

1 Problem 1: File Type: *.json*

1.1 Definition

.json(JavaScript Object Notation) is a lightweight data-interchange format. It often looks like this:

```
{
  "first_name": "George",
  "last_name": "Washinton",
  "address": {
    "street_address": "1600 Pennsylvania Avenue NW",
    "city": "Washington",
    "state": "DC",
    "postal_code": "20500"
  }
}
```

1.2 Common Usage

This file type is widely used in web application with servers.

1.3 Pros

- Easy organizing and readability for human.
- Easy parsing and generation for machine.[1]
- Using conventions in so many programming languages that make *.json* an ideal data-interchange language.

1.4 Cons

- Unfriendly to SQL databases. Mostly all NoSQL databases use JSON format data.[2]
- *XML* supports comments, while *.json* does not.

1.5 Evolution

- The JSON.org website was launched in 2001.
- In October 2013, Ecma International published the first edition of its JSON standard ECMA-404.
- In November 2017, ISO/IEC JTC 1/SC 22 published ISO/IEC 21778:2017 as an international standard. [3]
- JSON5 is an extension of JSON, which was started in 2012 and finished in 2018 with version 1.0.0. [4]

2 Programming Language: *R*

2.1 Definition and Common Usage

R is a free software environment for statistical computing and graphics. It compiles and runs on a wide variety of UNIX platforms, Windows and MacOS. [5]

R is used among data miners, bioinformaticians and statisticians for data analysis and developing statistical software.[6]

R supports procedural programming. Due to its S heritage, R has stronger object-oriented programming facilities than most statistical computing languages.

2.2 Pros

- R and its libraries implement various statistical techniques.
- For computationally intensive tasks, C, C++, and Fortran code can be linked and called at run time.
- Another of R's strengths is static graphics; it can produce publication-quality graphs that include mathematical symbols.[7]
- R's capabilities are extended through user-created packages.[8]

2.3 Cons

R is specifically designed for doing statistical analysis, while other languages, like Python, are more general-purpose programming languages.

2.4 Evolution

- Was created freely by statisticians Ross Ihaka and Robert Gentleman in June 1995.
- The Comprehensive R Archive Network (CRAN) was founded in 1997 by Kurt Hornik and Fritz Leisch to host R's source code, executable files, documentation, and user-created packages.[9]

References

- [1] Introducing JSON
- [2] Working With JSON in SQL
- [3] JSON Wikipedia
- [4] The JSON5 Data Interchange Format
- [5] The R Project for Statistical Computing
- [6] Giorgi, Federico M.; Ceraolo, Carmine; Mercatelli, Daniele (27 April 2022). "The R Language: An Engine for Bioinformatics and Data Science". *Life*. 12 (5): 648. Bibcode:2022Life...12..648G. doi:10.3390/life12050648. ISSN 2075-1729. PMC 9148156. PMID 35629316.
- [7] What is R?
- [8] Hadley, Wickham; Bryan, Jenny. "R packages: Organize, Test, Document, and Share Your Code"
- [9] Hornik, Kurt (2012). "The Comprehensive R Archive Network". *WIREs Computational Statistics*. 4 (4): 394–398. doi:10.1002/wics.1212. ISSN 1939-5108. S2CID 62231320.