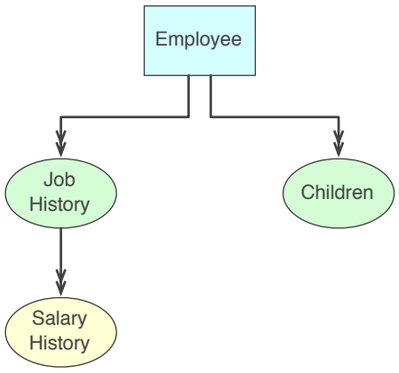
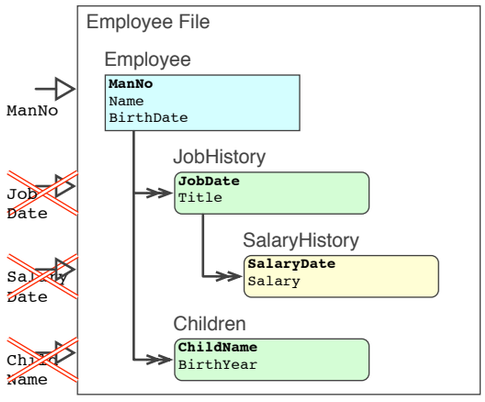
1.4. Normal Form

Fig 3(a) Unnormalised Set (Hierarchical Model)



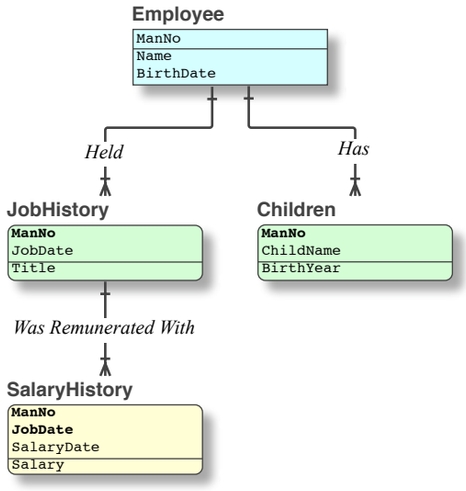
- The open arrow indicates a pointer (not a Key)
- The double-head indicates many child records, forming a chain, with first and last pointers in the parent record
  - That is, a Repeating Group
  - That is, a **Non-simple Domain**.

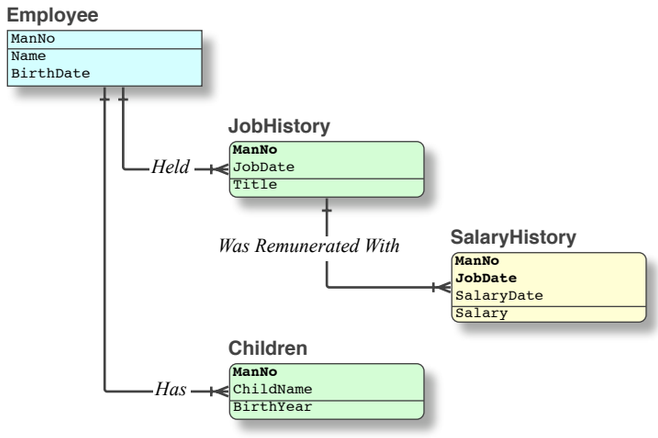


This is the Hierarchical Model of the example given in the text

- As such (a model), it is logical, an abstraction of the physical, those details are excluded. It shows the information that a programmer requires: record types; fields; and navigation paths (hierarchy)
- The closed arrow indicates access by Key, ISAM (not pointer)
- **Access Path Dependence** means that:
  - there is no direct access to the subordinate record types
  - one had to access the single Key, then navigate the chain
  - such **Access Paths** had to be known, and programmed
  - thus causing severe limitations, a complete lack of **Data Independence**

Fig 3(b) Normalised Set (Relational Model)





- The tables and relations are that given by Codd in the text
  - Any other structure (eg. Independent tables or Non-identifying relations) is a failure to understand his words.
  - Further, such tables will have substantially less Relational Integrity, Power, and Speed.
- This has no **Access Path Dependence**
  - Each table can be accessed individually, by its own Key (or part thereof), joined as required, etc
- This has maximal **Data Independence** (wrt these elements)
- Of course the relations define the logical structure of any model, and the diagrammatic layout should display that. Two layouts (as distinct from configuration, or physical structure) are given, both of which are valid because they clearly reflect the hierarchy *that exists in the data*. Any other arrangement is invalid, because the data hierarchy is not reflected.
  - the left shows the data hierarchy in the style that is typical of an organisation chart, it s noteworthy that it matches the tree given in Fig 3(a)
  - the right employs the genealogical or Explorer window style, it matches the logical storage of the Hierarchical Model