



Computational Linguistics (INF2820 — Data Abstraction)

(funcall #'equal 'eq 'equal) → nil

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Abstract Data Types

- `defstruct()` creates a new *abstract data type*, encapsulating a structure:

```
? (defstruct rule  
  lhs rhs)  
→ RULE
```

- `defstruct()` defines a new *constructor*, *accessors*, and a type *predicate*:

```
? (setf *foo* (make-rule :lhs 'S :rhs '(NP PP)))  
→ #S(RULE :LHS S :RHS (NP PP))
```

```
? (listp *foo*) → nil
```

```
? (rule-p *foo*) → t
```

```
? (setf (rule-rhs *foo*) '(NP VP)) → (NP VP)
```

```
? *foo* → #S(RULE :LHS S :RHS (NP VP))
```

- abstract data types *encapsulate* a group of related data (i.e. an 'object').



Vectors and Arrays

- Multidimensional 'grids' of data can be represented as *vectors* or *arrays*;
- `(make-array (rank1 ... rankn))` creates an array with n dimensions;

```
? (setf *foo* (make-array '(2 5) :initial-element 0))
```

```
→ #((0 0 0 0 0) (0 0 0 0 0))
```

```
? (setf (aref *foo* 1 2) 42) → 42
```

	0	1	2	3	4
0	0	0	0	0	0
1	0	0	42	0	0

- all dimensions count from zero; `aref()` accesses one individual cell;
- one-dimensional arrays are called *vectors* (abstractly similar to lists).

