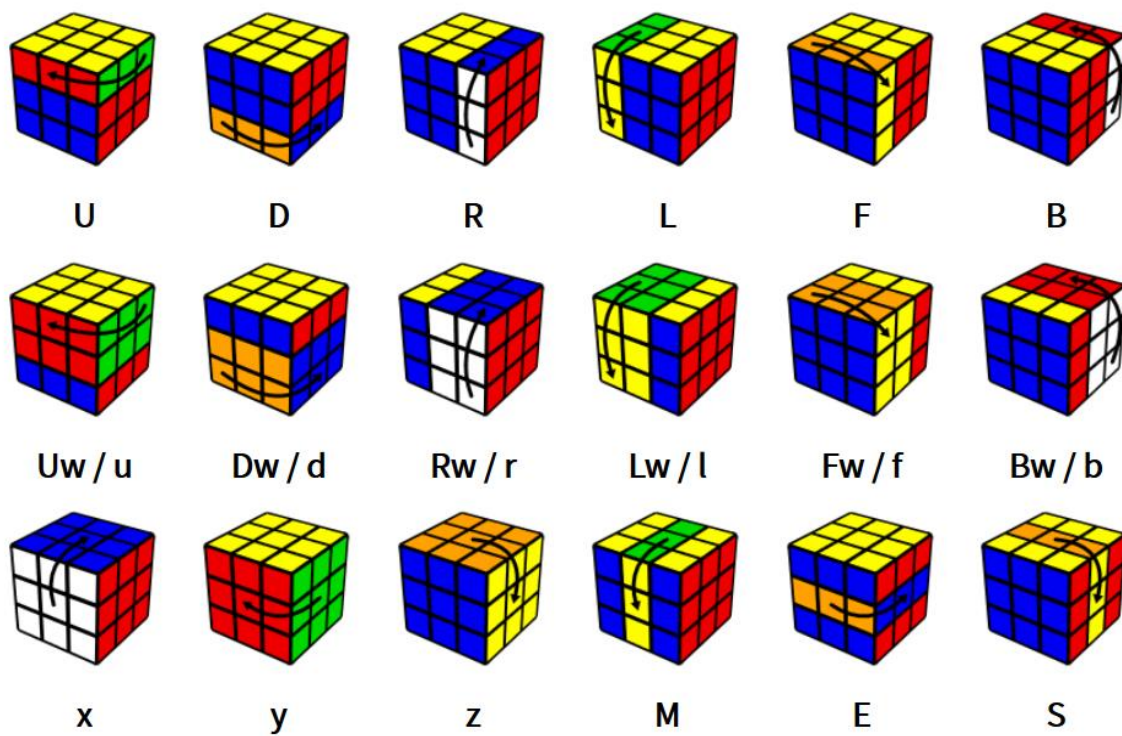


## Appendix

### Cubing Notation



Adding an apostrophe behind the move would reverse it. For example doing an R move followed by R' would cancel each other out.

Figure 1: Cubing notation (from [jperm.net](http://jperm.net))

## **First Consultation with Client**

Me: Good morning, I know that you have a Discord server with your friends where you guys talk about cubing related topics. How do you guys usually cube with each other.

Client: Usually we just use cstimer to time our solves, and then we screenshot our good solves and send them to the server, but I don't really like this method.

Me: Why's that?

Client: I would like to time my solves in Discord directly, so my friends can see my times immediately

Me: How about I make you a Discord bot that times the solves for you.

Client: That would be perfect actually, is it possible for the bot to let me compete against my friends in cubing?

Me: Sure, would you also like a help command

Client: that would be nice... Oh can you also add a virtual cube feature

Me: What's that

Client: Like sometimes I don't have a physical cube with me, so having a virtual cube that I can play with would be great.

Me: I see. I assume you would control the cube using cube notation?

Client: yes

Me: Great, I'll work on the design and get back to you soon.

## Second Consultation with Client

Me: Here are the success criteria I came up with

1. Can provide user with instructions on how to use the application
2. Can generate scrambles for 2x2 to 7x7 cubes
3. Displays image of the cube to ensure that the user have scrambled the cube according to the scramble
4. User can time his solves
5. Has a virtual cube that the user can turn with by using cubing notation (see appendix)
6. User can challenge other users to a timed solve
7. User can add penalty to a solve
8. Displays the most recent solve times
9. Generates current and best statistics of the user's solves, which includes: average of 5 (ao5), average of 12 (ao12), and mean of 3 (mo3). Average of  $x$  is calculated by taking  $x$  consecutive solves, removing the fastest and slowest solve, and calculating the mean of the remaining. Mean of  $x$  is simply the mean of  $x$  consecutive solves
10. User can manually add times
11. User can delete unwanted times

Me: anything else you want to add

Client: Seems good

Me: ok I'll go devise a list of commands

### **Third Consultation with Client**

Me: Hello, here is a list of commands that I came up with

Client: Let me see... I think that maybe each cube size should have its own command.

Me: What do you mean

Client: So like instead of /scramble 3x3, I can just do /3x3

Me: ok

Client: and can you have commands that gives more detail than /list and /stats. So maybe you can have /details that provides the details of one solve

Me: and a command for each stat like /ao5?

Client: yeah, and is it possible to change the angle of perspective of the 3D image for the cube?

Me: ok

Client: last thing, can you add a /clear that clears all solves in a session?

Me: sure, do you want a filter so you can specify the type of solves to clear?

Client: that would be great

Me: Ok, I'll go make the changes

## **Final Consultation with Client**

(The final product was given 2 days prior to this meeting)

Me: Hello, what do you think of the final product

Client: Great, I think the product fulfilled all my requests

Me: What specifically do you think the product does well in?

Client: I like how you added a select menu to the filter so I can look through my solves more easily. Also, I like how easy it is to add penalty to the solves.

Me: Is there anything you think that is missing from the product?

Client: I notice that the bot disconnects sometimes, and the bot loses all the data, is there a way to fix that?

Me: the disconnection is out of my control; however, I could add persistent storage to the bot so that it won't lose data after disconnection.

Client: Oh yeah, and for the /list, I would like more filters and sorting.

Me: Can you elaborate?

Client: Like right now, I can only filter by the type, but I think filtering it by times, dates, etc, would make it much better.

Me: ok.

Client: And can you allow more players to be in /match instead of it just being a 1v1?

Me: Sure, anything else?

Client: That's pretty much it.

Me: Thank you for your feedback today.

Client: No problem