BURNING CDs

Physical types of 120mm discs
- **Factory-pressed discs:** Compact Disc (**CD**) and Digital Versatile Disc (**DVD**)
- **CD-R:** CD Recordable; write-once, read many
- **CD-RW:** CD Rewriteable; eraseable
- **DVD-RAM, DVD+RW, DVD-RW:** Writeable DVD formats (incompatible with each other)
- CD formats also can be used on mini-discs (80 mm?)

Data formats
- **Audio CD:** usually 74 minutes capacity, 16-bit, 44 kHz, stereo sound
- **CD-ROM:** ISO-9660 format for storing files   (Rock Ridge or Juliet extensions): capacity usually about 650 MB
- **Multi-session:** both audio and CD-ROM tracks on one CD
- **Video CD:**   Compressed video burned on CDs
- **DVD-ROM,DVD-Video:**   normally used only on DVDs; 4.7 to 17 GB capacity.

Player Compatibility

General list; every player is different and may not follow this chart.

	Factory Audio CD	Factory CD-ROM	Audio CD on CD-R	Audio on CD-RW	CD-ROM on CD-R	CD-ROM on CD-RW	Video CD on CD-R	Factory DVD-Video	Factory DVD-ROM
Home/car audio CD Player	Read		Most Read	Some read					
Home DVD player	Read		Read	Possibly Read			Read	Read	
Computer CD-ROM drive	Read	Read	Read	Read	Read	Read	Possibly Read		
Computer DVD drive	Read	Read	Read	Read	Read	Read	Read	Read	Read
Computer CD-R drive (rarer)	Read	Read	Write Once	Possibly read	Write Once	Possibly Read	Write Once		
Computer CD-RW burner	Read	Read	Write Once	Write / Erase	Write Once	Write / Erase	Write Once		

Note: Your computer CD drive is likely a "standard computer CD drive" in the chart above, or if you have a newer computer, a CD-RW burner. Room 952 (training center) and room 965 (open lab) have "computer CD-RW burners".   Also, there are several other types of drives such as DVD-RAM burners, MP3 CD players, consumer audio CD-R recorders, etc.

Why Burn CDs?
- Backup files
- Copy existing CDs
- Distribute materials
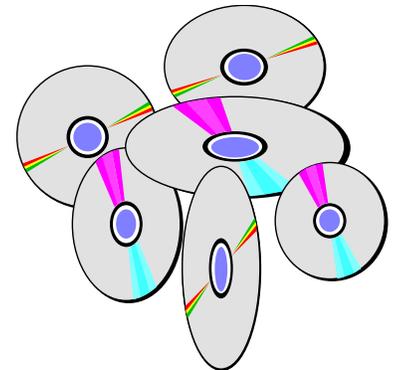- Audio CD compilation

Copyright Rules
- Sometimes allowed one copy of software for backup purposes – check license agreement
- Audio CD compilations generally illegal; perhaps conversion onto CD from older formats ok (compilations possibly legal with special CD-Audio media)
- Always okay to backup your own files or burn music you composed and recorded
- Research before you get yourself in trouble!
- Understand Fair Use Doctrine; applicable laws (No Electronic Theft Act – up to 5 years in prison; fines of up to $250,000 plus civil liability)

CD Media Tips
- Sold in office and computer supply stores
- Re-writeable disks are about $1 each, CD-R disks under 50 cents or sometimes much less. Sometimes you "get what you pay for."
- There are several brands and colors. Dye formulas are patented, and some disk makers claim the color determines durability: platinum disks may last longer than green, up to 200 years, for example. Others may last only a few years.
- Normal CDs are 74 minutes or 650 MB, but often are 80 min / 700 MB
- "Formatted" CD-RWs are for DirectCD ("packet writing") and have lower capacity
- If your CD-R disks will not play in consumer devices, try other brands and colors.
- Discs are sold in spindles or in jewel cases; cases are sometimes more expensive than the discs themselves!   I prefer paper sleeves.
- "Audio CD-Rs" are identical to computer CD-Rs except their price includes a royalty to the RIAA (Recording Industry Association of America)

CD Duplication
- Two drives – one CD player or DVD player, and one burner
    - Copy directly with "CD Copier" utility.
- One Drive (burner only)
    - Create image – exact copy of CD on your hard drive
    - Then burn duplicate from image
    - Images require lots of HD space!
    - For audio CDs, each track is a separate image.
- Destination media must be equal or greater size than source

CD-ROM Creation
- Assemble files on local hard drive (not network or floppy drives)
- Easiest to first set up directory structure just how you want it on hard drive
- Also can set up directories in CD-burning software]
- May want to create image first if you have the space, or directly burn
- Discs with multiple data tracks or sessions may not be viewable on many CD-ROM drives, but will play on the burner, so that's good for backups.
- Be sure to set software to correct speed and CD length

Audio CD Burning
- Rip tracks from existing CDs
- Or record sound in .WAV format with audio software (16-bit, 44 kHz, stereo)
- Choose Audio CD in software; assemble tracks
- Be sure to "close session," do not add any non-audio tracks for best results
- MP3 CDs are really data CDs, but can be read by some consumer audio players

Where Next?
- Much software available for MP3 creation and management
- Multimedia creation software available for your own CD-based interactive presentations (or just burn PPT files to CD-R's)
- Backup your hard drive with software that automatically separates data over multiple CDs; also includes recovery tools
- Divx and Video CD formats for movies / video clips
- Label creation software for custom disc and case labels
- DVD burning – expand capacity with the latest drives and media

References / Documentation
- Help files for Roxio Easy CD Creator are very comprehensive – know how to use your computer's own help! (press F1 in any window for context-sensitive help)
- Microsoft article on CDs and Windows 2000: http://www.microsoft.com/windows2000/techenthusiast/features/cdr.asp
- Links to many CD recording/burning resources: http://homerecording.about.com/cs/burningcds/
- There's probably even Burning CDs for Dummies or something in the bookstore!

Roxio Easy CD Creator Components
- **Easy CD Creator:** primary program for creating layouts, grabbing images, and burning
- **Disk Duplicator:** applet to easily duplicate CDs if you have multiple drives
- **Project Menu:** Allows you to choose different project types (audio CD, data CD, DirectCD, disk duplicator) and then launches Easy CD Creator. Project menu may also appear when you insert a blank CD.
- **DirectCD:** Allows you to "format" and setup a writeable CD as a drive letter. Then, you can copy files to that drive letter like a floppy disk. When you eject the drive, it closes the session. Recommended for experienced users only.

Roxio Easy CD Creator Tips
- To create data or audio CD layouts, choose project type first (File/New Project)
- Drag and drop files or tracks from top (explorer view) to bottom (CD layout)
- To extract tracks (from audio CD) or images (whole data CD), choose CD from the menu bar, then Information. Choose a track then press "Read Track." Then choose a hard drive location – be sure you have enough free space
- When getting ready to burn, choose burn speed no higher than what's marked on the media, and make sure CD length (74 or 80 minutes) is correct
- Burn options: set to finalize CD for best compatibility (and definitely for audio CDs)
- To burn from ISO files (CD images), instead of a layout – double-click on the file from Explorer. Do not add ISO files to the layout of a data CD (unless you really mean it)
- Audio CDs: CD Creator can convert between various formats (WAV, MP3, etc.)
- If you encounter problems, try the various testing options. You may need to burn at a slower speed if your system isn't fast enough.