Chapter 2: Syntax for Data

Semistructured Data: self-describing or schemaless.

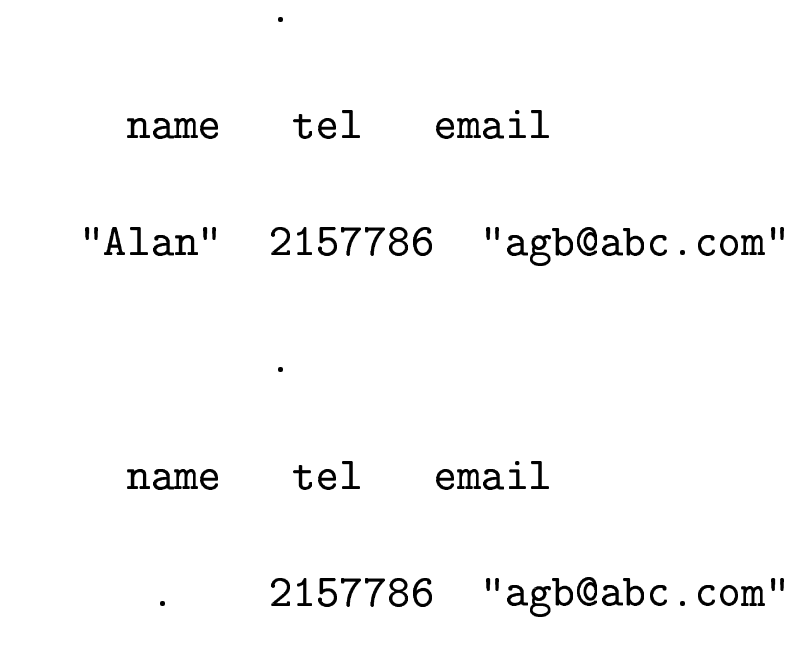
```
{name: "Alan", tel: 2157786, email: "agb@abc.com"}
```

set of label-value pairs;

The values themselves may be structures; ex:

```
{name: {first: "Alan", last: "Black"},
 tel: 2157786,
 email: "agb@abc.com"
}
```

Graphical notation: nodes representing objects connected by edges (labeled with the label) to the values.



Duplicate labels will be allowed:

```
  {name: "Alan", tel: 2157786, tel: 2498762"}
```

The syntax is easily generalized to describe sets of objects/tuples:

```
{ person:
    {name: "Alan", tel: 2157786, email: "agb@abc.com"},
  person:
    {name: "Sara", tel: 2136877, email: "sara@math.xyz.com"},
  person:
    {name: "Fred", tel: 7786312, email: "fds@acme.co.uk"}
}
```

```
  All objects/tuples within a set need not have the same structure:

  { person:
      {name: "Alan", tel: 2157786, email: "agb@abc.com"},
    person:
      {name: {first: "Sara", last: "Green"},
       tel: 2136877,
       email: "sara@math.xyz.com"}
      },
    person:
      {name: "Fred", tel: 7786312, height: 183}
  }

Base Types: numbers, strings, labels
  there could be others, but in this book we
     limit ourselves to these three
```

Representing Relational Databases:

```
{r1: {row: {a: a1, b: b1, c: c1},
      row: {a: a2, b: b2, c: c2}
     },
 r2: {row: {c: c2, d: d2},
      row: {c: c3, d: d3},
      row: {c: c4, d: d4}
     }
 }
```

This data represents two relations r1 and r2.

See Figure 2.3 on Page 15 for 3 tree structures representing the same data;

Representing Object Databases:

```
  {person: &o1{name: "Mary",
               age: 45,
               child: &o2,
               child: &o3
              },
   person: &o2{name: "John",
               age: 17,
               relatives: {mother: &o1,
                           sister: &o3}
              },
   person: &o3{name: "Jane",
               country: "Canada",
               mother: &o1
              }
  }
```

See Figure 2.4 for graphical notation. The names &o1, &o2, &o3 are called Object Identities (oids).

Each node has a unique oid. If a node is not assigned an oid by the user, the system automatically creates one for the node.

ex: {a: &o1{b: &o2 5}}
and {a: &o1{b: 5}}
are isomorphic

In {a: {b: 3}, a: {b: 3}}
there are two objects with different oids!

Syntax for semi-structured data expressions (ssd):

```
  <ssd-expr> ::== <value> | oid <value> | oid
  <value>    ::== atomicvalue | <complexvalue>
  <complexvalue> ::== { label:<ssd-expr>, ..., label:<ssd-expr> }
```

oids are written with an ampersand followed by a string.

Def: An oid o is DEFINED in an ssd-expression s if
either s is of the form o v for some atomic value v
or s if of the form {l1:e1, ..., ln:en} and o is defined
in one of e1, ..., en.
If an oid occurs in s in any other way,
we say that it is USED in s.

Def: ssd-expression s is CONSISTENT if
(a) Any object identifier is defined at most once in s and
(b) If an object identifier o is used in s, it must be defined
in s