

CSCI235 – Database Systems

JSON and BSON

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CSCI235 – Database Systems, 14JSON and BSON

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JSON – What is it?
BSON – What is it?

JSON – What is it?

- **Java Script Object Notation (JSON)** is a lightweight data interchange format.
- It is based on a subset of the JavaScript programming.
- Language Standard ECMA-262 3rd Edition – December 1999
- JSON is build on two structures:
 - A **collection** of **name:value** pairs – **object**
 - An **ordered list of values** - **array**

JSON – What is it?

- **Object** is an unordered set of **name:value** pairs

```
{"firstname" : "James"}
```

```
{"city" : "Sydney", "street" : "Victoria", "bldg" : 25}
```

```
{"number" : 25, "isOdd" : true, "nothing" : null}
```

```
{ }
```

JSON – What is it?

- **Value** is either **a string** or **a number** or **true** or **false** or **null** or **an object** or **an array**.

```
{"single quote" : "\"", "back slash" : "\\",  
  "forward slash" : "\/", "line feed" : ""\u000A" }
```

```
{"fraction" : 0.25, "true" : true, "false" : false,  
  "nothing": null}
```

```
{"full name" : {"first name" : "James", "initials" :  
  null, "last name" : "Bond"}, "number" : "007"}
```

JSON – What is it?

- **Value** is either **a string** or **a number** or **true** or **false** or **null** or **an object** or **an array**.

```
{"colours" : ["red", "green", "blue"]}
```

```
{"numbers" : [10, 20, 30, 40, 50]}
```

JSON – What is it?

- **Array** is a sequence of **values**

```
{"2dim array" : [ [11, 12, 13, 14],  
                  [21, 22, 23, 24],  
                  [31, 32, 33, 34] ]}
```

```
{"array of objects" : [ {"name" : "James Bond"},  
                        {"name" : "Harry Potter"},  
                        {"name" : "Robin Hood"} ]}
```

```
{"array of truth" : [true, false, true, true]}
```

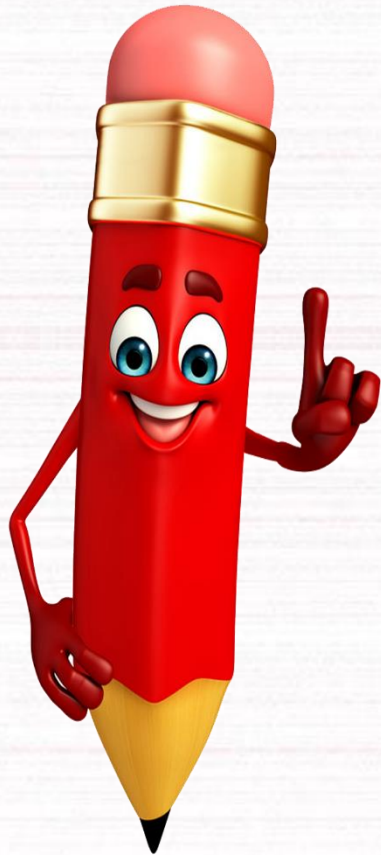

JSON – What is it?

- **Array** is a sequence of **values**

```
{"array of nothing" : [null, null, null, null, null] }
```

```
{"empty array" : [ ]}
```

```
{"array of varieties" : [1, "one", true, ["a", "b", "c"] ]}
```



JSON – What is it?

BSON – What is it?

BSON – What is it?

- Binary JSON (BSON) is a computer data interchange format used mainly as a data storage and network transfer format in the MongoDB database system.
- BSON is a binary encoded serialization of JSON-like documents (objects).
- BSON includes the extensions not in JSON that allow for representation of data types.
- For example BSON has a Date type and a BinData type.
- The common data types includes: null, Boolean, number, string, array, embedded document(object)
- The new data types include: date, regular expression, object id, binary data, code

BSON – What is it?

```
{"nothing" : null}
```

```
{"truth" : false}
```

```
{"pi" : 3.14}
```

```
{"int" : NumberInt("345")}
```

```
{"long" : NumberLong("1234567890987654321")}
```

```
{"greeting" : "Hello!"}
```

```
{"pattern" : /(Hi|Hello)!/}
```

```
{"date" : new Date("2020-10-3")}
```

```
{"array of varieties" : [1, "one", true, ["a", "b", "c"]]}
```

BSON – What is it?

- Every document (object) in BSON must have an `"_id"` key!
- `"_id"` key's value can be of any type.
- A default value of `"_id"` key is `ObjectId()`.
- In a collection of documents(objects) every document(object) must have a unique value for `"_id"`.
- If a document has no `"_id"` key then when it is inserted into a collection `"_id"` key is automatically added to the document.

BSON – What is it?

```
{"_id" : ObjectId()}
```

```
{"_id" : ObjectId("507f191e810c19729de860ea")}
```

```
{"_id" : ObjectId("123456789012345678901234")}
```

References

- Introducing JSON, <http://www.json.org/>
- BSON, <http://bsonspec.org/>
- <https://docs.mongodb.com/manual/>
- Chodorow K. MongoDB The Definitive Guide, O'Reilly, 2013