The Sandbox - Backend Developer Quiz

Return your answers in a zip-file named `{YOUR_NAME}_tsb_backend_quiz.zip`

Questions

Take approx. 15 minutes to answer each question. You can use diagrams or whatever technique you find the best to explain your solution.

Question 1.

You are implementing a service that will receive video file uploads from mobile clients and needs to re-encode those videos to HLS format. You have thousands of clients that are uploading videos at the same time.

Explain the *software architecture* for the service. What *technology/architecture/patterns* would you use and why?

Question 2.

How would you implement a backend data storage for a whatsapp-like application (with similar scale demands). For example: how would you store chat related data?

Describe the *data model and technologies* you would use.

Question 3.

You are building an application running inside the web browser (a classic SPA). You have to read a list of user's followers' usernames from the server. This list can contain thousands of usernames. You need to implement a component that finds a username from the list based on user input.

For example given a list of usernames `'fred', 'frank', 'jerry'`. When a user types `fr`, you should filter the list so that usernames starting with `fr` are included (`fred` and `frank` in this case).

How would you implement this? What *data structures and algorithms* would you use?

Programming task

Implement function `diff` to find changed values in two JSON objects.

You can use any programming language but no external libraries are allowed. Consider the performance of your implementation while keeping your code clean and readable. Provide code, tests & instructions on how to run the tests.

Find below and example of expected input and output:

first:

```
{
  "foo": {
    "bar": "baz",
    "biz": "foo"
  },
  "fiz": {
    "foo": "baz"
  },
  "bar": "baz",
  "baz": [
    "foo",
    "bar"
  ],
  "miss": 123
}
```

second

```
{
  "foo": {
    "bar": "baz1",
    "biz": "foo"
  },
  "fiz": {
    "foo": "baz"
  },
  "bar": "baz",
  "baz": [
    "foo1"
  ],
  "new_value": 1
}
```

Then `diff(first, second)` should return

```
{
  "foo": {
    "bar": "baz1"
  },
  "baz": [
    "foo1"
  ],
  "miss": "undefined",
  "new_value": 1
}
```