JSON-JavaScript Object Notation.

JSON

- JSON stands for JavaScript Object Notation.
- It is an open standard data-interchange format.
- It is lightweight and self describing.
- It is originated from JavaScript.
- JSON is text, written with JavaScript object notation.
- It is easy to read and write than XML. For AJAX applications, JSON is faster and easier than XML.
- It is language independent (interoperability).
- It supports array, object, string, number and values.
- The format was specified by Douglas Crockford.
- The JSON file must be save with .json extension.
- The MIME type for JSON text is "application/json"

JSON and XML

- JSON and XML are human readable formats and are language independent. They both have support for creation, reading and decoding in real world situations.
- **JSON**

```
{"car":{"company": “Volkswagen”, "name": "Vento", "price": 800000 }}
```

- **XML**

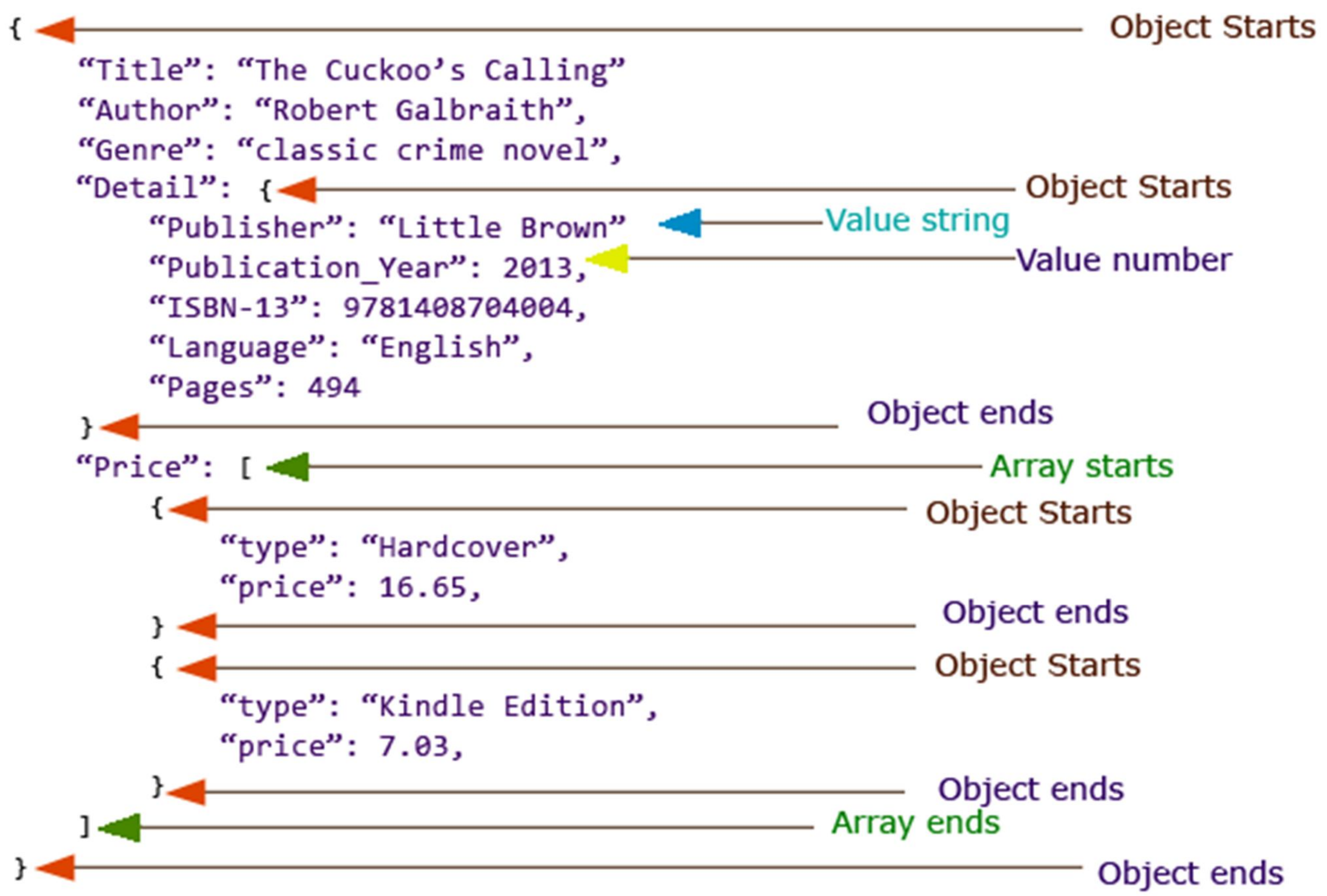
```
<car>
<company>Volkswagen</company>
 <name>Vento</name>
<price>800000</price>
 </car>
```

A syntax for storing and exchanging data

- When exchanging data between a browser and a server, the data can only be text.
- JSON is text, and we can convert any JavaScript object into JSON, and send JSON to the server.
- We can also convert any JSON received from the server into JavaScript objects.
- This way we can work with the data as JavaScript objects, with no complicated parsing and translations.
- If you have data stored in a JavaScript object, you can convert the object into JSON, and send it to a server using JSON.stringify().
- If you receive data in JSON format, you can convert it into a JavaScript object using JSON.parse().

Uses of JSON

- It is used while writing JavaScript based applications that includes browser extensions and websites.
- JSON format is used for serializing and transmitting structured data over network connection.
- It is primarily used to transmit data between a server and web applications.
- Web services and APIs use JSON format to provide public data.
- JSON uses JavaScript syntax, but the JSON format is text only. Text can be read and used as a data format by any programming language.



```
{
   “Title”: “The Cuckoo’s Calling”
   “Author”: “Robert Galbraith”,
   “Genre”: “classic crime novel”,
   “Detail”: {
       “Publisher”: “Little Brown”
       “Publication_Year”: 2013,
       “ISBN-13”: 9781408704004,
       “Language”: “English”,
       “Pages”: 494
   }
   “Price”: [
       {
           “type”: “Hardcover”,
           “price”: 16.65,
       }
       {
           “type”: “Kindle Edition”,
           “price”: 7.03,
       }
   ]
}
```

Example 1 – to store employee data - first.json

```
{"employees":[
   {     "name":"Sonoo",
         "email":"sonoojaiswal1987@gmail.com"},
   {     "name":"Rahul",
         "email":"rahul32@gmail.com"},
   {     "name":"John",
         "email":"john32bob@gmail.com"}
]}
```

Example 2 – to store book data – book.json

```
{ "book": [
        {       "id":"01",
                "language": "Java",
                "edition": "third",
                "author": "Herbert Schildt"    },
        {       "id":"07",
                "language": "C++",
                "edition": "second",
                "author": "E.Balagurusamy"    }
] }
```

JSON syntax

- Data is represented in name/value pairs. JSON names require double quotes. JavaScript names don't.
- Curly braces hold objects and each name is followed by ':'(colon), the name/value pairs are separated by , (comma).

```
{
   "employee": {"name": "sonoo", "salary": 56000,  "married":  true}
}
```

- Square brackets hold arrays and values are separated by ,(comma).

1. ["Sunday", "Monday", "Tuesday", "Wednesday", "Thursday", "Friday", "Saturday"] → Values in an Array
2. → Objects in an Array

```
[  {"name":"Ram", "email":"Ram@gmail.com"},
   {"name":"Bob", "email":"bob32@gmail.com"}
]
```

JSON Datatypes

- Number
  - Integer (0-9 ,+ve,-ve), Fraction, Exponent.
  - Octal and hexadecimal formats are not used.
  - No NaN or Infinity is used in Number.

```
{
"integer": 34,
"fraction": .2145,
"exponent": 6.61789e+0
}
```

- String → It is a sequence of zero or more double quoted Unicode characters with backslash escaping.

Eg: "aaa ",'aaa', \n, \t

JSON Datatypes

- Boolean → true, false
- Array → an ordered collection of values
- Value – String, number, true or false, null etc
- Object – unordered collection of key:value pairs
- Whitespace – can be used between any pair of tokens. It can be added to make a code more readable.

```
var obj1 = {"name":     "Sachin Tendulkar"}
var obj2 = {"name":     "Saurav Ganguly"}
```

- null → empty type

```
var i = null;
```

- JSON values **cannot** be one of the following data types: a function, a date, *undefined*

Accessing Object Values

```
myObj = { "name":"John", "age":30, "car":null };
```

- `x = myObj.name;` → **Output:** John
- `x = myObj["name"];` → **Output:** John
-
```
for (x in myObj) {
    document.getElementById("demo").innerHTML += x;
}
```

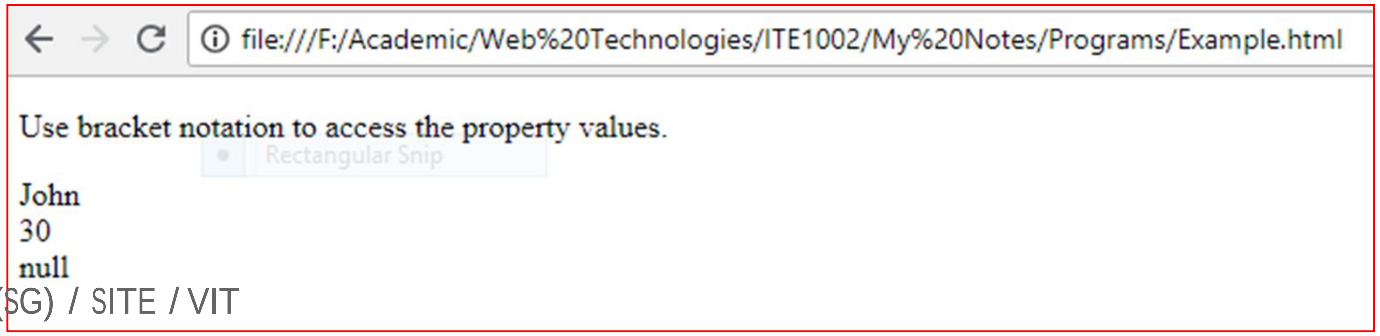
Output:
```
name
 age
car
```

-
```
for (x in myObj) {
    document.getElementById("demo").innerHTML += myObj[x];
}
```

Output:
```
John
30
null
```

Example.html

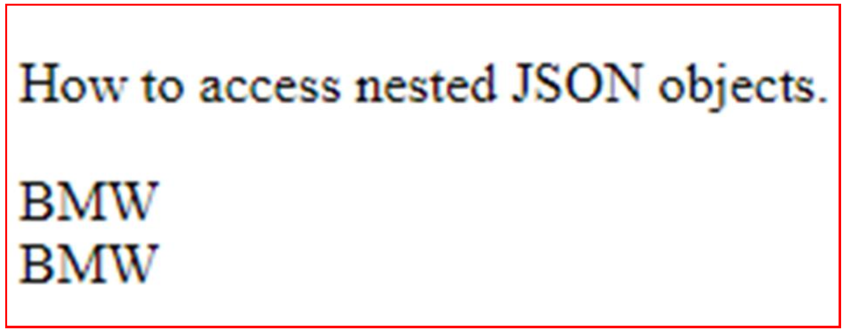
```
<html><body>
<p>Use bracket notation to access the property values.</p>
<p id="demo"></p>
<script>
var myObj = {"name":"John", "age":30, "car":null};
for (x in myObj) {
   document.getElementById("demo").innerHTML += myObj[x] +
"<br>";}
</script></body></html>
```


file:///F:/Academic/Web%20Technologies/ITE1002/My%20Notes/Programs/Example.html
Rectangular Snip

```
Use bracket notation to access the property values.

John
30
null
```

Nested Objects

```
<html> <body> <p>How to access nested JSON objects.</p>
<p id="demo"></p><script>
var myObj = {
            "name":"John",
            "age":30,
            "cars": {
                        "car1":"Ford",
                        "car2":"BMW",
                        "car3":"Fiat"   } }
document.getElementById("demo").innerHTML += myObj.cars.car2 +
"<br>"; //or:
document.getElementById("demo").innerHTML += myObj.cars["car2"];
</script> </body></html>
```



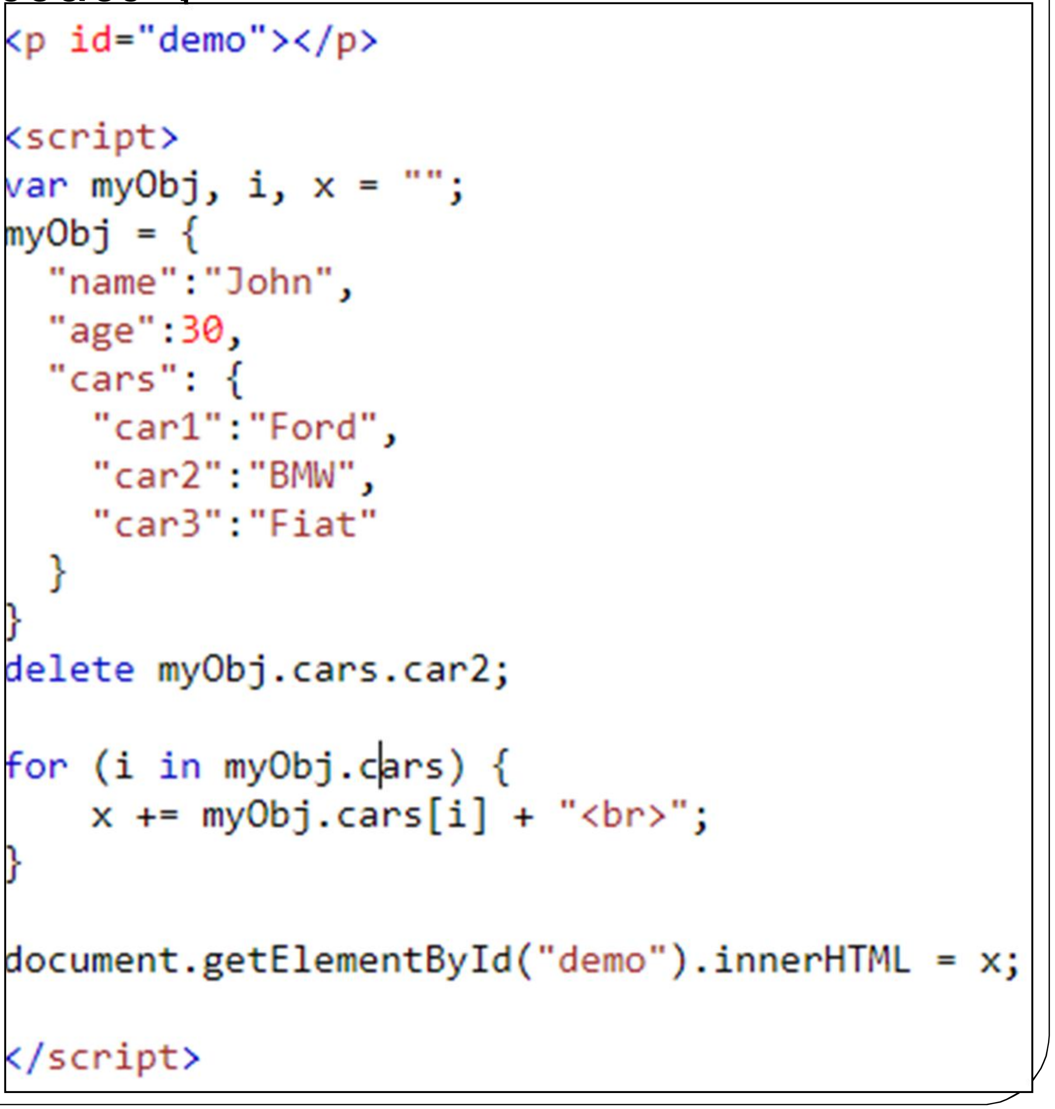
```
How to access nested JSON objects.

BMW
BMW
```

Modify Values

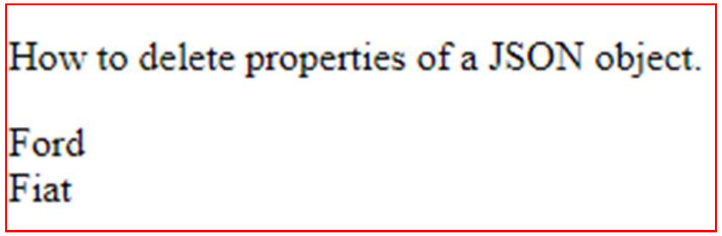
- myObj.cars.car2 = "Mercedes"; / / or
- myObj.cars["car2"] = "Mercedes";

Delete Object Properties

delete myObj.cars.car2;



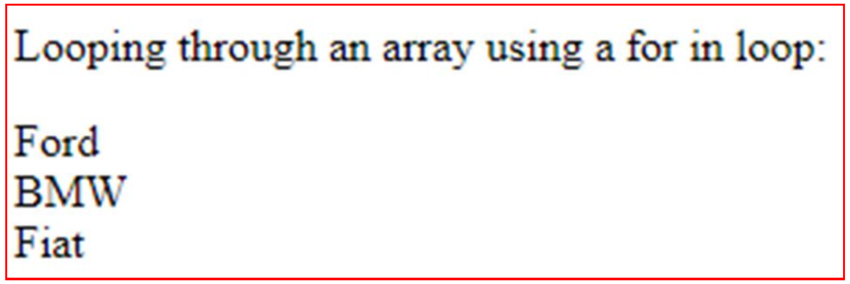
```
<p id="demo"></p>

<script>
var myObj, i, x = "";
myObj = {
  "name":"John",
  "age":30,
  "cars": {
    "car1":"Ford",
    "car2":"BMW",
    "car3":"Fiat"
  }
}
delete myObj.cars.car2;

for (i in myObj.cars) {
    x += myObj.cars[i] + "<br>";
}

document.getElementById("demo").innerHTML = x;

</script>
```



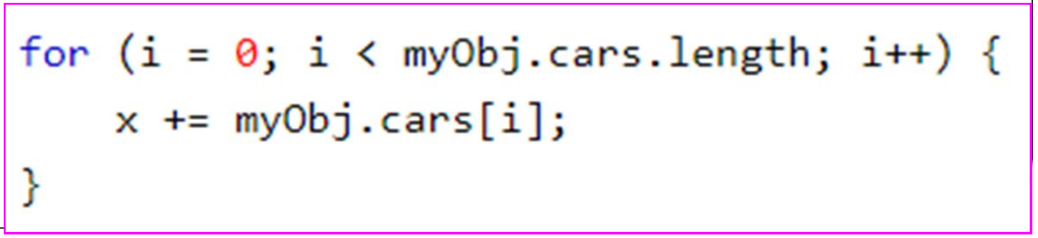
```
How to delete properties of a JSON object.

Ford
Fiat
```

Arrays in JSON Objects

```
<body> <p>Looping through an array using a for in loop:</p>
<p id="demo"></p> <script>
var myObj, i, x = "";
myObj = {
        "name":"John",
        "age":30,
       "cars":[ "Ford", "BMW", "Fiat" ]    };
for (i in myObj.cars) {
     x += myObj.cars[i] + "<br>";}
document.getElementById("demo").innerHTML = x;
</script></body></html>
```



```
Looping through an array using a for in loop:

Ford
BMW
Fiat
```



```
for (i = 0; i < myObj.cars.length; i++) {
    x += myObj.cars[i];
}
```

Nested Arrays in JSON Objects

- Values in an array can also be another array, or even another JSON object:
- myObj = {

```
myObj = {
    "name":"John",
    "age":30,
    "cars": [
        { "name":"Ford", "models":[ "Fiesta", "Focus", "Mustang"
 ] },
        { "name":"BMW", "models":[ "320", "X3", "X5" ] },
        { "name":"Fiat", "models":[ "500", "Panda" ] }
    ]
 }
```

- **Accessing:**

```
for (i in myObj.cars) {
   x += "<h1>" + myObj.cars[i].name + "</h1>";
   for (j in myObj.cars[i].models) {
      x += myObj.cars[i].models[j];
   }
}
```

- **Modify using index:**

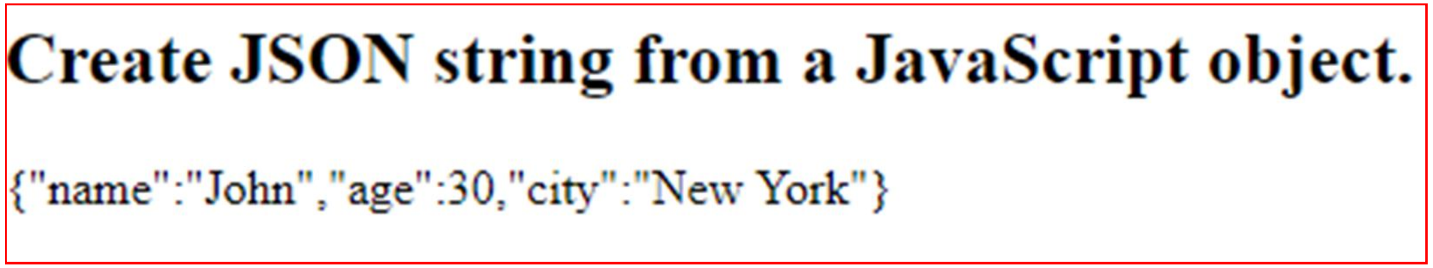
```
myObj.cars[1].name= "Mercedes";
```

- **Delete using index:**

```
delete myObj.cars[1];
```

A common use of JSON is to exchange data to/from a web server. When sending data to a web server, the data has to be a string. Convert a JavaScript object into a string with JSON.stringify()

```
<html> <body>
<h2>Create JSON string from a JavaScript object.</h2>
<p id="demo"></p><script>
var obj = {"name":"John", "age":30, "city":"NewYork"};
var myJSON = JSON.stringify(obj);
document.getElementById("demo").innerHTML = myJSON;
</script> </body></html>
```

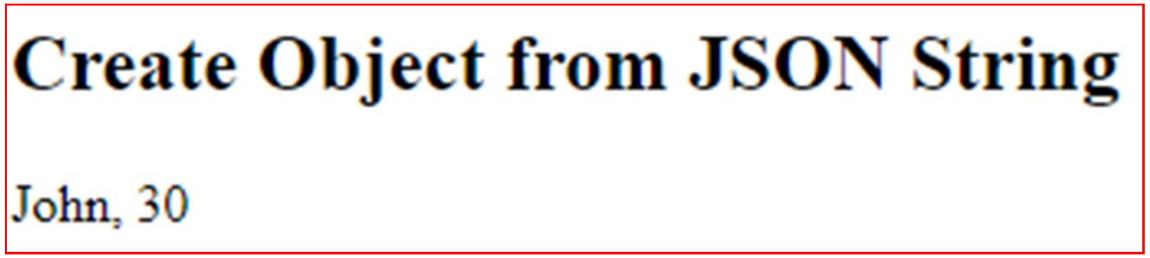


Create JSON string from a JavaScript object.

```
{"name":"John","age":30,"city":"New York"}
```

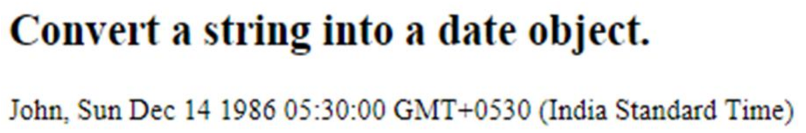
A common use of JSON is to exchange data to/from a web server.When receiving data from a web server, the data is always a string. Parse the data with JSON.parse(), and the data becomes a JavaScript object.

```
<html> <body><h2>Create Object from JSON String</h2>
<p id="demo"></p><script>
var txt = '{"name":"John", "age":30, "city":"NewYork"}'
var obj = JSON.parse(txt);
document.getElementById("demo").innerHTML = obj.name + ", " + obj.age;
</script></body></html>
```



```
Create Object from JSON String

John, 30
```

```
<!DOCTYPE html>
<html>
<body>
<h2>Convert a string into a date object.</h2>
<p id="demo"></p>
<script>
var text = '{"name":"John", "birth":"1986-12-14", "city":"New York"}';
var obj = JSON.parse(text, function (key, value) {
    if (key == "birth") {
        return new Date(value);
    } else {
        return value;
    }});
document.getElementById("demo").innerHTML = obj.name + ", " + obj.birth;
</script>
</body>
</html>
```



```
Convert a string into a date object.

John, Sun Dec 14 1986 05:30:00 GMT+0530 (India Standard Time)
```