File Management

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Use descriptive and informative **file names and directories**

File names … Best practices

Do not name all your files **`data.xls`** or **`experiment.doc`**

Include any information that will allow you to distinguish your files from one another

- Project / experiment name / acronym
- Location / spatial coordinates
- Researcher name / initials
- Date of experiment
- Type of data
- Conditions
- Version number

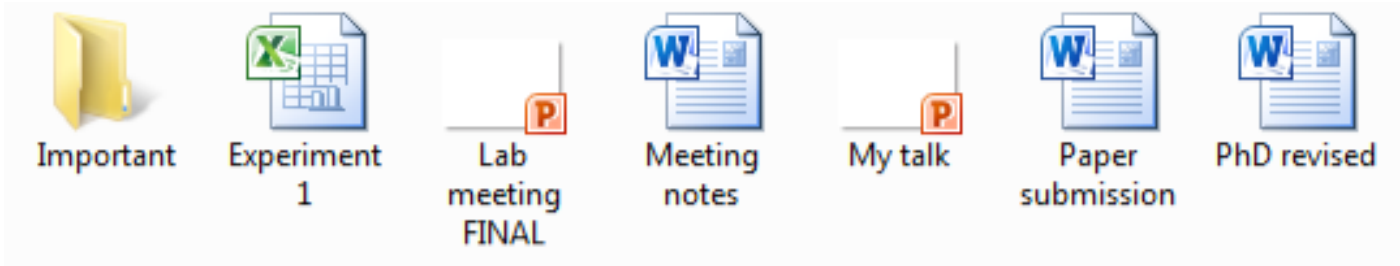
File names … Best practices

Choose a consistent naming scheme and stick to it

Meaningful to you and your colleagues

Include in the directory a **`README.txt`** file that explains your naming format along with any abbreviations or codes you have used

Allow you to find files easily



File names … Tips

Avoid **special characters** ~ ! @ # $ % ^ & * ( ) ` ; < > ? , [ ] { } ' ” |

Use **short file names**

A good format for **dates** is **YYYY-MM-DD** or **YYMMDD**

All of your files will always stay in chronological order

Use **leading zeros** for clarity and to make sure files sort in sequential order

E.g. "001, 002 ... 010, 011 …" instead of "1, 2, ...10, 11 ... "

File names … Tips

Do not use spaces. Some softwares do not recognize file names with spaces.

e.g. data table.xls

Other options include:

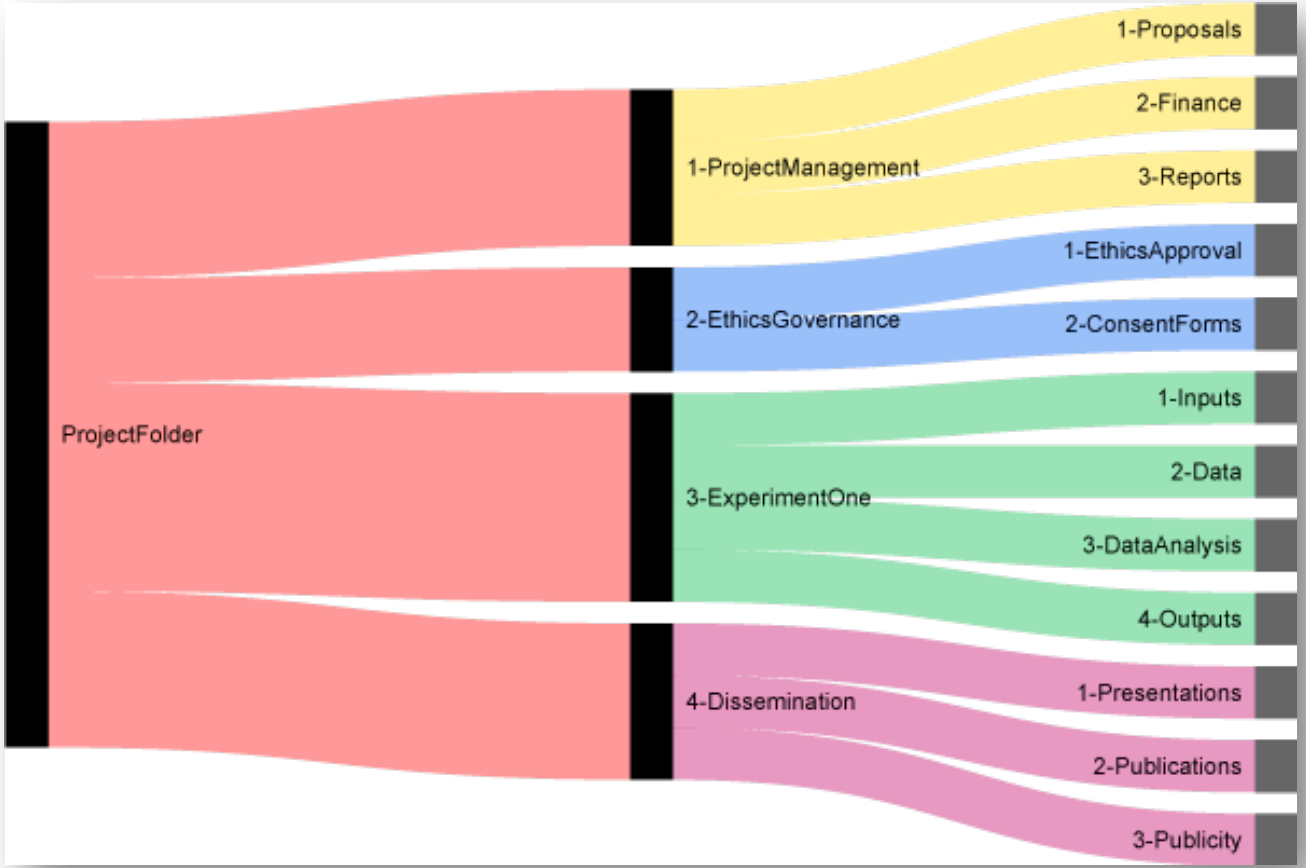
Underscores, e.g. data_table.xls

Dashes, e.g. data-table.xls

No separation, e.g. datatable.xls

Camel case, first letter of each section of text is capitalized, e.g. DataTable.xls

Keep an organised **directory structure**

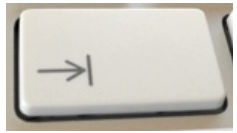


Choose **file formats** that will ensure long-term access

File formats … Best practices

Save data in a **non-proprietary** (open) file format when possible

- Usable on diverse platforms and by multiple applications
- Export your data as tab separated file (.tsv)



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Unencrypted and uncompressed

Common in your research community

Preferred formats

- .tsv, comma separated file (.csv), .txt

Track different **versions** of your documents

File versioning

Versioning refers to saving new copies of your files when you make changes allowing you to reverse or roll back those changes or retrieve specific versions of your files later

Simple file versioning

Simple software options

Advanced software options

Simple file versioning

Manually save new versions when you make significant changes

- Include a version number, e.g. "v01," "v02," or "v02.1" into file names

This works well if…

- No need to keep lots of different versions
- Only one person working on the files OR every collaborator knows what each version contains
- Files are accessed from one location only

Simple software options: cloud services

Google Drive's word processing, spreadsheet and presentation

Any time you edit files, new versions are saved as you go

Version information includes who was editing the file and when the new version was created

OneDrive

Up to 1TB of available space for University of Cambridge members

Dropbox

Online and software to install locally

Business option, £55-66 for unlimited space

www.data.cam.ac.uk

Advanced software options: version control

Version control is the management of changes to documents, computer programs, and other collections of information.

Changes are usually identified by a number named the "**revision number**".

Each revision is associated with a **timestamp** and the **person** making the change.

Revisions can be compared, restored, and with some types of files, merged.

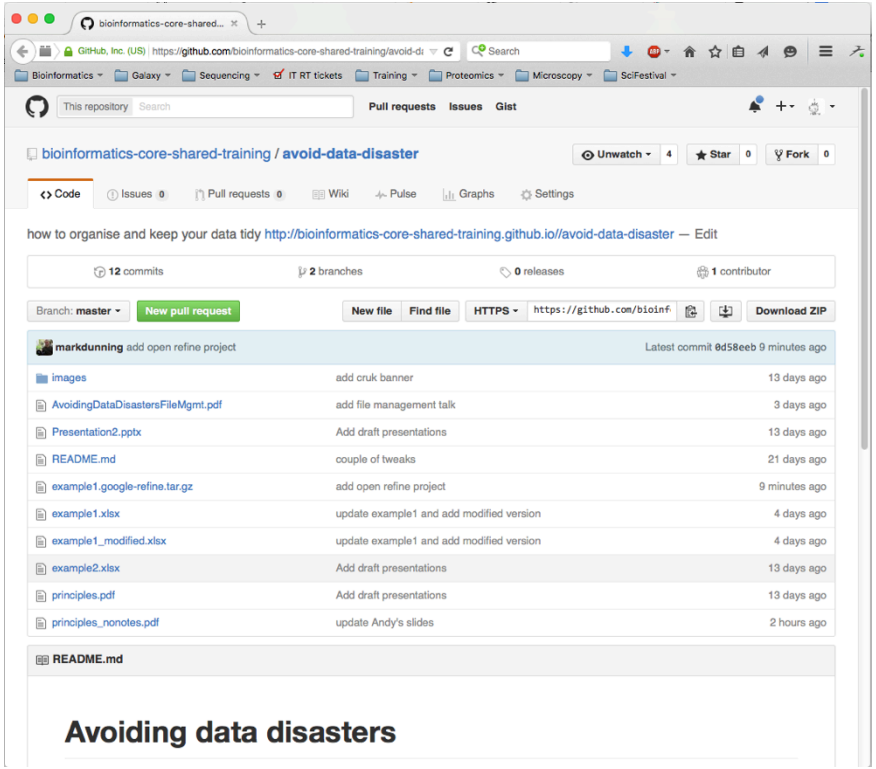
Systems like **Git** and **Subversion** can be used to do version control of files (e.g. computer code). Many people share projects on **GitHub**.

Course materials on GitHub

https://github.com/

Search for repository:

avoid-data-disaster
or
bioinformatics-core-shared-training



Next GitHub course

https://kirstiejane.github.io/friendly-github-intro

www.bit.ly/GithubCam

Friday 13th January 2017 13:00 - 17:30

Spreadsheets and Databases

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Spreadsheets

The good …

Easy to **browse**, **manually enter and edit** data, and to **share** copies of files.

Fine control over **visual presentation**.

Very **flexible structure**.

Formulas make it a **living document**.

Built-in suite of helpers for charts, comments, spell checking …

Relatively **easy to learn**.

The not so good …

Lack data integrity. Data is not necessarily data.

Not good for **working with multiple datasets** and answering **detailed questions** about your data.

Do not scale. As spreadsheet size increases, performance suffers. Limits on cells (and spreadsheet) sizes.

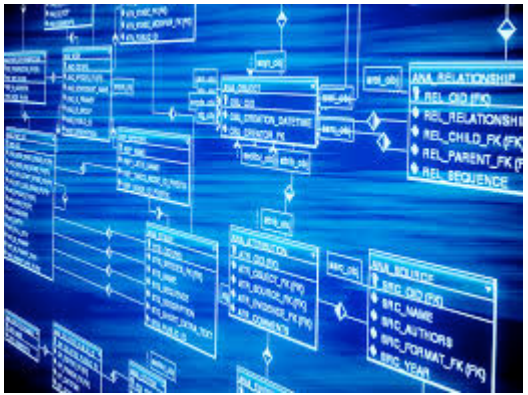
Collaborating is hard. It is not easy to do version control.

Databases

System to store data (think of a huge library) and a **mechanism for searching** (think of a librarian).

The **Structured Query Language (SQL)** is a syntax for requesting things from the database (the language librarian speaks).

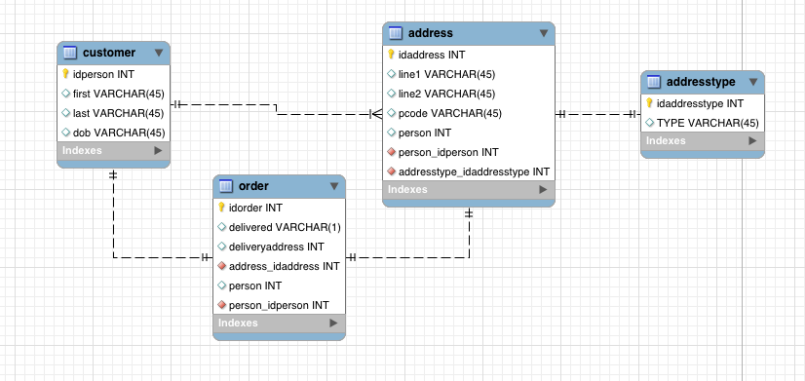
Relational databases consider **relationships between data**.



The database mantra

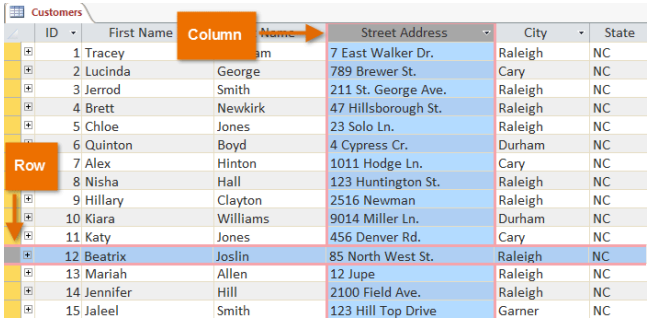
A database encourages/forces you to **store data logically**.

Every database consists of **tables and relationships** between them. Think of a table like a single spreadsheet. Just like in Excel, a table consists of **columns** and **rows**.



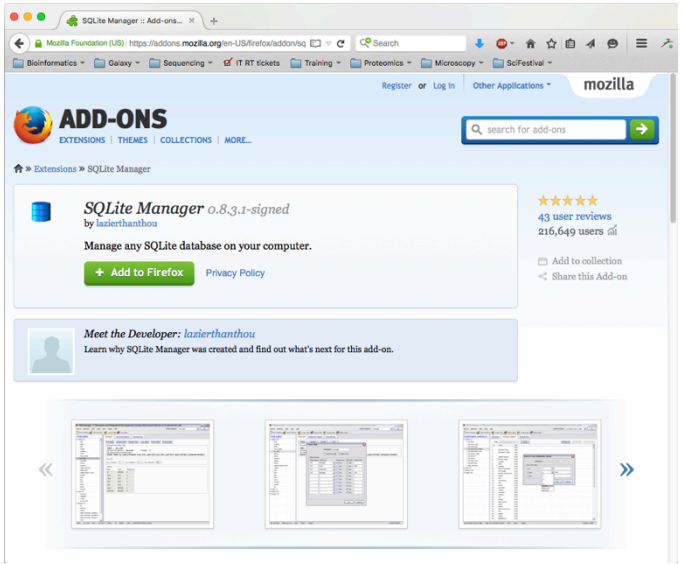
Columns define the structure of your data. Every column is given a **name** (like ‘Address’) and a defined **column type** (like ‘Integer,’ ‘Date’, ‘Date +Time’, or ‘Text’).

Rows contain the actual data in the table and have a value for every column. Once you establish the column structure, you can add in as many rows as you like.



Where to start?

SQLite is a good way to get started. You can install the “**SQLite Manager**” add-on for Firefox and start from within your browser.



University courses www.training.cam.ac.uk
search: relational database

Relational Database Design
http://training.cam.ac.uk/event/1853176
Monday 9th January 2017 9:00 – 13:00

Access

SQLite

MySQL®

Reference

Rosie Higman and Research data management team

www.data.cam.ac.uk

File management best practices

STANFORD UNIVERSITY LIBRARIES

http://library.stanford.edu/research/data-management-services/data-best-practices

Spreadsheets and Databases

http://schoolofdata.org/2013/11/07/sql-databases-vs-excel/