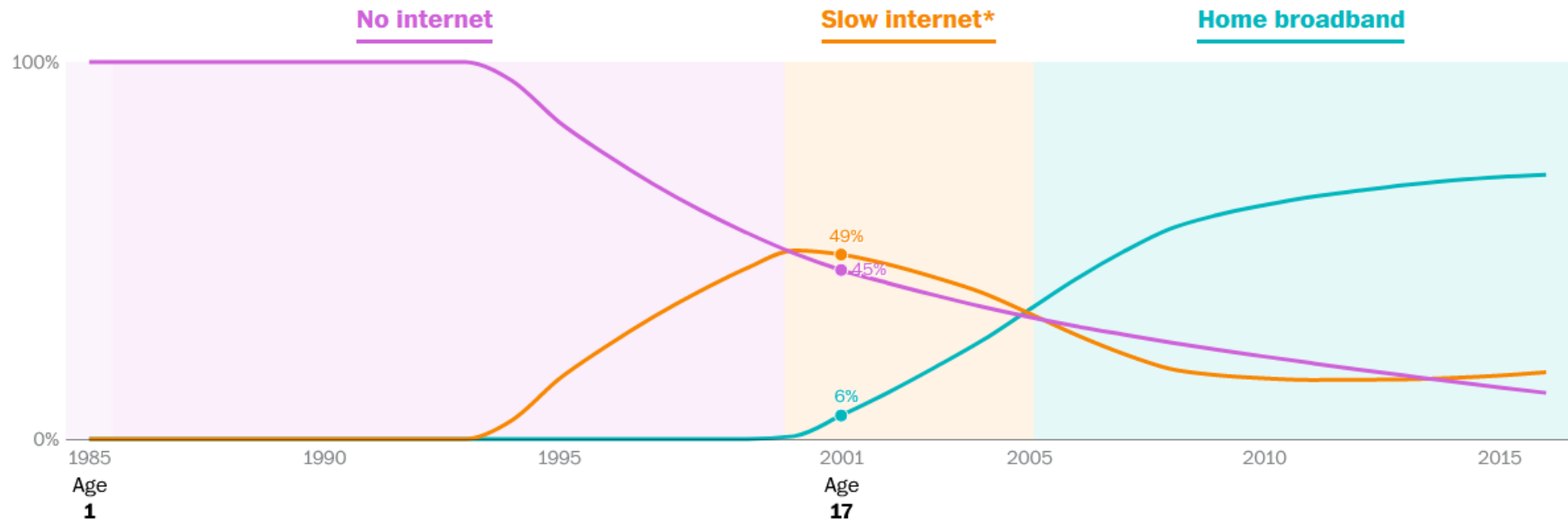
Blue Ray - 2006



Video Streaming - 2007

Did people have internet access?

- Estimated share of Americans that used each type of internet:



- When you were 14 in 1998, 61% of U.S. households had No internet, and the top website was AOL.
- When you were 1 in 1985, 100% of U.S. households had No internet.

Internet Timeline

info

WORLD-WIDE-WEB

ARPANET

ETHERNET

ebay

Java

iTunes

facebook.

bing

LYCOS

Aol.



tumblr.



1969

1973

1976

1982

1990

1994

1995

1998

1999

2003

2004

2005

2007

2009

2010

2012

2014

INTERNET

Google



You Tube

FTP & TCP/IP

Netscape

YAHOO!

amazon.com

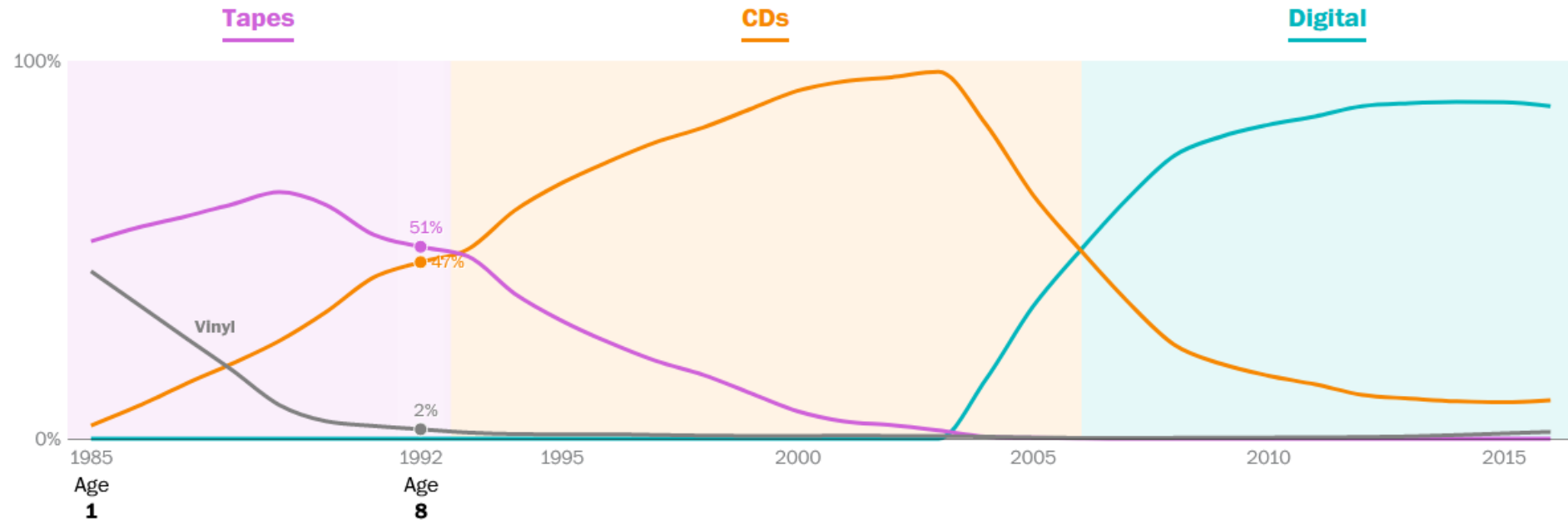
myspace.com

napster



How did people listen to music?

- Share of U.S. music sales (volume) by format:



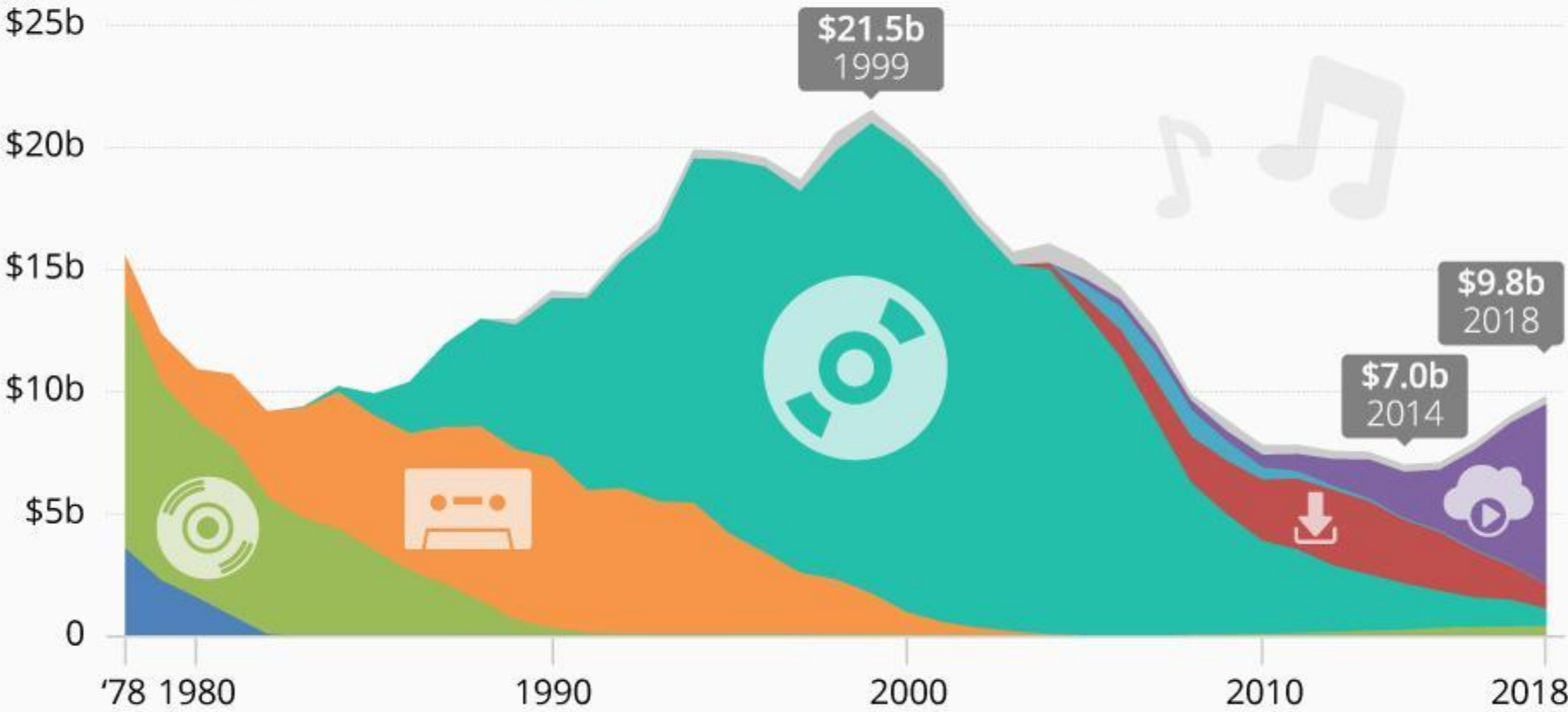
- When you were 6 in 1990, 62% of U.S. music sales (by volume) were Tapes, and the top selling album was Janet Jackson – Janet Jackson's *Rhythm Nation 1814*.
- When you were 1 in 1985, 52% of U.S. music sales (by volume) were Tapes, and the top selling album was Bruce Springsteen – *Born in the U.S.A.*



The Times They Are A-Changin'

U.S. recorded music revenues from 1978-2018, by format (adjusted for inflation)

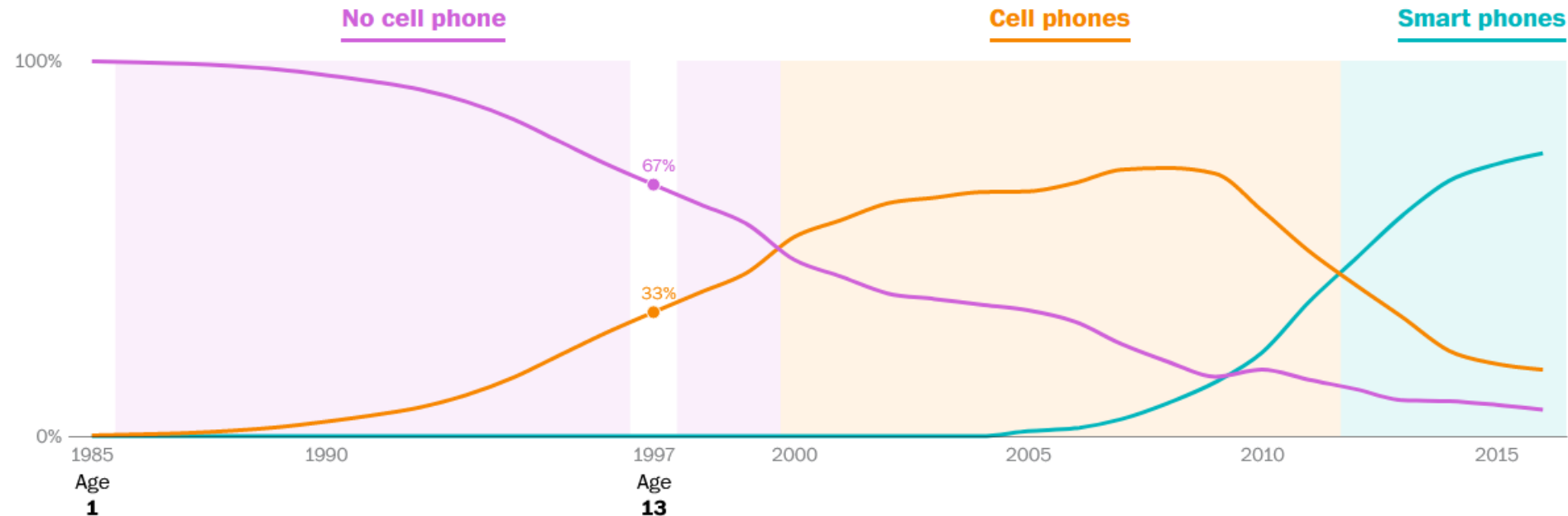
- 8-Track
- Vinyl
- Cassette
- CD
- Downloads
- Ringtones
- Streaming*
- Others



* incl. SoundExchange payments to performers and copyright holders for digital and customized radio services

Did people have cell phones?

- Estimated share of Americans that owned each device:



- When you were 9 in 1993, 89% of Americans had No cell phone.
- When you were 1 in 1985, over 99% of Americans had No cell phone.

Evolution of the Mobile Phone



Motorola 8900X-2



Nokia 2146



Nokia 3210



Nokia 6210



Ericsson T39



Alcatel OT511



Samsung E250



Apple iPhone



BlackBerry Curve 8900



Samsung Galaxy S2



Samsung Galaxy S4



Sony Xperia Z Ultra

Requirement 2



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Future of Digital Technology

- **Artificial Intelligence**

- The holy grail of artificial intelligence research is general AI, a machine that is self-aware and commands intelligence equal to a person's.
- These theoretical systems would be our intellectual equals—well, until v2.0 drops and we fall to a distant second.
- Until then we have narrow AI, which are systems that perform very specific tasks.
- Chatbots, logistics, self-driving cars, virtual nursing assistants, personalized textbooks and tutors, and even artificial creativity are just a few of the applications that narrow AI can improve or bring to light in the coming years.



Future of Digital Technology

- **5G and the Internet of Things (IoT)**

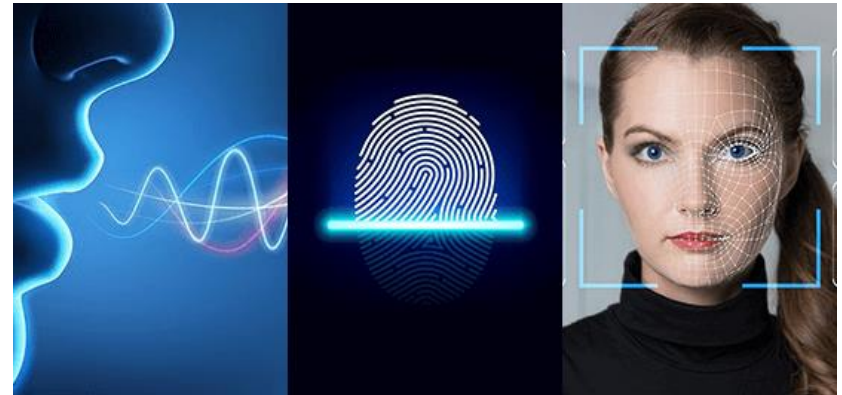
- 5G networks may ultimately be 100 times faster than 4G, allowing many more devices to connect, reducing latency to practically zero, and providing more reliable signals.
- This wireless technology will provide the backbone for the internet of things (IoT), which will expand the power of the internet beyond computers and across a wide range of objects, processes, and environments.
- The IoT is the keystone technology for such futuristic scenes as smart cities, robot-driven agriculture, and self-driving highway systems.



Future of Digital Technology

- **Biometrics**

- Biometrics allows a system to recognize users by biological markers such as their face, voice, or fingerprint.
- Many people already have one or several of these on their laptops and smartphones, but as the technology improves, it may finally end the password paradigm.
- Because most people have inefficient passwords, use the same one for every account, and never change them, hackers typically need only one hit to enjoy unlimited access to someone's personal and professional data.
- For these reasons, biometrics promises much-needed security of sensitive data.
- A fingerprint is much more difficult to hack with raw computational power than a password, and that difficulty is increased by magnitudes when multiple markers are used together.



Future of Digital Technology

- **Augmented/Virtual Reality**

- With hardware costs lowering, processing power increasing, and high-profile players such as Google and Facebook entering the game, virtual reality's day may have finally come.
- The more widespread acceptance of augmented reality apps in smartphones may make such technologies an easier sell moving forward.
- New remote-work era is a concept that combines these “mixed-reality” technologies to create virtual shared spaces that business teams can use to hold meetings or work on projects.
- This technology can revolutionize the customer experience in retail by allowing them to try clothes on a virtual avatar or sit in their amphitheater seats before making a purchase.



Future of Digital Technology

- **Blockchain**

- Unlike traditional, centralized records, a blockchain is decentralized.
- The permanent record is not stored in one location but exists on nodes spread across the system.
- This design makes it difficult to lose records or tamper with them.
- This is why blockchain has caught the attention of organizations that need to store records (i.e., all organizations).
- The potential use cases are impressive.
- Blockchain could be used by hospitals to store and share health records. It could underpin a secure online voting platform. It could track logistics across international supply chains. And, of course, there are numerous applications for cybersecurity, too.



Future of Digital Technology

- **Robotics**

- The first industrial robot punched the clock in 1962.
- Technological advancements have steadily widened robotics' workforce representation since, and in the coming years, robots will continue moving from factories to First Street to perform rudimentary tasks such as cleaning and delivery.
- One challenge faced by organization leaders will be reassuring their teams that the robots aren't here to replace them.
- In fact, as more people move into soft-skilled, human-focused jobs, they'll likely find the transition a beneficial one.



Future of Digital Technology

- **Quantum Computing**

- Quantum computing is “the exploitation of collective properties of quantum states, such as superposition and entanglement, to perform computation.”
- Translation: It solves problems faster and more accurately—in some cases, ones that stump even modern supercomputers.
- Adoption of this technology could make big data more manageable.
- It could cut costly and complex development time through speedy simulations.



Requirement 3



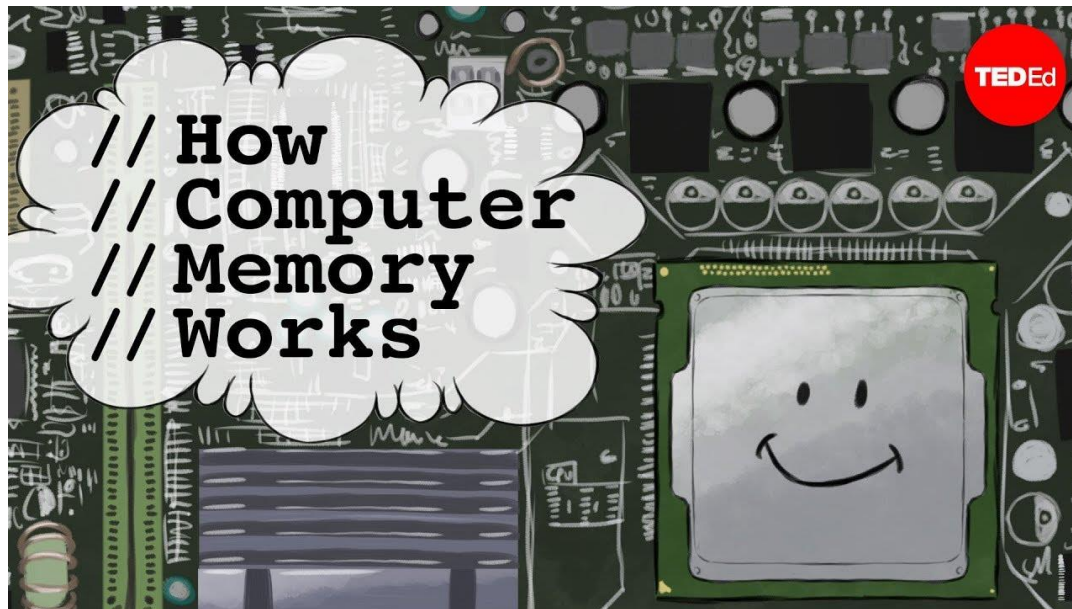
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- e. Explain what a computer network is and describe the network's purpose.

How does data storage work?

- When you stop to think about it, it's really incredible how a device like your cellphone can capture an image of reality, turn it into a bunch of data, and store it forever.
- How does the data digitization and storage process work?
- The following TED video (5:05) does a fantastic job of explaining how computer memory works, as well as its current drawbacks:



Digitizing Data

ASCII Code

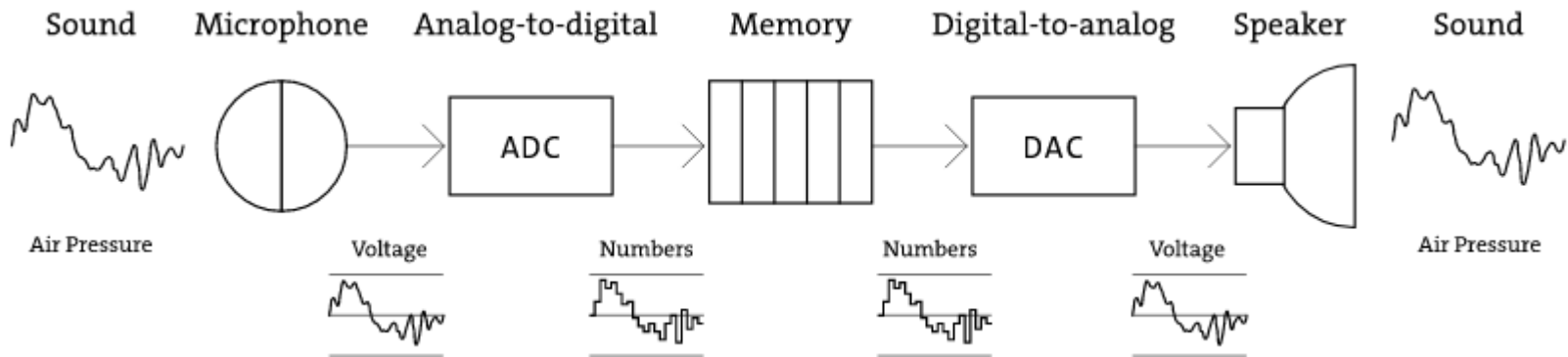
Char.	ASCII	Char.	ASCII	Char.	ASCII
@	64	U	85	j	106
A	65	V	86	k	107
B	66	W	87	l	108
C	67	X	88	m	109
D	68	Y	89	n	110
E	69	Z	90	o	111
F	70	[91	p	112
G	71	\	92	q	113
H	72]	93	r	114
I	73	^	94	s	115
J	74	_	95	t	116
K	75	`	96	u	117
L	76	a	97	v	118
M	77	b	98	w	119
N	78	c	99	x	120
O	79	d	100	y	121
P	80	e	101	z	122
Q	81	f	102	{	123
R	82	g	103		124
S	83	h	104	~	125
T	84	i	105		126

B → 1000010
L → 1101100
U → 1110101
e → 1100101



- How is Text Digitized for Storage?
 - Digital text is stored using *ASCII* (American Standard Code for Information Interchange), which is a code that translates numbers, letters, and special characters to numbers between 0 and 255.
 - These numbers are translated to *binary* by computers, which is another code made up of a sequence of 0s and 1s.
- Digital Formats: txt, doc, ods, pdf

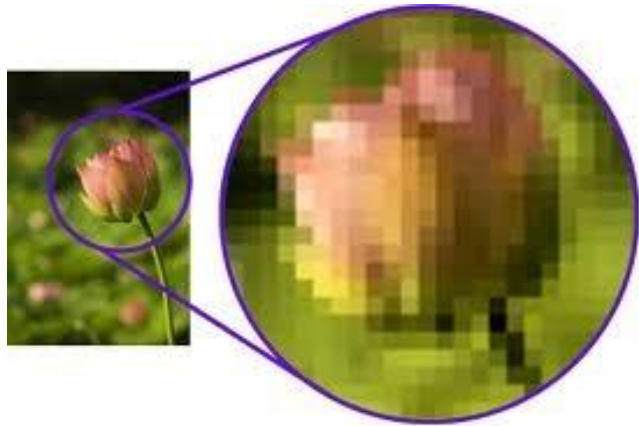
Digitizing Data



- How Is Sound Digitized for Storage?
 - Sound becomes digitized and stored via a process called sampling.
 - During the sampling process, analog sound (regular sound waves) are converted into bits that the computer can read and save as a digital file; basically a long list of 1's and 0's.
 - When you replay the file, the data is used to rebuild the shape of the sound wave and sends that information to the speakers, which vibrate the air, re-creating the original sound wave that you can hear.
- Digital Formats: mp3, wma, aiff, wav

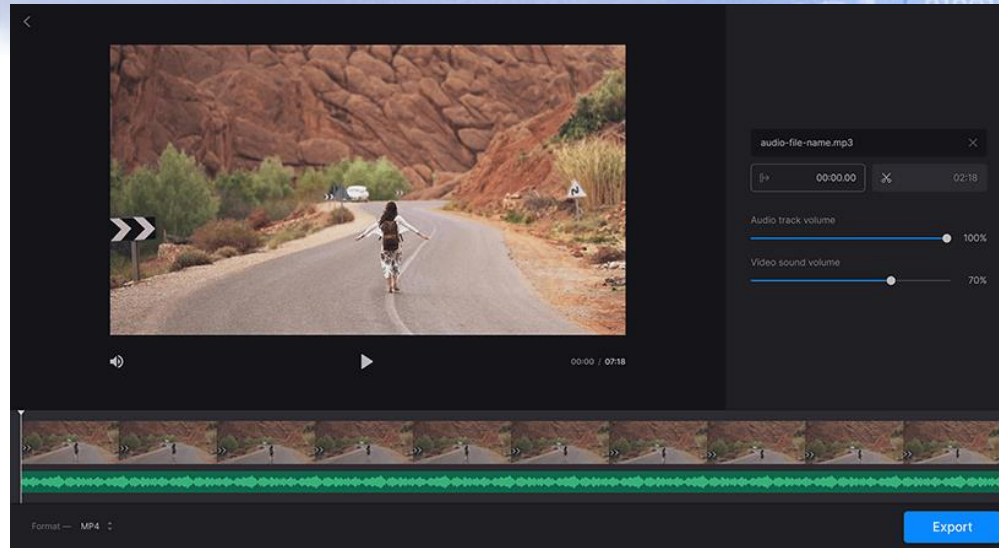


Digitizing Data



- How Are Pictures Digitized for Storage?
 - Pictures are stored as pixels, which essentially look like a series of small dots.
 - You can see these when you zoom in really close to a picture online and it becomes broken up into squares, a process called pixelization.
 - Each pixel holds information and data, measured in bits (unit of computer memory).
 - Color pictures take more bits, and therefore also take up more memory.
- Digital Formats: jpg, gif, png, tiff

Digitizing Data



- How Are Videos Digitized for Storage?
 - Videos are digitized through a combination of how sound and pictures are digitized.
 - Generally, a video file is collected as separate parts: sequential pictures, and synchronized sound.
 - Both of those files are given time stamps so that they can overlap to form a coherent video, and then are stored in container files.
- Digital Formats: avi, mpeg, flv, mov



Requirement 3



info

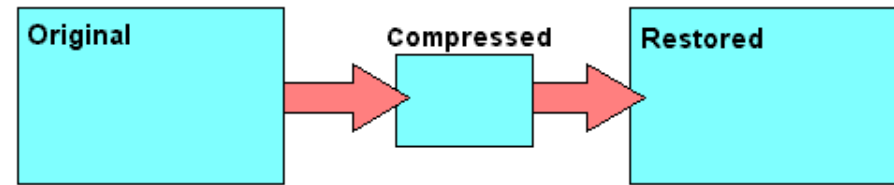
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- e. Explain what a computer network is and describe the network's purpose.

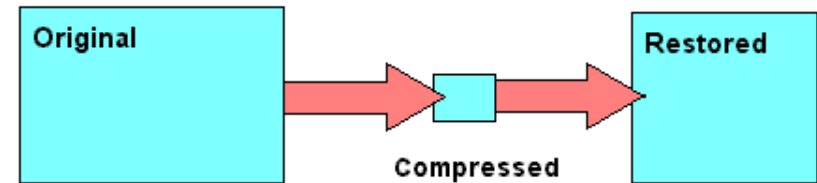
Data Compression

- Picture, image, music, and video files are stored in many different formats.
 - Some formats use specialized mathematical formulas to compress the file.
 - The file takes up less disk space and is easier to email, listen to, or display on the Web, but some of the original data is sacrificed and cannot be restored.
 - This is called *lossy* compression.
 - Examples: JPG, GIF, MP3
- Another type of compression, called *lossless*, can temporarily shrink a file by removing parts that are repeated and then, later restore the file to its full size.
 - Lossless compression is often used with text files and database files.
 - Lossless compression is also used when you want to retain the original picture size.
 - Examples: WMA, PNG, WebP

LOSSLESS



LOSSY



Requirement 3



info

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Digital Devices

- **MP3 Player:**

- The MP3 player uses software to interface with the hardware to translate the signals produced by powering the unit on and by navigating the device's menu by pressing buttons or rotating dials.
- The software programming also facilitates the input of MP3 files into the device's internal memory storage and the conversion of the files into sound that you can hear using headphones or the device's internal speaker.



- **Digital Camera:**

- Digital cameras also use software programming to provide digital instructions to the device's hardware components such as opening the lens and triggering the shutter.
- The software programming also provides an interface to adjust the device's settings and features and to control the image as is copied to the device's memory storage unit, usually a separate memory chip.



Requirement 3



info

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Digital Technology

Computers, Gaming Consoles & Mobile Devices

3D



	Computers	Gaming Consoles	Mobile Devices
Similarities	Processors (CPU'S), Executable Programs, Install Software, Digital Storage, Displays, Internet Access, Audio		
Differences	Keyboards vs. Touchscreens vs. Controllers, Portability, Number of Users, Proprietary Media or Apps, Expansion, Online platforms		

Requirement 3



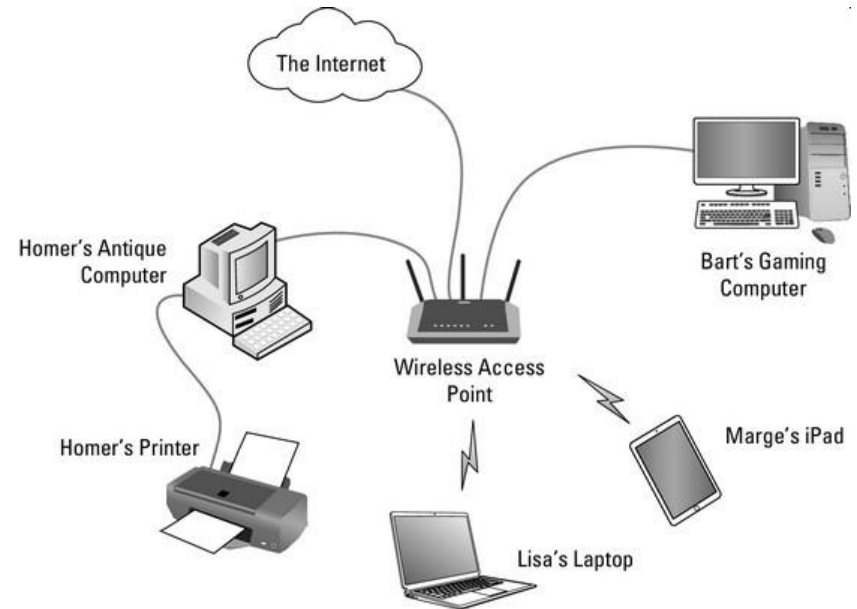
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Computer Networks

- A computer network is a set of computers that are connected together so that they can share information.
- Computer networks are used to carry out a large number of tasks through the sharing of information that include:
 - Communicating using email, video, instant messaging and other methods
 - Sharing devices such as printers, scanners and photocopiers
 - Sharing files
 - Sharing software and operating programs on remote systems
 - Allowing network users to easily access and maintain information



Requirement 4



info

Do the following:

- a. Explain what a program or software application or "app" is and how it is created.
- b. Name four software programs or mobile apps you or your family use, and explain how each one helps you.
- c. Describe what malware is, and explain how to protect your digital devices and the information stored on them.

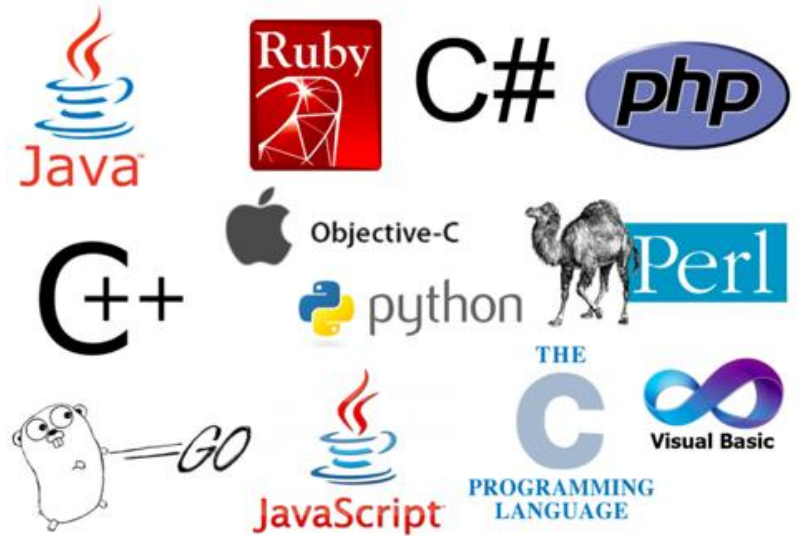
Software

- A program or software application is a group or set of instructions that are stored in memory and are acted upon, in sequence, by the device's central processing unit (CPU) to complete a task.
 - Examples include: Word Processing, Games, Utilities (calendar, calculator), Photo/Video Editor
- In the course of executing program instructions, the CPU will communicate or share data with random access memory (RAM), graphical display, sound device, and any other device that is available and the program was written to access.



Software

- Software applications or programs are created by developers and written in one of a number of different computer languages.
 - Examples of coding or programming languages are:



Requirement 4



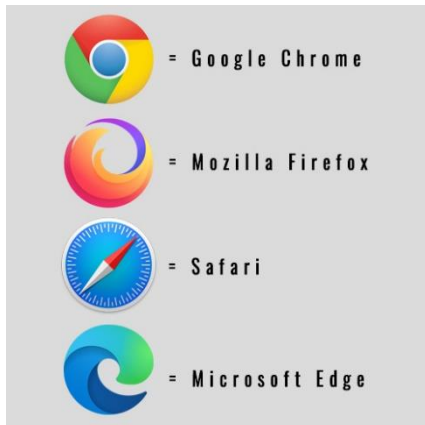
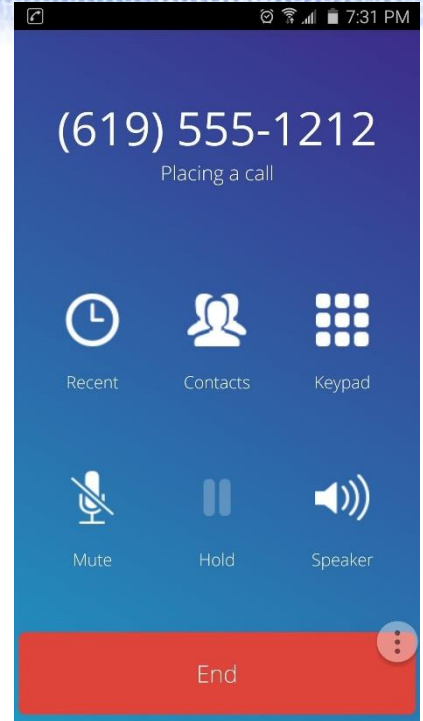
info

Do the following:

- a. Explain what a program or software application or "app" is and how it is created.
- b. **Name four software programs or mobile apps you or your family use, and explain how each one helps you.**
- c. Describe what malware is, and explain how to protect your digital devices and the information stored on them.

Family Software Programs and Mobile Apps

- **Browser:** Enables you to surf the web.
- **Music:** Allows you to listen to your mp3 music files that are stored either on your device or in the cloud.
- **E-mail:** Allows your to communicate with other people that have your email address and that you have their email address (internet connection is typically required).
- **Phone:** Allows you to make voice calls and send text messages to other people whose phone number you have.



Requirement 4



info

Do the following:

- a. Explain what a program or software application or "app" is and how it is created.
- b. Name four software programs or mobile apps you or your family use, and explain how each one helps you.
- c. Describe what malware is, and explain how to protect your digital devices and the information stored on them.

What is Malware?

It is short for malicious software which can be used to manipulate your computer and steal your information.



Spyware

Collects information about users without their knowledge.



Virus

Damages your data and files via downloads from the internet



Ransomware

IT blocks the PC, takes control, encrypts your files, and demands a ransom to return them to you.



Types of Malware

Adware



Automatically displays or downloads advertising material such as banners or pop-ups when a user is online.



Trojan horses

A computer program that seems to be a game but in reality, steals/ erases information

Worms



Takes up space and slows your system by making copies of themselves repeatedly.

Malware Protection

Protect your devices

- Keep your operating system and applications updated.
- Never click on a link in a popup. Simply close the message.
- Limit the number of apps on your devices. If you no longer use an app, uninstall it.
- Use security software.
- Don't lend out your phone or leave your devices unattended .

Be careful online

- Avoid clicking on unknown links.
- Be selective about which sites you visit and avoid risky websites (i.e. those offering free screensavers.)
- Beware of emails requesting personal information.

Pay attention to downloads and other software purchases

- Only purchase security software from a reputable company via their official website or in a retail store.
- Stick to official app stores.
- Do not open an email attachment unless you know what it is, even if it came from a friend or someone you know.

Perform regular checks

- If you are concerned that your device may be infected, run a scan using the security software you have installed on your device.



Requirement 5



Do the following:

- a. Describe how digital devices are connected to the internet.
- b. Using an internet search engine (with your parent or guardian's permission), find ideas from at least three different websites about how to conduct a troop court of honor or campfire program. Present the ideas to your counselor, and explain how you used a search engine to find this information.
- c. Use a web browser to connect to an HTTPS (secure) website (with your parent's permission). Explain to your counselor how to tell whether the site's security certificate can be trusted, and what it means to use this kind of connection.

- Digital devices are connected to the internet by several technologies, often at the same time.
- Your families desktop PC, laptop, or tablet may be connected to your home's wireless network router which, in turn, is connected to your Internet Service Provider (ISP) by cable, fiber, or even satellite.
- Your smart phone maybe connected to the same wireless network as the other digital devices in your home or may be connected to your phone/internet service provider by a 4G or 5G cellular network.



Requirement 5



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Do the following:

- a. Describe how digital devices are connected to the internet.
- b. Using an internet search engine (with your parent or guardian's permission), find ideas from at least three different websites about how to conduct a troop court of honor or campfire program. Present the ideas to your counselor, and explain how you used a search engine to find this information.
- c. Use a web browser to connect to an HTTPS (secure) website (with your parent's permission). Explain to your counselor how to tell whether the site's security certificate can be trusted, and what it means to use this kind of connection.

Internet Search Engines

- A search engine is a software system that is designed to carry out web searches.
- They search the World Wide Web in a systematic way for particular information specified in a textual web search query.
- Click on one of the logos to the right to access the most popular search engines in the U.S.
- Find ideas from at least three different websites about how to conduct a troop court of honor or campfire program.

The Google logo, featuring the word "Google" in its characteristic multi-colored font (blue, red, yellow, blue, green, red).The Bing logo, featuring a green arrow pointing right and the word "Bing" in a green, sans-serif font.The Yahoo! logo, featuring the word "YAHOO!" in a purple, serif font with a registered trademark symbol.

DuckDuckGo

Requirement 5



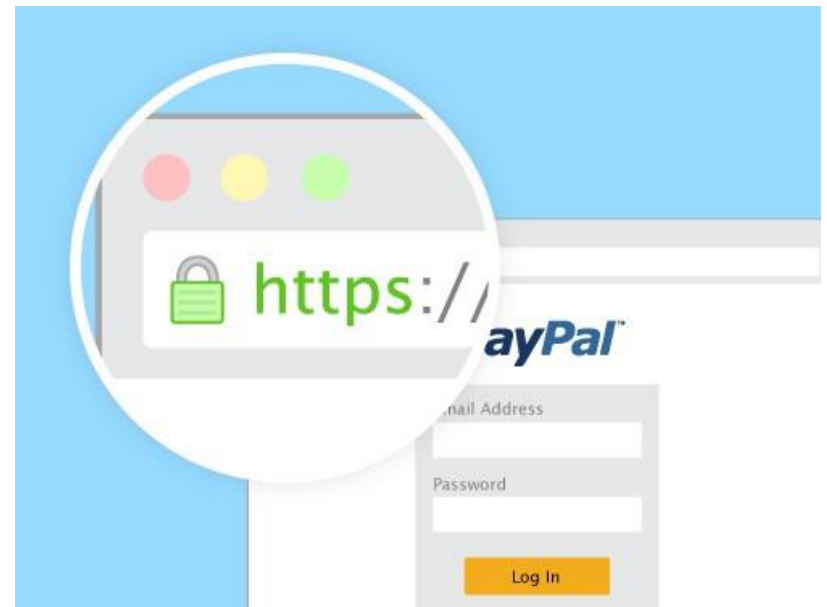
inf

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- a. Describe how digital devices are connected to the internet.
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- c. Use a web browser to connect to an HTTPS (secure) website (with your parent's permission). Explain to your counselor how to tell whether the site's security certificate can be trusted, and what it means to use this kind of connection.

How to Know a Website is Secure

- Check the URL of the website and see if it says “HTTPS” at the start of the address (instead of “HTTP”).
 - This means the website is secure with an SSL certificate.
 - The SSL certificate is used to secure all data that is passed from the browser to the website’s server.
- If you look at the address bar of your browser and see a small padlock before the address, the website is secure.
 - Clicking on it, a message stating that “the connection to this site is secure” will appear, depending on your browser, of course.



What does it mean to use a info

- This means that there is a company guaranteeing that the communication between you and the company responsible for the website cannot be intercepted or modified.
- Imagine that you go to a shopping website and inform the company about your personal data.
- Without SSL certification, this information could be copied — without you or the store noticing any hack.
- Therefore, the first step to check if a website is safe is to verify that it has that certification.



Requirement 6



inf

Do THREE of the following. For each project you complete, copy the files to a backup device and share the finished projects with your counselor.

- a. Using a spreadsheet or database program, develop a food budget for a patrol weekend campout OR create a troop roster that includes the name, rank, patrol, and telephone number of each Scout. Show your counselor that you can sort the roster by each of the following categories: rank, patrol, and alphabetically by name.
- b. Using a word processor, write a draft letter to the parents of your troop's Scouts, inviting them to a troop event.
- c. Using a graphics program, design and draw a campsite plan for your troop OR create a flier for an upcoming troop event, incorporating text and some type of visual such as a photograph or an illustration.
- d. Using a presentation software program, develop a report about a topic approved by your counselor. For your presentation, create at least five slides, with each one incorporating text and some type of visual such as a photograph or an illustration.
- e. Using a digital device, take a picture of a troop activity. Send or transfer this image to a device where it can be shared with your counselor.
- f. Make a digital recording of your voice, transfer the file to a different device, and have your counselor play back the recording.
- g. Create a blog and use it as an online journal of your Scouting activities, including group discussions and meetings, campouts, and other events. Include at least five entries and two photographs or illustrations. Share your blog with your counselor. You need not post the blog to the internet; however, if you choose to go live with your blog, you must first share it with your parents AND counselor AND get their approval.
- h. Create a web page for your troop, patrol, school, or place of worship. Include at least three articles and two photographs or illustrations. Include at least one link to a website of interest to your audience. You need not post the page to the internet; however, if you decide to do so, you must first share the web page with your parents AND counselor AND get their approval.

Requirement 6

- Your choice of any 3 from Requirement 6.



Excel



Word



Publisher



PowerPoint

Requirement 7



Do the following:

- a. Explain to your counselor each of these protections and why they exist: copyright, patents, trademarks, trade secrets.
- b. Explain when it is permissible to accept a free copy of a program from a friend.
- c. Discuss with your counselor an article or a news report about a recent legal case involving an intellectual property dispute.

Copyrights



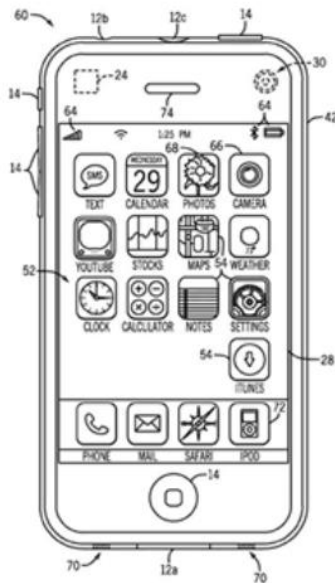
The
WALT DISNEY
Company

- A Copyright is a legal right created by the law of a country, that grants the creator of an original work exclusive rights to its use and distribution, usually for a limited time, with the intention of enabling the creator to receive compensation for their intellectual effort.
- Encourages original work to be created with the intent it is protected and can be profitable to the creator

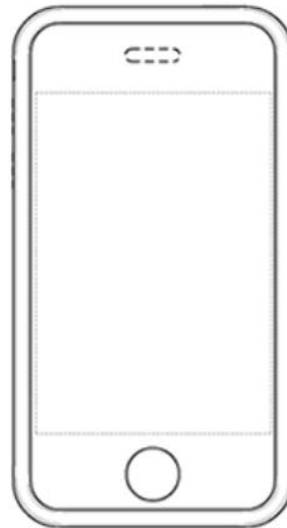


Patents

- A Patent is a form of intellectual property protection that gives the creator of an invention the exclusive legal right to market, sell, manufacture, and profit from that invention for a limited period of time in exchange for detailed public disclosure of an invention.



Utility Patent



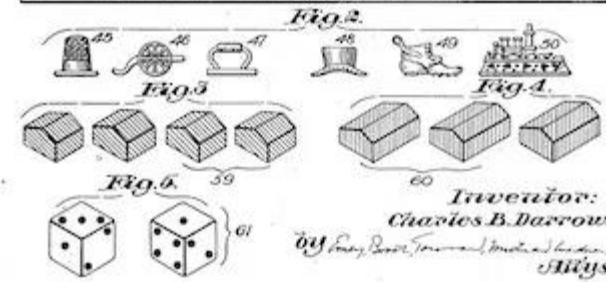
Design Patent

Dec. 31, 1935. C. B. DARROW 2,026,082

BOARD GAME APPARATUS

Filed Aug. 31, 1935

7 Sheets-Sheet 1



Inventor:
Charles B. Darrow.
By [Signature]

Trademarks

- A Trademark is a recognizable sign, design or expression which identifies products, services or a company from those of others.
- Trademark owners can be individuals, business organizations or any legal entity.
- Trademarks can be located on packaging, labels, print media or even verbal phrases.
- Provides protection of a unique design or expression to its creator or owner.
- Protects the owner from misuse or impersonation and creates an identity.



Trade Secrets



- A Trade Secret is an invented formula, practice, process, design, instrument, pattern, commercial method or compilation of information which is not generally known or reasonably ascertained by others, and by which a business can obtain an economic advantage over competitors or customers.
- Legally recognizes unique solutions as the property of the developer
- Protects the solutions and methods of a developer from being forcibly divulged while keeping products unique and safe.

Free Copies of Programs

- Software can be protected by copyright, trademark and patent laws.
- The defining difference in the software world is how the software is “Licensed”.
- You can freely share software with your friend if it is Open Source licensed software.
- Open source means that software is made available, including its source code, for distribution or modification.

Free and Open Source Software



Digital Technology

Open Source vs. Proprietary

- Open Source software can often be as capable, or more capable than proprietary software.
- Below are some examples of proprietary software and open source alternatives.

Proprietary



Open Source



Intellectual Property Disputes

- **Mattel Inc. v. MGA Entertainment Inc.**

- The successful Bratz Dolls were launched in 2001 as a rival to Barbie, who first came on the scene in 1959.
- Within two years, \$1 billion of Bratz dolls were sold.
- Because the Bratz creator, Carter Bryant, had previously worked for Mattel, they made the case that he broke his employee agreement that any intellectual property he created would be the property of Mattel.
- In 2008, Mattel's case against MGA went to court, and a jury ruled in Mattel's favor, awarding it \$100 million under the reasoning that Bryant had illegally sold his idea.
- It also gave Mattel rights over the Bratz line of dolls as well.
- That was reversed a year later when MGA was awarded \$300 million in damages, fees, and costs after courts decided that they failed to recognize how much work was done by MGA in developing their designs.



Intellectual Property Disputes

- **A&M Records, Inc. v. Napster Inc.**
 - The file-sharing platform Napster launched in 1999.
 - It allowed music lovers to easily download music from other users' digital libraries.
 - A year later it had 20 million users across the globe.
 - The company's launch transformed the music industry so much so that 2000 was the first year that record sales ever dipped on a global scale.
 - Many sued, including BMG, EMI, Sony, Warner and Universal, and in 2001, courts ruled against Napster for breach of copyright.



Requirement 8



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Do TWO of the following:

- a. Describe why it is important to properly dispose of digital technology. List at least three dangerous chemicals that could be used to create digital devices or used inside a digital device.
- b. Explain to your counselor what is required to become a certified recycler of digital technology hardware or devices.
- c. Do an internet search for an organization that collects discarded digital technology hardware or devices for repurposing or recycling. Find out what happens to that waste. Share with your counselor what you found.
- d. Visit a recycling center that disposes of digital technology hardware or devices. Find out what happens to that waste. Share what you learned with your counselor.
- e. Find a battery recycling center near you and find out what it does to recycle batteries. Share what you have learned with your counselor about the proper methods for recycling batteries.

Digital Technology Disposal

- Electronic devices are a complex mixture of many different materials.
 - A single smartphone contains between 500 and 1,000 components.
 - Many of these contain toxic heavy metals as well as hazardous chemicals and materials which do not decay.
- Proper disposal of electronics protects the environment, humans and wildlife from exposure to dangerous and toxic materials that are in digital technology devices.





Digital Technology Disposal

- Some dangerous chemicals used in electronic devices include:
 - **Brominated Flame Retardants** – used in circuit boards and casings.
 - Long term exposure can lead to impaired learning and memory functions.
 - It can also interfere with thyroid and estrogen hormone systems
 - **Lead** – Used in cathode ray tubes (CRT) in monitors.
 - Exposure can cause intellectual impairment, and damage nervous, blood and reproductive systems.
 - **Mercury** – Used in lighting for flat screen displays.
 - Can damage the brain and nervous system especially during early development
 - **Hexavalent Chromium Compounds** – Used in metal housing production.
 - Highly toxic and carcinogenic to humans and animals.
 - **Polyvinyl Chloride (PVC)** – Used in wire and cable insulation.
 - Releases highly persistent and toxic fumes when burned.

Certified Digital Technology Recycler

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- To earn an R2 certification you must follow these steps:
 - Able to determine if technology can be reused or recycled.
 - Able to test equipment prior to reuse.
 - Able to repair equipment for reuse or resale
 - Able to separated non-reusable items into components.
 - Steel, copper, aluminum, glass, plastic.
 - Circuit boards, memory chips, power supplies.
 - Able to reprocess components for remanufacturing.
 - Reprocess components internally.
 - Transfer components to reprocessors.
- Click on the following link to find an [R2 Certified Facility](#).



**Responsible™
Recycling**

Digital Technology Recycling Organizations

- Businesses that support recycling of digital technology, devices, and batteries.



Requirement 9



info

Do ONE of the following:

- a. Investigate three career opportunities that involve digital technology. Pick one and find out the education, training, and experience required for this profession. Discuss this with your counselor, and explain why this profession might interest you.
- b. Visit a business or an industrial facility that uses digital technology. Describe four ways digital technology is being used there. Share what you learned with your counselor.

Career Opportunities in Digital Technology

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