Google MAP Geodcoding API Testing

Google Map Geocoding API web service

Geocoding is process of conversion of human-readable address into cooridnates (latitude and longitude) which we use for maping. Getting human-readable address from latitude and longitude is reverse geocoding.

Google Map Geocoding API is web service which enable both proccess via HTTP request. It uses static addresses; it is not usable for dynamic geocoding. Google Map Geocoding API allows developers to place maps on web pages and is designed for working on mobile devices and desktop browsers.

Google Map Geociding API request form is:

https://maps.googleapis.com/maps/api/geocode/*outputFormat*?*parameters*

Output format can have two values:

- *Json* – JavaScript Object Notation
- *Xml* – Extensible Markup Language

URLs are limited to 8.192 characters.

Parameters are separating with „&“. *Parameters* in geocoding request can be required and optional.

Required ones are:

- *Address* or *components*
- *Key*

Optional parameters are:

- *Bounds*
- *Language*
- *Region* – *ccTLD* – two character value
- *Components* – separated by„I“

JSON response contains status codes and result.

Status codes are:

- *OK*" indicates that no errors occurred; the address was successfully parsed and at least one geocode was returned;
- *"ZERO_RESULTS"* indicates that the geocode was successful but returned no results. This may occur if the geocoder was passed a non-existent address.
- *"OVER_QUERY_LIMIT"* indicates that you are over your quota.
- *"REQUEST_DENIED"* indicates that your request was denied.

- *"INVALID_REQUEST"* generally indicates that the query (address, components or latlng) is missing.
- *"UNKNOWN_ERROR"* indicates that the request could not be processed due to a server error. The request may succeed if you try again.

Result of geocoding consist of:

1. *Types*
2. *formatted_address* is a string containing the human-readable address
3. *address_components[] - types[] , long_name , short_name*
4. *postcode_localities*[]
5. *geometry* contains the following information:

- *location* contains the geocoded latitude,longitude value.

- *location_type* :

  "ROOFTOP" indicates that the returned result is a precise geocode for which we have location information accurate down to street address precision.

  "*RANGE_INTERPOLATED*" indicates that the returned result reflects an approximation (usually on a road) interpolated between two precise points (such as intersections). Interpolated results are generally returned when rooftop geocodes are unavailable for a street address.

  "*GEOMETRIC_CENTER*" indicates that the returned result is the geometric center of a result such as a polyline (for example, a street) or polygon (region).

  "*APPROXIMATE*" indicates that the returned result is approximate.

- *Viewport*
- *Bounds*

6. *Partial matches*
7. *Place ID*

Reverse geocoding paramers can be required and optional.

Required ones are:

- *Latlng* of *placeID*
- *Key.*

Optional parameters are:

- *Language*
- *Result_type*
- *Location_type*

Google Map Geocodig API testing

First step in testing some API is good understanding of the way how given API works, and based on description written above, requiered and optional parameters, type of parameters, we can write few positive and negative test cases.

Note: my API key is *AIzaSyAIQAhWDH18jjVPfJWuMR-dHCT3dtcDSvw*

Examples of positive testing (postive test cases)

1. *TCP01* – Getting latitude and longitude coordinates from existing address

   Description: after puting correct, existing address in request form, JSON response should have status „OK“ and response should correspond to the response in "Expected response" test step.

   Test steps:

   1. In request form put address „Milana Preloga 1“

      https://maps.googleapis.com/maps/api/geocode/json?address=Milana+Preloga+1&key=AIzaSyAIQAhWDH18jjVPfJWuMR-dHCT3dtcDSvw

   2. Press „enter“
   3. Expected response:


```
{
   "results" : [
      {
         "address_components" : [
            {
               "long_name" : "1",
               "short_name" : "1",
               "types" : [ "street_number" ]
            },
            {
               "long_name" : "Milana Preloga",
               "short_name" : "Milana Preloga",
               "types" : [ "route" ]
            },
            {
               "long_name" : "Novi Grad Sarajevo",
               "short_name" : "Novi Grad Sarajevo",
```

```
               "types" : [ "political", "sublocality",
"sublocality_level_1" ]
            },
            {
               "long_name" : "Sarajevo",
               "short_name" : "Sarajevo",
               "types" : [ "locality", "political" ]
            },
            {
               "long_name" : "Kanton Sarajevo",
               "short_name" : "Kanton Sarajevo",
               "types" : [ "administrative_area_level_2", "political" ]
            },
            {
               "long_name" : "Federacija Bosne i Hercegovine",
               "short_name" : "Federacija Bosne i Hercegovine",
               "types" : [ "administrative_area_level_1", "political" ]
            },
            {
               "long_name" : "Bosnia and Herzegovina",
               "short_name" : "BA",
               "types" : [ "country", "political" ]
            },
            {
               "long_name" : "71000",
               "short_name" : "71000",
               "types" : [ "postal_code" ]
            }
         ],
         "formatted_address" : "Milana Preloga 1, Sarajevo 71000, Bosnia
and Herzegovina",
         "geometry" : {
            "bounds" : {
               "northeast" : {
                  "lat" : 43.84729189999999,
                  "lng" : 18.3757082
               },
               "southwest" : {
                  "lat" : 43.8472879,
                  "lng" : 18.3756903
               }
            },
            "location" : {
               "lat" : 43.84729189999999,
               "lng" : 18.3757082
            },
            "location_type" : "RANGE_INTERPOLATED",
            "viewport" : {
               "northeast" : {
                  "lat" : 43.8486388802915,
                  "lng" : 18.3770482302915
               },
               "southwest" : {
                  "lat" : 43.8459409197085,
                  "lng" : 18.3743502697085
               }
            }
         },
         "partial_match" : true,
```

```
         "place_id" :
"EjVNaWxhbmEgUHJlbG9nYSAxLCBTYXJhamV2byA3MTAwMCwgQm9zbmEgaSBIZXJjZWdvdmluYQ
",
         "types" : [ "street_address" ]
      }
   ],
   "status" : "OK"
}
```


2. *TCP02* – Geting latitude and longitude coordinates with corect input of parametars – address and bounds

   Description: after we put correct address in request, and adding a bound, JSON result shoud be corect with status "OK", and response should correspond to the response in "Expected response" test step.

   Test steps:

   1. In request form, put address with bounds „Solun, BiH“

      https://maps.googleapis.com/maps/api/geocode/json?address=Solun,+BiH&key=AIz18jjVPfJWuMR-dHCT3dtcDSvw

   2. Press „enter“
   3. Expected response:


```
{
   "results" : [
      {
         "address_components" : [
            {
               "long_name" : "Solun",
               "short_name" : "Solun",
               "types" : [ "locality", "political" ]
            },
            {
               "long_name" : "Zeničko-dobojski kanton",
               "short_name" : "Zeničko-dobojski kanton",
               "types" : [ "administrative_area_level_2", "political" ]
            },
            {
               "long_name" : "Federacija Bosne i Hercegovine",
               "short_name" : "Federacija Bosne i Hercegovine",
               "types" : [ "administrative_area_level_1", "political" ]
            },
            {
               "long_name" : "Bosnia and Herzegovina",
               "short_name" : "BA",
               "types" : [ "country", "political" ]
            }
         ],
         "formatted_address" : "Solun, Bosnia and Herzegovina",
         "geometry" : {
            "location" : {
               "lat" : 44.1639455,
               "lng" : 18.5338639
```

```
            },
            "location_type" : "APPROXIMATE",
            "viewport" : {
               "northeast" : {
                  "lat" : 44.1652944802915,
                  "lng" : 18.5352128802915
               },
               "southwest" : {
                  "lat" : 44.1625965197085,
                  "lng" : 18.5325149197085
               }
            }
         },
         "place_id" : "ChIJDaC3nxMsWUcRqn16zqpk63Q",
         "types" : [ "locality", "political" ]
      }
   ],
   "status" : "OK"
}
```


3. *TCP03* – Geting human readable address from correct, existing latitude and longitude cooridnates

   Description: after we put correct latlng parameters in request, JSON result shoud be correct with status "OK" and response should correspond to the response in "Expected response" test step.

   Test steps:

   1. In request form, put latlng „44.161567, 18.58262“ which are coordinates for address „Olovo“

      https://maps.googleapis.com/maps/api/geocode/json?latlng=44.161567,18.5826&key=AIzaSyAIQAhWDH18jjVPfJWuMR-dHCT3dtcDSvw

   2. Press“ enter“
   3. Expected response:


```
{
   "results" : [
      {
         "address_components" : [
            {
               "long_name" : "Unnamed Road",
               "short_name" : "Unnamed Road",
               "types" : [ "route" ]
            },
            {
               "long_name" : "Zeničko-dobojski kanton",
               "short_name" : "Zeničko-dobojski kanton",
               "types" : [ "administrative_area_level_2", "political" ]
            },
            {
               "long_name" : "Federacija Bosne i Hercegovine",
               "short_name" : "Federacija Bosne i Hercegovine",
               "types" : [ "administrative_area_level_1", "political" ]
```

```
      },
      {
         "long_name" : "Bosnia and Herzegovina",
         "short_name" : "BA",
         "types" : [ "country", "political" ]
      }
   ],
   "formatted_address" : "Unnamed Road, Bosnia and Herzegovina",
   "geometry" : {
      "bounds" : {
         "northeast" : {
            "lat" : 44.1655009,
            "lng" : 18.5957457
         },
         "southwest" : {
            "lat" : 44.1591118,
            "lng" : 18.5757261
         }
      },
      "location" : {
         "lat" : 44.1612789,
         "lng" : 18.5881928
      },
      "location_type" : "GEOMETRIC_CENTER",
      "viewport" : {
         "northeast" : {
            "lat" : 44.1655009,
            "lng" : 18.5957457
         },
         "southwest" : {
            "lat" : 44.1591118,
            "lng" : 18.5757261
         }
      }
   },
   "place_id" : "ChIJf9ojDuouWUcRqiPYtV1LM0s",
   "types" : [ "route" ]
},
{
   "address_components" : [
      {
         "long_name" : "Olovo",
         "short_name" : "Olovo",
         "types" : [ "administrative_area_level_3", "political" ]
      },
      {
         "long_name" : "Zeničko-dobojski kanton",
         "short_name" : "Zeničko-dobojski kanton",
         "types" : [ "administrative_area_level_2", "political" ]
      },
      {
         "long_name" : "Federacija Bosne i Hercegovine",
         "short_name" : "Federacija Bosne i Hercegovine",
         "types" : [ "administrative_area_level_1", "political" ]
      },
      {
         "long_name" : "Bosnia and Herzegovina",
         "short_name" : "BA",
         "types" : [ "country", "political" ]
      }
   ],
```

```
         "formatted_address" : "Olovo, Bosnia and Herzegovina",
         "geometry" : {
            "bounds" : {
               "northeast" : {
                  "lat" : 44.32803089999999,
                  "lng" : 18.8311802
               },
               "southwest" : {
                  "lat" : 44.0478782,
                  "lng" : 18.31327
               }
            },
            "location" : {
               "lat" : 44.1615671,
               "lng" : 18.5825997
            },
            "location_type" : "APPROXIMATE",
            "viewport" : {
               "northeast" : {
                  "lat" : 44.32803089999999,
                  "lng" : 18.8311802
               },
               "southwest" : {
                  "lat" : 44.0478782,
                  "lng" : 18.31327
               }
            }
         },
         "place_id" : "ChIJj9qWFtYtWUcRNAhdyPwvn5I",
         "types" : [ "administrative_area_level_3", "political" ]
      },
      {
         "address_components" : [
            {
               "long_name" : "Zenica-Doboj Canton",
               "short_name" : "Zenica-Doboj Canton",
               "types" : [ "administrative_area_level_2", "political" ]
            },
            {
               "long_name" : "Federation of Bosnia and Herzegovina",
               "short_name" : "Federation of Bosnia and Herzegovina",
               "types" : [ "administrative_area_level_1", "political" ]
            },
            {
               "long_name" : "Bosnia and Herzegovina",
               "short_name" : "BA",
               "types" : [ "country", "political" ]
            }
         ],
         "formatted_address" : "Zenica-Doboj Canton, Bosnia and
Herzegovina",
         "geometry" : {
            "bounds" : {
               "northeast" : {
                  "lat" : 44.7219349,
                  "lng" : 18.8311802
               },
               "southwest" : {
                  "lat" : 43.9029122,
                  "lng" : 17.7332017
               }
```

```
            },
            "location" : {
               "lat" : 44.2127109,
               "lng" : 18.1604625
            },
            "location_type" : "APPROXIMATE",
            "viewport" : {
               "northeast" : {
                  "lat" : 44.7219349,
                  "lng" : 18.8311802
               },
               "southwest" : {
                  "lat" : 43.9029122,
                  "lng" : 17.7332017
               }
            }
         },
         "place_id" : "ChIJd4x27azFXkcR4bJO91OWDHE",
         "types" : [ "administrative_area_level_2", "political" ]
      },
      {
         "address_components" : [
            {
               "long_name" : "Federation of Bosnia and Herzegovina",
               "short_name" : "Federation of Bosnia and Herzegovina",
               "types" : [ "administrative_area_level_1", "political" ]
            },
            {
               "long_name" : "Bosnia and Herzegovina",
               "short_name" : "BA",
               "types" : [ "country", "political" ]
            }
         ],
         "formatted_address" : "Federation of Bosnia and Herzegovina,
Bosnia and Herzegovina",
         "geometry" : {
            "bounds" : {
               "northeast" : {
                  "lat" : 45.2271323,
                  "lng" : 19.0392512
               },
               "southwest" : {
                  "lat" : 42.6075035,
                  "lng" : 15.7237473
               }
            },
            "location" : {
               "lat" : 43.8874897,
               "lng" : 17.842793
            },
            "location_type" : "APPROXIMATE",
            "viewport" : {
               "northeast" : {
                  "lat" : 45.2271323,
                  "lng" : 19.0392389
               },
               "southwest" : {
                  "lat" : 42.6075035,
                  "lng" : 15.7237473
               }
            }
```

```
         },
         "place_id" : "ChIJU5OpZm2oX0cRS7IhJeWTkuw",
         "types" : [ "administrative_area_level_1", "political" ]
      },
      {
         "address_components" : [
            {
               "long_name" : "Bosnia and Herzegovina",
               "short_name" : "BA",
               "types" : [ "country", "political" ]
            }
         ],
         "formatted_address" : "Bosnia and Herzegovina",
         "geometry" : {
            "bounds" : {
               "northeast" : {
                  "lat" : 45.2766262,
                  "lng" : 19.621935
               },
               "southwest" : {
                  "lat" : 42.5564516,
                  "lng" : 15.7223665
               }
            },
            "location" : {
               "lat" : 43.915886,
               "lng" : 17.679076
            },
            "location_type" : "APPROXIMATE",
            "viewport" : {
               "northeast" : {
                  "lat" : 45.2766262,
                  "lng" : 19.621935
               },
               "southwest" : {
                  "lat" : 42.5564516,
                  "lng" : 15.7223665
               }
            }
         },
         "place_id" : "ChIJ16k3xxWiSxMRDOm3QwPi920",
         "types" : [ "country", "political" ]
      }
   ],
   "status" : "OK"
}
```

Examples of negative testing (negative testing cases):

1. *TCN01* – Getti ng „ZERO RESULTS“ form puting incorrect parameter

   Description: after we put incorrect, not existing address in request, JSON result shoud be with status "ZERO RESULTS" and response should correspond to the response in "Expected response" test step.

   Test steps:

   1. In request form, put address „AmraAmra“:

      https://maps.googleapis.com/maps/api/geocode/json?address=AmraAmra&key=AIzaSyAIQAhWDH18jjVPfJWuMR-dHCT3dtcDSvw

   2. Press enter
   3. Expected response:

```
{
   "results" : [],
   "status" : "ZERO_RESULTS"
}
```

2. *TCN02* – Getti ng „ZERO RESULTS“ form puting incorrect parameter

   Description: after we put incorrect address, with not existing address number in request, JSON result shoud be with status "ZERO RESULTS" and response should correspond to the response in "Expected response" test step.

   Test steps:

   1. In request form, put address „Milana Preloga 28743097320902“:

      https://maps.googleapis.com/maps/api/geocode/json?address=Milana Preloga 28743097320902&key=AIzaSyAIQAhWDH18jjVPfJWuMR-dHCT3dtcDSvw

   2. Press enter
   3. Expected response

```
{
   "results" : [],
   "status" : "ZERO_RESULTS"
}
```

3. *TCN03* - Getting „INVALIDE REQUEST“ form puting incorrect parameter

   Description: after we put no address in request, JSON result shoud be with status "INVALIDE REQUEST" and response should correspond to the response in "Expected response" test step.

Test steps:

1.In request form, put address „“ (empty):

https://maps.googleapis.com/maps/api/geocode/json?address=&key=AIzaSyAIQAhWDH18jjVPfJWuMR-dHCT3dtcDSvw

2. Press enter

3. Expected response


```
{
   "error_message" : "Invalid request. Missing the 'address', 'bounds',
'components', 'latlng' or 'place_id' parameter.",
   "results" : [],
   "status" : "INVALID_REQUEST"
}
```


4. *TCN04* - Getting „ZERO RESULT“ form puting incorrect parameter

Description: after we put address as series of numbers, JSON result shoud be with status "ZERO RESULTS" and response should correspond to the response in "Expected response" test step.

Test steps:

1.In request form, put address „1234567“:

https://maps.googleapis.com/maps/api/geocode/json?address=1234567&key=AIzaSyAIQAhWDH18jjVPfJWuMR-dHCT3dtcDSvw

2. Press enter

3. Expected response:


```
{
   "results" : [],
   "status" : "ZERO_RESULTS"
}
```


5. *TCN05* – getting „REQUEST DENIED“ with puting incorrect key

Description: after we put incorrect key in request, JSON result shoud be with status "REQUEST DENIED" and response should correspond to the response in "Expected response" test step.

Test steps:

1.In request form, put incorrect key:

https://maps.googleapis.com/maps/api/geocode/json?address=Olovo&key=AIaSyAIQAhWDH18jjVPfJWuMR-dHCT3dtcDSvw

2. Press enter

3. Expected response


```
{
   "error_message" : "The provided API key is invalid.",
   "results" : [],
   "status" : "REQUEST_DENIED"
}
```


6. TCN06 – Getting „REQUEST DENIED“ using latlng coordinates in geocoding request

   Description: after we put gecoding request address as lanlng coordinates, JSON result shoud be with status "REQUEST DENIED" and response should correspond to the response in "Expected response" test step.

   Test steps:

   1. In request form, put address as „40.71422, -73.961452“:

      https://maps.googleapis.com/maps/api/geocode/json?address=40.714224,-73.961452&key=AIaSyAIQAhWDH18jjVPfJWuMR-dHCT3dtcDSvw

   2. Press enter
   3. Expected response


```
{
   "error_message" : "The provided API key is invalid.",
   "results" : [],
   "status" : "REQUEST_DENIED"
}
```


7. *TCN07* – Getting „INVALIDE REQUEST“ by putting incorrect address parameter

   Description: after we put „&“ as address in request form, JSON result shoud be with status "INVALIDE REQUEST" and response should correspond to the response in "Expected response" test step.

   Test steps:

   1. In request form, put „&“ as address:

      https://maps.googleapis.com/maps/api/geocode/json?address=&&key=AIaSyAIQAhWDH18jjVPfJWuMR-dHCT3dtcDSvw

   2. Press enter
   3. Expected response


```
{
   "error_message" : "Invalid request. Missing the 'address', 'bounds',
'components', 'latlng' or 'place_id' parameter.",
   "results" : [],
   "status" : "INVALID_REQUEST"
```

}

8. *TCN08* – getting „REQUEST DENIED“ when puting human readable address parameter in reverse geocoding

   Description: after we put in reverse geocoding request human readable address as lanlng coordinates, JSON result shoud be with status "REQUEST DENIED" and response should correspond to the response in "Expected response" test step.

   Test steps:

   1. In request form, put as lanlng „Olovo“:

      https://maps.googleapis.com/maps/api/geocode/json?latlng=Olovo&key=AIaSyAIQAhWDH18jjVPfJWuMR-dHCT3dtcDSvw

   2. Press enter
   3. Expected response


```
{
   "error_message" : "The provided API key is invalid.",
   "results" : [],
   "status" : "REQUEST_DENIED"
}
```


From given examples, we can see that smoke test is the one that shows basic function of service is working and that is test case TCP01.