Data organisation

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Outline

- Normalisation
- Practice

Data Tables

- Records in rows
- Variables in columns (put id variables first)
- Good idea to use freeze panes in big spreadsheets

Name	Date	Weight	Sex
Jane Doe	1 Jan	160	Female
Jane Doe	1 Feb	150	Male
Jane Doe	1 Mar	140	Female

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Normalisation

- Minimise redundancy and inconsistency
- Each “fact” stored only once
- May not be optimal for entry or analysis
- Multiple datasets, each containing information about one “entity”

Normal forms

- 5 different levels of normalisation
- We'll look at first three

Less duplication

More consistent

Normalisation

Small pieces joined together

Harder to edit

Harder to view

Tables must be rectangular

1st normal form

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- Each record has to be unique / identifiable
- each entry has to be atomic (number, string, date, ...)

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Keys

- Key: set of fields that identify a record (so must be unique)
- Like indices on a random variable
- May be single or composite
- Fixed by design of experiment (known in advance)
- As compared to measurements/measured variables

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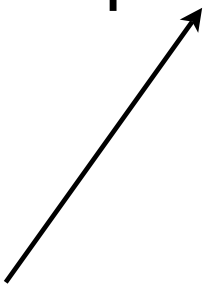

Need a composite key!

Relationships

- Keys identify an object
- And allow us to see relationships in the data
- 1-to-1, 1-to-many, many-to-many

The key, the whole key and nothing but the key

2nd normal form

- table has to be in 1st normal form and
- **whole key** necessary to describe non-key field in table

- Violated when: Fact is about a subset of a key (in composite keys)
- To fix: create another table

Person	**Date**	Weight	Sex
James	1 Jan	205	Male
James	1 Feb	195	Male
James	1 Mar	190	Male

Person	**Date**	Weight	Sex
James	1 Jan	205	Male
James	1 Feb	195	Male
James	1 Mar	190	Female

Person	**Date**	Weight	Age
James	1 Jan	205	20
James	1 Feb	195	20
James	1 Mar	190	20

3rd normal form

- tables are in 2nd normal form and
- non-key fields are not facts about other non-key fields

Person	Zip Code	State
Hadley Wickham	50014	Iowa
John Smith	90210	California
...	...	...

Practice

Download file data-organisation-practice.xls from
streaming.stat.iastate.edu/~stat480
and transfer into 2nd normal form.

Make notes, which fields are violating the 3rd normal form