

## Criterion E: Evaluation

1. Can provide user with instructions on how to use the application
  - a. Met
  - b. User can run `/help` to get a list of each command's description. User can also type add a command (`/help command`) to get that command's description
2. Can generate scrambles for 2x2 to 7x7 cubes
  - a. Met
  - b. User can run `/2x2...` `/7x7` to get scrambles for 2x2... 7x7 Rubik's cube, respectively. The scramble length increases for each cube size to ensure the cube is thoroughly scrambled
3. Displays image of the cube to ensure that the user have scrambled the cube according to the scramble
  - a. Met
  - b. The commands `/2x2...` `/7x7` display both a 2D net of the cube, as well as a 3D image of the cube. The user can also run `/angle` to change the angle of perspective of the 3D image
4. User can time his solves
  - a. Met
  - b. Users can time their solves by clicking "Start Time" after running the commands `/2x2...` `/7x7`. After finishing the solve, the user can click "Stop time" to stop the timer. The bot would display the finish time.
5. Has a virtual cube that the user can turn with by using cubing notation (see appendix)
  - a. Met
  - b. Users can use `/virtual` to start a virtual solve. Then the user can use `/move` followed by a sequence of move to turn the virtual cube. If the moves are invalid, the bot would display an error message. Once the solve is finished, the timer automatically stops.
6. User can challenge other users to a timed solve
  - a. Met
  - b. User can use `/match` followed by mentioning another user to challenge that user. Both users can click "Ready up" to ready. The match would automatically be aborted

if after 15 seconds, 1 user is still not ready up. If both users ready up, a countdown would start and the users can start solve. Once the user is done solving, the user can click "stop time"

7. User can add penalty to a solve

- a. Met
- b. After a solve, there are 3 buttons: "OK", "+2", "DNF". The user can click the buttons to add a penalty

8. Displays the most recent solve times

- a. Met
- b. Users can run /list to display the 12 most recent solves. There's also a select menu at the bottom for the user to filter the solves by cube size (2x2, 3x3, ...)

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)

- a. Met
- b. Users can run /stats to see ao5, ao12, mo3, best ao5, best ao12, and best mo3. The user can also run /ao5, /ao12, /mo3, /bestao5, /bestao12, and /bestmo3 to see each stat separately.

10. User can manually add times

- a. Met
- b. User can run /addtime and a pop-up window would display, where the user can insert the time, scramble, solve type, and additional comments. Then users can click submit to add the time.

11. User can delete unwanted times

- a. Met
- b. User can run /delete and a solve number to delete a solve. The user can also run /clear to delete all solves.

## Recommendations for Further Development

### Persistent storage

After having a final evaluation with the client, the client requested that he would like persistent storage in the bot, meaning that even after the bot has disconnected, it would still preserve its data. This eliminates the need for users to manually add the times back in after the bot has disconnected.

### More features in /list and /stats

Currently, the /list command can only filter the list by solve type. However, the client expressed that he would like additional filters such as time, date, etc. In addition, he said he would also like a sorting feature in /list, allowing him to see his top solves. For /stats, currently there are it only displays 6 stats, but the client would like to have customized stats as well, such as mo50 and ao100.

### Multiplayer in /match

The client said that he would like /match to be able to work against multiple players instead of just one, allowing multiple friends to race at once. Also, he wants a leaderboard system to show the win/loss of each user in the server.

Total Word Count: 1808