Data Persistence

Files and Data Formats

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Object Oriented Programming ESPE

Data persistence

- Data will last
- Data will stay through time
- Data will persist
- Files
  - Txt, csv, XML, JSON, …
- Data bases
  - SQL, No-SQL

Data Persistence: Text Files

Plain text

- The programmer must organize the information
- The programmer decides what separator is used
  - Student: id, name, birthDate, GPA
  - student.txt
    - 1:Edison Lascano:17/12/1970:9.0
    - 2:Jeremy Cuadrado:06/02/2003:7.5
    - 3:Juan Pinza:15/03/2004:8.0

```
1:Edison Lascano:17/12/1970:9.0
2:Jeremy Cuadrado:06/02/2003:7.5
3:Juan Pinza:15/03/2004:8.0
4:Lady Cajilima:10/02/1999:8.1
```

Data Persistence: Text Files

Plain text

- Issues
  - Information can be confused some times
  - The changes in data may be overridden
  - Programming is going to be long and difficult
  - We have to separate each content of every line
  - The separator can be used as part of the data

Data Persistence: Files

CSV : Comma Separated Values

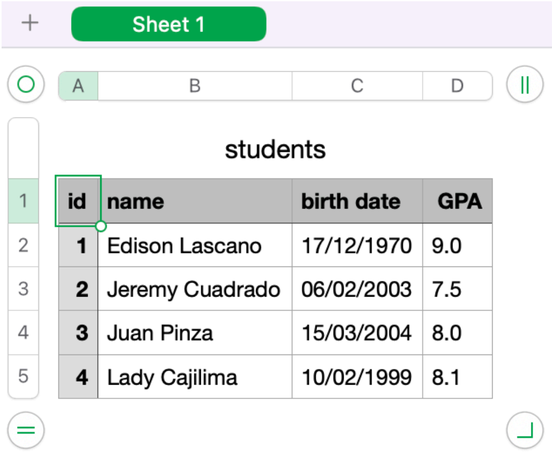
- The programmer must use
  - , comma
  - ; semicolon
- Student: id, name, birthDate, GPA
- student.csv
  - 1,Edison Lascano,17/12/1970,9.0
  - 2,Jeremy Cuadrado,06/02/2003,7.5
  - 3,Juan Pinza,15/03/2004,8.0

```
1,Edison Lascano,17/12/1970,9.0
2,Jeremy Cuadrado,06/02/2003,7.5
3,Juan Pinza,15/03/2004,8.0
4,Lady Cajilima,10/02/1999,8.1
```

Data Persistence: Files

CSV : Comma Separated Values

- The programmer must program everything
- There can be libraries
- These files can opened using MS Excel or any other spreadsheets program



	id	name	birth date	GPA
2	1	Edison Lascano	17/12/1970	9.0
3	2	Jeremy Cuadrado	06/02/2003	7.5
4	3	Juan Pinza	15/03/2004	8.0
5	4	Lady Cajilima	10/02/1999	8.1

Data Persistence

XML : eXtensible Markup Language

- Main use of XML files is for configuration, they can also be used for data storage
- Structure of an XML file
  - <tag attribute="value">
    - text (value or data)
  - </tag>
- Student: id, name, birthDate, GPA
- student.xml
  - <student>
  - <id>1</id>
  - <name>Edison Lascano</name>
  - <birthDate>17/12/1970</birthDate>
  - <gpa>9.0</gpa>
  - </student>

```
<students>
 <student>
   <id>1</id>
   <name>Edison Lascano</name>
   <birthDate>17/12/1970</birthDate>
   <gpa>9.0</gpa>
 </student>
 <student>
   <id>2</id>
   <name>Jeremy Cuadrado</name>
   <birthDate>06/02/2003</birthDate>
   <gpa>7.5</gpa>
 </student>
 <student>
   <id>3</id>
   <name>Juan Pinza</name>
   <birthDate>15/03/2004</birthDate>
   <gpa>8.0</gpa>
 </student>
 <student>
   <id>4</id>
   <name>Lady Cajilima</name>
   <birthDate>10/02/1999</birthDate>
   <gpa>8.1</gpa>
 </student>
</students>
"students.xml" 31L, 638B written
```

Data Persistence

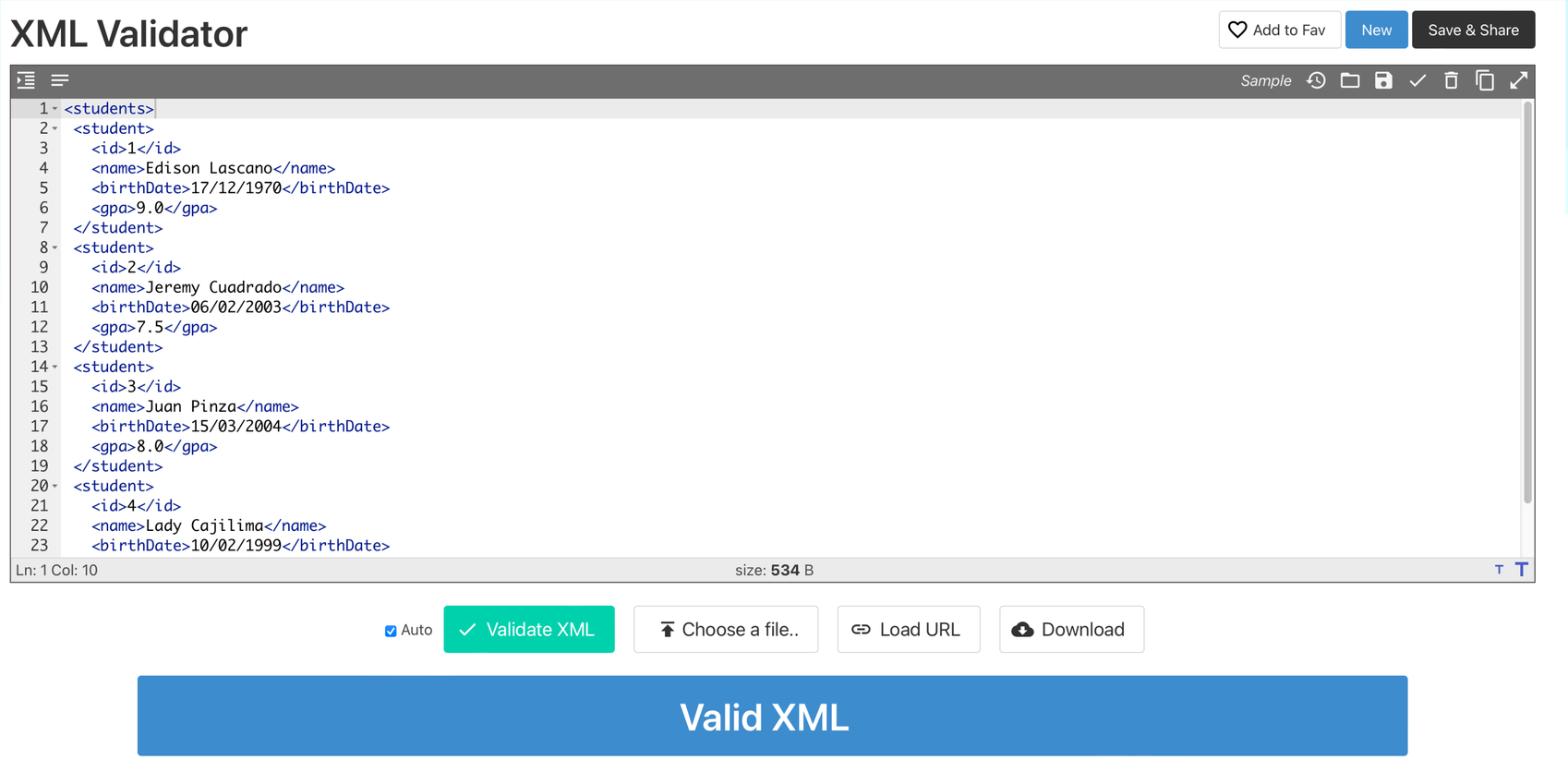
XML : eXtensible Markup Language

- Advantages
  - Platform independent
  - Data is very well separated, better organization
  - Data specific
  - Human language, more than a computer language
  - Readable, xml can be validated
  - Standard , there are many libraries
- Disadvantages
  - More space is needed, very large files
  - XMl syntax is redundant

Data Persistence

XML : eXtensible Markup Language

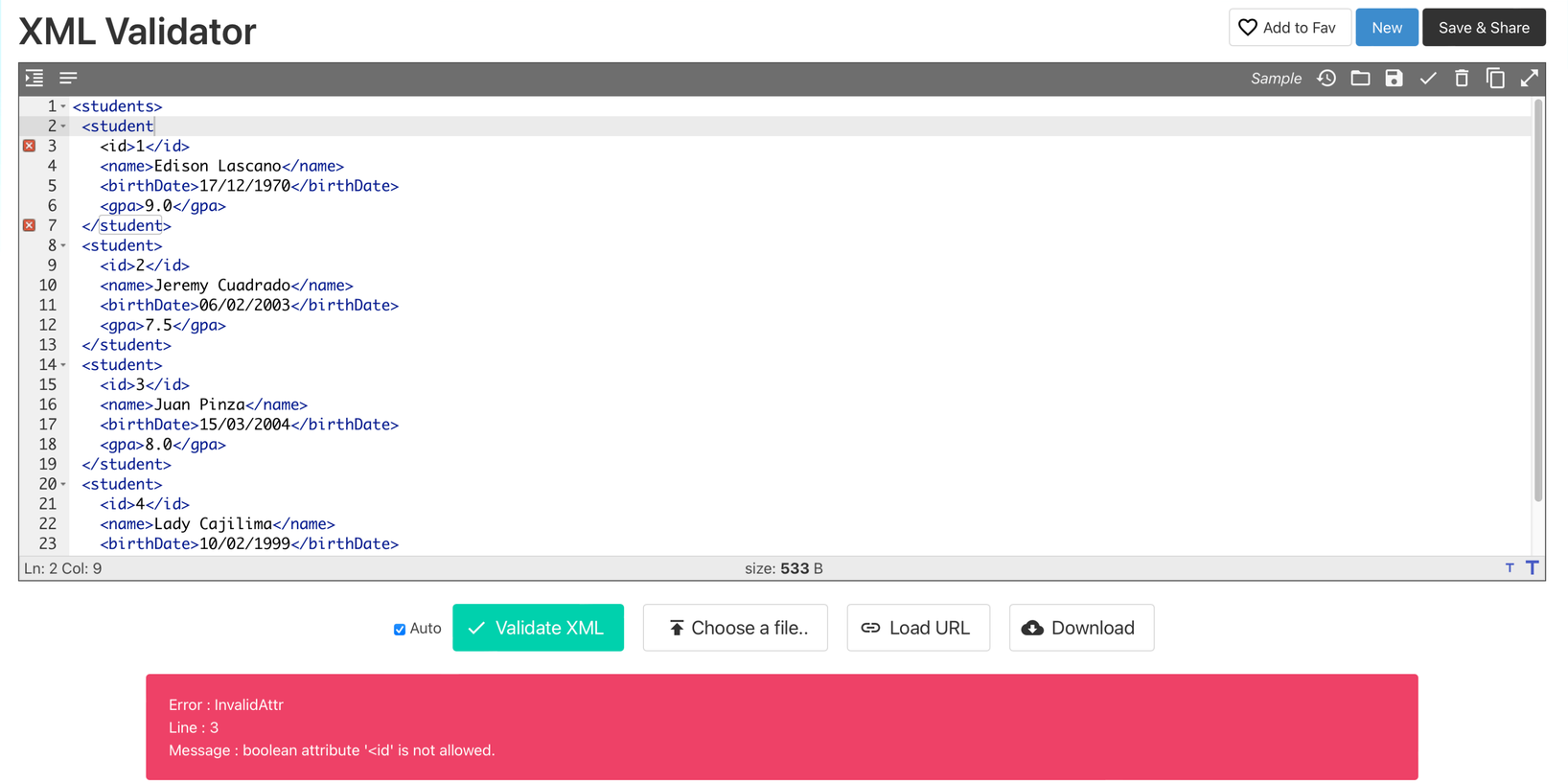
- It can be validated
-



Data Persistence

XML : eXtensible Markup Language

- It can be validated
- https://codebeautify.org/xmlvalidator



Data Persistence

JSON : JavaScript Object Notation

- Main use of JSON is for data sharing
- Data format
- Structure of a JSON file
  - [{
    - “key”:”value”
  - }, { …}]
- Student: id, name, birthDate, GPA
- student.json
  - {“id”:1, ”name”:”Edison Lascano”, “birthDate”:”17/12/1970”, “GPA”:9.0}

```
{"students":[
 {"id":1,"name":"Edison Lascano","birthDate":"17/12/1970","gpa":9.0},
 {"id":2,"name":"Jeremy Cuadrado","birthDate":"06/02/2003","gpa":7.5},
 {"id":3,"name":"Juan Pinza","birthDate":"15/03/2004","gpa":8.0},
 {"id":4,"name":"Lady Cajilima","birthDate":"10/02/1999","gpa":8.1}
]}
```

Data Persistence

JSON : JavaScript Object Notation

- Lightweight format
- transparent
- Widely used in web applications, mobile apps, and any other client server application
- Understandable
- Readable
- Libraries for any programming language

Data Persistence

JSON : JavaScript Object Notation

- It can be validated
- https://jsonlint.com/

```
{
    "students": [{
            "id": 1,
            "name": "Edison Lascano",
            "birthDate": "17/12/1970",
            "gpa": 9.0
        },
        {
            "id": 2,
            "name": "Jeremy Cuadrado",
            "birthDate": "06/02/2003",
            "gpa": 7.5
        },
        {
            "id": 3,
            "name": "Juan Pinza",
            "birthDate": "15/03/2004",
            "gpa": 8.0
```

Validate JSON | Clear | Support JSONLint for $2/Month

Results

Valid JSON

Data Persistence

JSON : JavaScript Object Notation

- It can be validated
- https://jsonlint.com/

```
1  {
2      "students": "id": 1,
3      "name": "Edison Lascano",
4      "birthDate": "17/12/1970",
5      "gpa": 9.0
6  }, {
7      "id": 2,
8      "name": "Jeremy Cuadrado",
9      "birthDate": "06/02/2003",
10     "gpa": 7.5
11 }, {
12     "id": 3,
13     "name": "Juan Pinza",
14     "birthDate": "15/03/2004",
15     "gpa": 8.0
16 }, {
17     "id": 4,
18     "name": "Lady Cajilima",
```

Validate JSON | Clear | Support JSONLint for $2/Month

Results

```
Error: Parse error on line 2:
{       "students": "id": 1,    "name": "Ediso
------------------^
Expecting 'EOF', '}', ',', ']', got ':'
```