

Acknowledgement

First of all, I want to thank to Allah SWT, the lord of universe who has been giving us mercies and blessing. Secondly, may sholawat and salam always be with our best prophet Muhammad SAW, who has guided us from the darkness to the light. I would like to say thanks too, for all people whose names may not all be enumerated, people who have been support and assist me to complete this final project. I would like to express them deep appreciation particularly to the following:

1. My Mom; Siti Asiyah, my dad; Masjhud, BA (deceased), my big brother; Ba'di Ristanto, Danis Husaini Dahlan, Muhammad Husni Mubarok, and Fajar Sidik Permana, my big sister: Maulida Isnawati, Dian Anis Musfiroh, Siti Nur Aflah, Maria Ulfah, and my lovely sister Nasirottuddiniyah, and all of my big family for all the support, trust and motivation. I love you all.
2. Kiki Maulana Adhinugraha, Ph. D., Sultan Mofareh Alamri, Ph. D. as my supervisors that have been patiently supervise me with all the bright solution.
3. Endro Ariyanto, S. T., M. T as my advisor lecturer.
4. Sahabat Basis Data (Helmi, Afnizar, Anti, Hevyka), Sahabat Sosialita (Ashri, Cao, and Raka), Sahabat Seper TA (Fala, Romi, Helmi, Ican, Gugun and Agung) that have been accompany me, remind me about this final project, support me and boost my mood. Thank you.
5. Helmi Satria Nugraha, he always encourage me when I was down, always remind me, always support me, always right there beside me when i was up and down. Thank you for helping me.
6. Database Laboratory that have been my second home during this work. Thank you for providing such a great environment. I never regret joining this laboratory.
7. Informatics Laboratory as my second family too, who always right there beside me when i was up and down. Thank you for the assistance and

cooperation. Thank you for providing me with a great professional experience.

8. IF-39-03, my class during college. I meet a lot of new people from all around Indonesia. We've been doing a lot of great things together, I am really lucky to have you guys. Do not forget our friendship and always wish us a huge luck.
9. NetOS Laboratory as my first laboratories, thank you for accepting me and for the experience.
10. People around the world that posted questions and answers in Stackoverflow, you are helping a lot of people. Keep sharing.