

JSON



JSON as an XML Alternative

- JSON is a lightweight alternative to XML for data interchange
- JSON = JavaScript Object Notation
 - It's really language independent
 - most programming languages can easily read it and instantiate objects or some other data structure
- Defined in [RFC 4627](#)
- Started gaining tracking ~2006 and now widely used
- <http://json.org/> has more information

Values

- Strings
- Numbers
- Integer
- Booleans

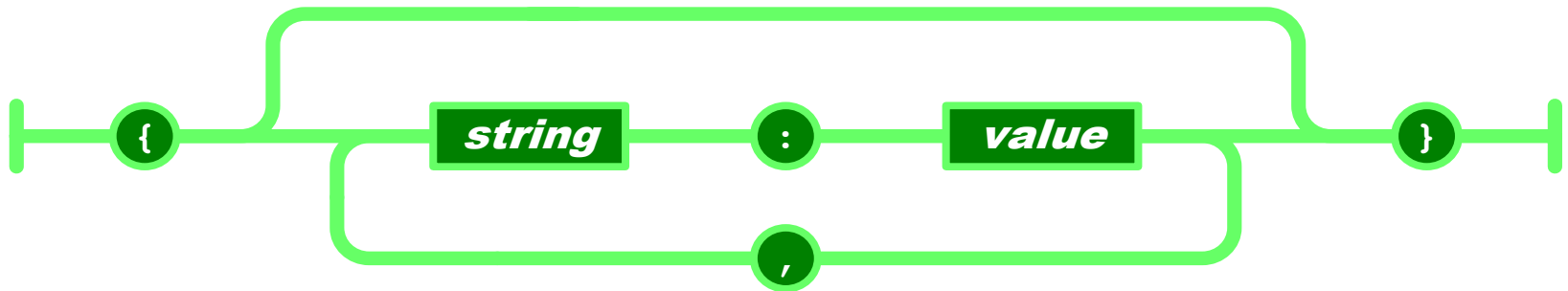
- Objects
- Arrays

- **`null`**

Object

- Objects are unordered containers of key/value pairs
- Objects are wrapped in { }
- , separates key/value pairs
- : separates keys and values
- Keys are strings
- Values are JSON values

Object



Object

```
{  
    "name":      "Jack B. Nimble",  
    "at large":  true,  
    "grade":     "A",  
    "format": {  
        "type":      "rect",  
        "width":     1920,  
        "height":    1080,  
        "interlace": false,  
        "framerate": 24  
    }  
}
```

Array

- Arrays are ordered sequences of values
- Arrays are wrapped in `[]`
- `,` separates values
- JSON does not talk about indexing.
 - An implementation can start array indexing at 0 or 1.

Array



Array

```
["Sunday", "Monday", "Tuesday",  
 "Wednesday", "Thursday", "Friday",  
 "Saturday"]
```

```
[  
  [0, 1, 0],  
  [1, 0, 0],  
  [0, 0, 1]  
]
```

Arrays vs Objects

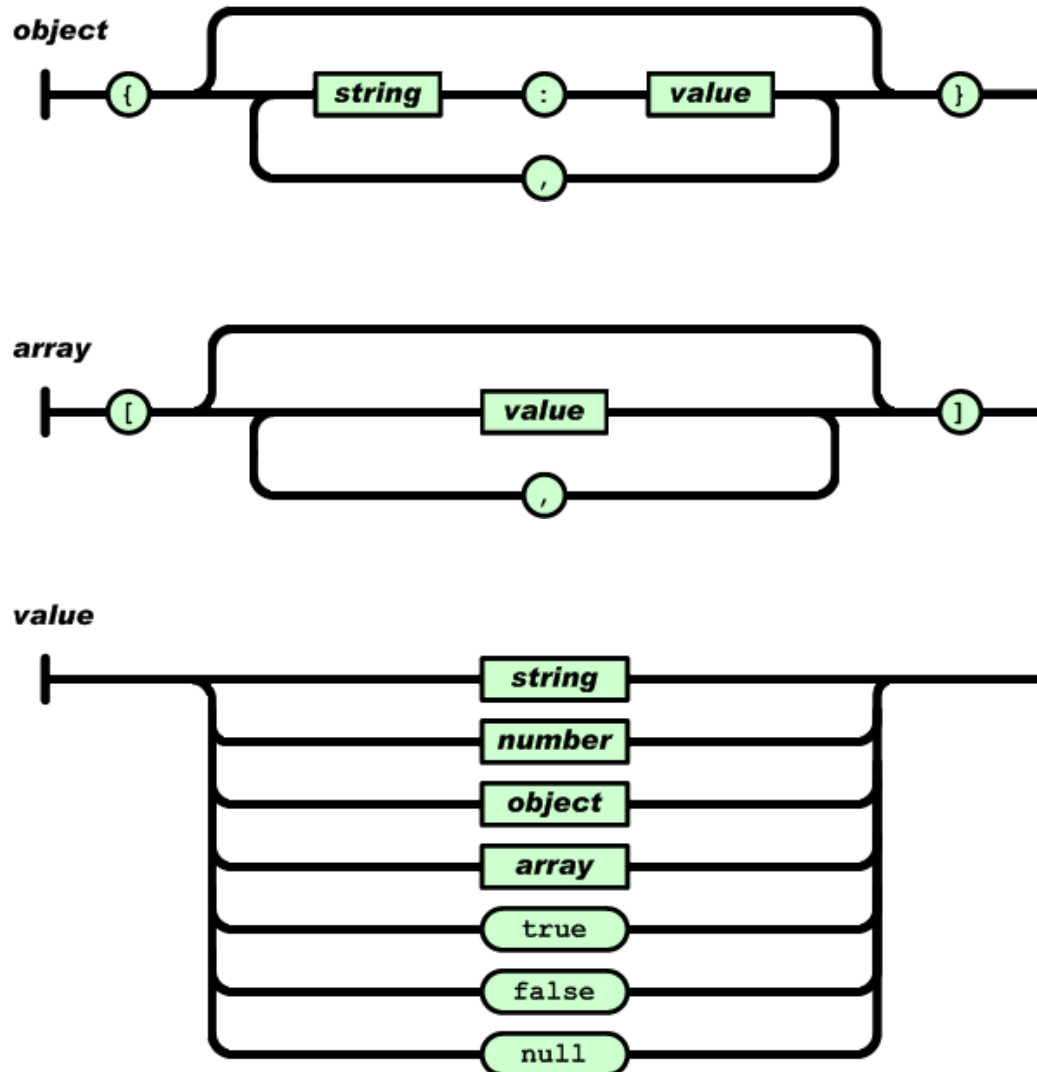
- Use objects when the key names are arbitrary strings.
- Use arrays when the key names are sequential integers.

Example

```
{ "firstName": "John",  
  "lastName" : "Smith",  
  "age"       : 25,  
  "address"   :  
    { "streetAdr" : "21 2nd Street",  
      "city"      : "New York",  
      "state"     : "NY",  
      "zip"       : "10021"},  
  "phoneNumber":  
    [ { "type" : "home",  
        "number": "212 5551234"},  
      { "type" : "fax",  
        "number" : "646 5554567"} ]  
}
```

- This is a JSON object with five keyvalue pairs
- Objects are wrapped by curly braces
- There are no object IDs
- Keys are strings
- Values are numbers, strings, objects or arrays
- Ararys are wrapped by square brackets

The BNF is simple



Evaluation

- JSON is simpler than XML and more compact
 - No closing tags, but if you compress XML and JSON the difference is not so great
 - XML parsing is hard because of its complexity
- JSON has a better fit for OO systems than XML
- JSON is not as extensible as XML
- Preferred for simple data exchange by many
- Less syntax
- Schemas? We don't need no schemas!
- Transforms? Write your own.

JSON & XML

```
<?xml version="1.0" encoding="ISO-8859-1"?>
<bookstore id="1">
  <book category="cooking">
    <title lang="en">Everyday Italian</title>
    <author>Giada De Laurentiis</author>
    <year>2005</year>
    <price>30.00</price>
  </book>
  <book category="cook">
    <title lang="en">Everyday Italian</title>
    <author>Giada De Laurentiis</author>
    <year>2005</year>
    <price>30.00</price>
  </book>
</bookstore>
```

```
{
  "id": 1,
  "books": [
    {
      "category": "cooking",
      "title": {
        "lang": "en",
        "text": "Everyday"
      },
      "author": "giada",
      "year": 2005,
      "price": 30
    },
    {
      "category": "cooking",
      "title": {
        "lang": "en",
        "text": "Everyday"
      },
      "author": "giada",
      "year": 2005,
      "price": 30
    }
  ]
}
```