



## CUETSocial

Imagine we have a social networking app called CUETSocial that is used by all CUET current students, alumni, and teachers. The app was built in 2008 by a group of volunteer students and alumni. Later, it was maintained by a volunteer group when needed. Needless to say, the volunteer group was always going through changes in its members. Fresh graduates from CSE are always the frontier on contribution. The alumnus was always very supportive and **always paid for upgrading the server** and other costs. So, **the server is up to date**. The site has a backend RESTFull API, a SPA web app, and a mobile app. They are accessible using the following URL:

- A. Backend API: backend.cuetsocial.com
- B. Mobile APP: m.cuetsocial.com
- C. Website: cuetsocial.com

All backend frontend communication is done using HTTPs protocol. The site is almost bug-free, but after this many years, this site is running into two problems:

- 1) Adding new features is becoming very difficult
- 2) During the pick hours, the site runs very slowly.

Some alumni put together some money to update the system and handed it over to three students: your class: the first, second, and third place holders. They know the CSE 19 is a strong batch, and they are very confident that the top three students are sufficient enough to make these two problems go away. The three students took some quick steps and found the following:

1. The code for the backend is **spaghetti** and requires **a significant amount of RAM and processing power**.
2. The server is at its highest hardware level, so **no vertical scaling is possible**.
3. **No horizontal scaling** is also possible. If they buy a server that can run the application, then there is not enough money left to put a Load balancer in front of it.

So, this is showtime for the top three engineers of CSE 19 to prove themselves.

*While we all believe that anyone from the top three students can solve this problem just like that, we would like to brush up our skills to attack the problem and beat them. Your mission, if you choose to accept it, is to architect a solution and create a roadmap to implement it within the next 36 hours before the top three engineers in your class submit theirs. Once you are done, submit your proposal to my email with subject "CUETSocial".*

*Remember, this is a completely voluntary mission for you, and if you get caught doing this at any time, I have no knowledge of it. This message will self distract in 15 hours.*

**Note:**Some part of the ending statement is inspired by the Mission Impossible Movies.