

# 05 – Archiving, Chaining, Piping & Redirection

CS 2043: Unix Tools and Scripting, Spring 2019 [1]

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## 1. File Compression

# File Compression

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# Making Archives: Zip

## Package and Compress (Archive) Files

`zip <name_of_archive> <files_to_include>`

- E.g. `zip files.zip a.txt b.txt c.txt`
- Extracts to `a.txt`, `b.txt`, and `c.txt` in *current directory*.
- To do folders, you need recursion.
  - `zip -r folder.zip my_files/`
  - Extracts to folder named `my_files` in *current directory*.
  - Good practice to ALWAYS zip a folder and distribute with the name it will extract as.
    - `zip -r folder_name.zip folder_name/`
  - Drives me *crazy* when I get a `.zip` that extracts files in the same directory... very difficult to keep track of.

## List, Test and Extract Compressed Files in a **zip** Archive

`unzip <archive_name>`

- Use `-l` to list what would extract before doing it.
- **Note:** The original files DO stay intact.

# Making Archives: Gzip

## GNU zip

```
gzip <files_to_compress>
```

- Less time to compress, larger file: - -**fast**
- More time to compress, smaller file: - -**best**
- Read the **man** page, lots of options.
- By default, *replaces* the original files!
  - You can use - -**keep** to bypass this.

## GNU unzip

```
gunzip <archive_name>
```

- Use -**l** to list what would extract before doing it.

### • Notes:

- Does not bundle the files.
- Reiterate: *replaces original* by default.
- Usually has better compression than **zip**.

## Additional Archive Formats

- This is a non-exhaustive list. There are **many** out there.
- Similar interface to **gzip**:
  - **bzip2**: “Burrows-Wheeler block sorting compression algorithm”
  - **xz**: “x”-zip, uses LZMA compression scheme (good)
- Honorable mentions:
  - **file.rar**: a “**RAR**” archive; used for distributing large files
    - **file.rar.001**, **file.rar.002**, etc: multiple archives needed to reconstruct whole.
    - You extract the first one, it looks for the others in same directory.
  - **file.7z**: “**7**”-zip, successor to RAR, uses LZMA
    - If you are choosing between **.rar** and **.7z**...choose **.7z**.
  - Install **unrar** to deal with these on Unix.
- **Moral**:
  - Working with **tar** and/or only Unix? **Use xz**.
  - Have to support Windows fools? **Use 7zip**.

# Making Archives: Tar

- Bundling files together to compress is easy!

## Tape archive

```
tar -cf <tar_archive_name> <files_to_compress>
```

- Create a tar archive.

```
tar -xf <tar_archive_name>
```

- Extract all files from archive.

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- **tar** is a stream tool. By default, it is expecting stream input.
  - Don't forget the **-f** if you are working with files!

- **Notes:**

- **tar** is just a bundling suite, creating a single file.
- By default, it does *not* compress.
- Original files DO stay intact.
- Unlike **zip**, you do not need the **-r** flag for folders :)

# Making Archives: Tarballs

## Making tarballs

```
tar -c[zjJ]f <archive_name> <source_files>
```

```
tar -x[zjJ]f <archive_name>
```

- [zjJ] here means *either z, j, or J* — only one.
- YOU have to specify the file extension.
- Use **gzip** compression method: -z (or --gzip)
  - Extension convention: **.tar.gz**
  - Example: **tar -czf files.tar.gz files/**
- Use **bzip2** compression method: -j (or --bzip2)
  - Extension convention: **.tar.bz2**
  - Example: **tar -cjf files.tar.bz2 files/**
- Use **xz** compression method: -J (or --xz)
  - Extension convention: **.tar.xz**
  - Example: **tar -cJf files.tar.xz files/**



## Pro Tip: Minimize your Keystrokes

- **Extraction** can *usually* happen automatically:
  - `tar -xf files.tar.gz` will usually work (no `-z`)
  - Best results when:
    - You are obeying filename conventions.
    - `tar` made the archive in the first place.
- **Compression**: no, you have to tell it what to do...
- **SUDDEN REMINDER** to obsessively hit your **tab** key ;)

# References

- [1] Stephen McDowell, Bruno Abrahao, Hussam Abu-Libdeh, Nicolas Savva, David Slater, and others over the years. “Previous Cornell CS 2043 Course Slides”.