

## DAFTAR PUSTAKA

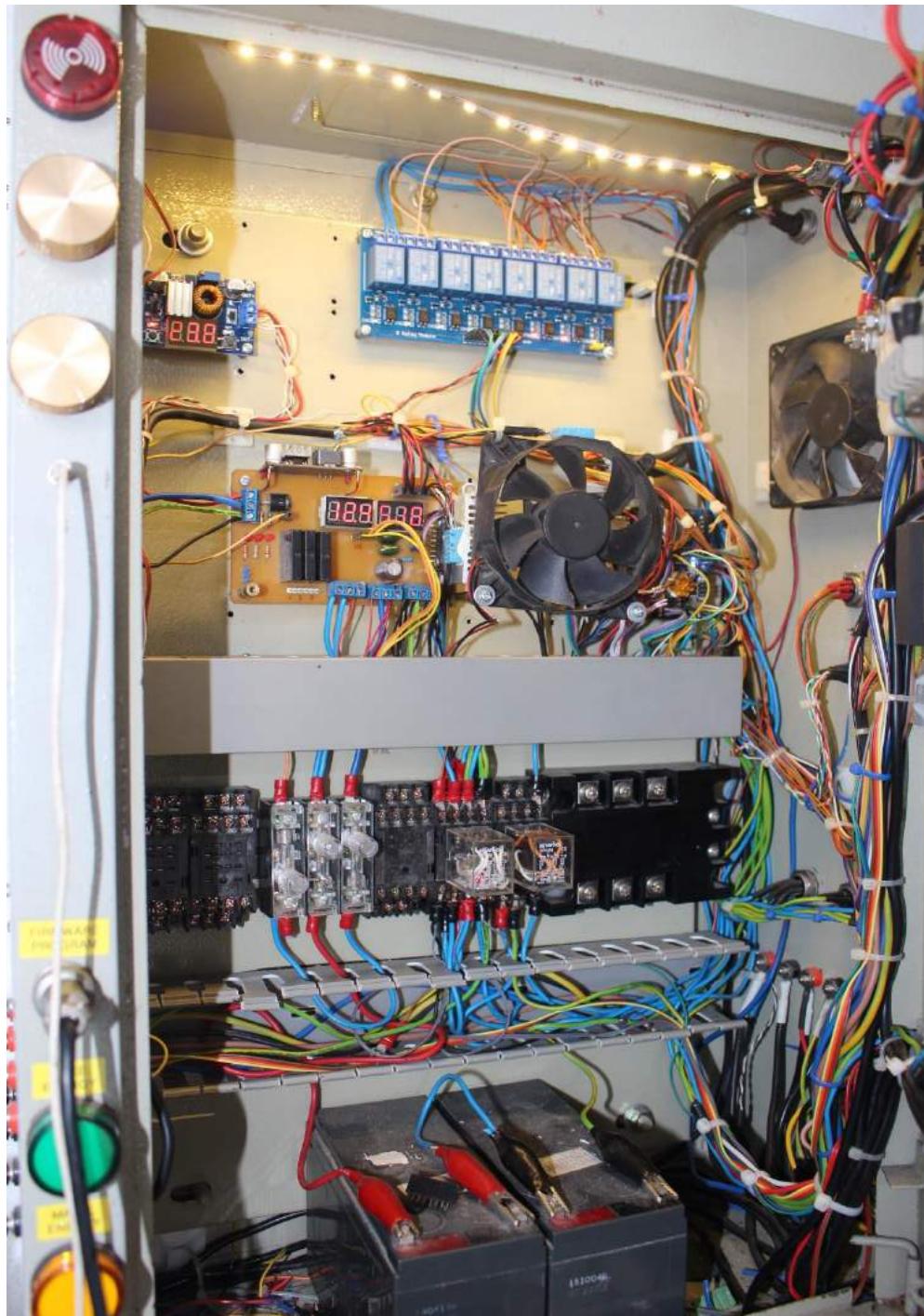
- [1] Zhou, B., et al., *Smarthome energi management systems: Concept, configurations, and scheduling strategies*. 2016. **61**: p. 30-40.
- [2] Lobaccaro, G., S. Carlucci, and E.J.E. Löfström, *A review of systems and technologies for smarthomes and smart grids*. 2016. **9**(5): p. 348.
- [3] Bingol, O., et al., *Web-based smarthome automation: PLC-controlled implementation*. 2014. **11**(3): p. 51-63.
- [4] Brenkuš, J., et al. *Power-efficient smart metering plug for intelligent households*. in *2015 25th International Conference Radioelektronika (RADIOELEKTRONIKA)*. 2015. IEEE.
- [5] Mültin, M., F. Allerding, and H. Schmeck. *Integration of electric vehicles in smarthomes-an ICT-based solution for V2G scenarios*. in *2012 IEEE PES Innovative Smart Grid Technologies (ISGT)*. 2012. IEEE.
- [6] Sriwati, S., F. Faridah, and S.J.P.S. Baco, *PENGEMBANGAN SISTEM PENGAMAN RUMAH DENGAN SECURITY PASSWORD MENGGUNAKAN SENSOR GERAK BERBASIS MIKROKONTROLLER ATMega8*. 2017. **3**(1): p. 59-1-8.
- [7] Behmann, F. and K. Wu, *Collaborative internet of things (C-IoT): For future smart connected life and business*. 2015: John Wiley & Sons.
- [8] Van Hoof, J., G. Demiris, and E.J. Wouters, *Handbook of smarthomes, health care and well-being*. 2017: Springer.
- [9] Turner, W.C. and S. Doty, *Energi management handbook*, 2009. The Fairmont Press, Inc.: United States of America.
- [10] Sugiyono, A., et al., *Indonesia Energi Outlook 2016: Energi Development in Supporting Green Industry*. 2016: p. 21.
- [11] Ilahi, N.I., et al. *Early Leakage Protection Sistem of LPG (Liquefied Petroleum Gas) Based on ATMega 16 Microcontroller*. in *IOP Conference Series: Materials Science and Engineering*. 2018. IOP Publishing.
- [12] Roger, W. and P. Haines, *HVAC systems design handbook*. 2010: McGraw-Hill, New York.

- [13] ASHRAE, A.J.I., USA, *Standard 55-2004, thermal environmental conditions for human occupancy, atlanta: american society of heating, refrigerating, and air-conditioning engineers.* 2004.
- [14] Wang, S., Z.J.H. Ma, and R. Research, *Supervisory and optimal control of building HVAC systems: A review.* 2008. **14**(1): p. 3-32.
- [15] Kolcaba, K., *Comfort theory and practice: a vision for holistic health care and research.* 2003: Springer Publishing Company.
- [16] Sugini, S.J.J.F.H.U., *Pemaknaan Istilah-Istilah Kualitas Kenyamanan Thermal Ruang Dalam Kaitan Dengan Variabel Iklim Ruang.* 2004. **1**(2).
- [17] Rilatupa, J.J.E.J.S.d.T., *Aspek kenyamanan termal pada pengkondisian ruang dalam.* 2008. **18**(3): p. 191-198.
- [18] Lippemeier, G., K. Mukerji, and S. Nasution, *Bangunan tropis.* 1997: Erlangga.
- [19] Umum, D.P.J.B.Y.L.P.M.B., *Standar Tata Cara Perencanaan Teknis Konservasi energi pada Bangunan Gedung (SK SNI T-14-1993-03).* 1993.
- [20] Talarosha, B.J.J.S.T.I., *Menciptakan kenyamanan thermal dalam bangunan.* 2005. **6**(3).
- [21] Lechner, N.J.T.o.S.S., *Heating, Cooling, Lighting: Metode Desain untuk Arsitektur Edisi Kedua.* 2007.
- [22] KURNIA, R.F.A., *ANALISIS INDEKS KENYAMANAN IKLIM (studi Kasus: Taman Wisata Jatim Park 2 Dan Karangkates).* 2019.
- [23] Ashadi, A. and A. J. N. Anisa (2017). "Konsep Disain Rumah Sederhana Tipe Kecil Dengan Mempertimbangkan Kenyamanan Ruang." **16**(1): 1-14.
- [24] Ansar Suyuti, Muhammad Tola,Muh. Saleh Pallu,Nadjamuddin Harun, Syafaruddin and Takashi Hiyama. ICIC Express Letters Part B: Applications ICIC International c 2013 ISSN 2185, 2766 Volume 4, Number 1, February 2013.Simple and Portable Gas Emission Detector Design Using Microcontroller ATMega16"
- [25] Asim Kaygusuz, Cemal Keles, Baris Baykant Alagoz, Abdulkerim Karabiber, Renewable energi integration for smart sites, *Energi and Buildings* 64 (2013) 456–462

- [26] Behmann, F. and K. Wu (2015). Collaborative internet of things (C-IoT): For future smart connected life and business, John Wiley & Sons.
- [27] Biao Sun, *Student Member, IEEE*, Peter B. Luh, *Fellow, IEEE*, Qing-Shan Jia, *Senior Member, IEEE*, Ziyang Jiang, Fulin Wang, and Chen Song, 2012 Building Energy Management: Integrated Control of Active and Passive Heating, Cooling, Lighting, Shading, and Ventilation Systems, IEEE TRANSACTIONS ON AUTOMATION SCIENCE AND ENGINEERING
- [28] Claes G. Granqvist “Electrochromics for smart windows: Oxide-based thin films and devices” Thin Solid Films 564 (2014) 1–38
- [29] Damalia, Agung M.H, Bambang., 2015. Identifikasi Pengaruh Material Bangunan. Jurnal Jurusan Arsitektur, Universitas Brawijaya: Malang
- [30] [https://wiki.dfrobot.com/DFPlayer\\_Mini\\_SKU\\_DFR0299](https://wiki.dfrobot.com/DFPlayer_Mini_SKU_DFR0299) (diakses tanggal 22 Juni 2019)
- [31] Ellis, H.C., dan Hunt, R.R. 1993. *Fundamental Of Cognitive Psychology*. Madison: Brown and Benchmark.
- [32] [http://115.78.239.30:8080/dspace/handle/DNULIB\\_52011/3512](http://115.78.239.30:8080/dspace/handle/DNULIB_52011/3512) (diakses tanggal 01 Juli 2019)
- [33] Elektronika <https://lastminuteengineers.com> (diakses tanggal 22 Juli 2019)
- [34] Elektronika belajar <https://www.adafruit.com/product/386> (diaskes tanggal 24 Juni 2019)
- [35] <https://www.safetyandhealthmagazine.com/articles/14079-know-the-benefits-of-an-ergonomics-program> (diakses tanggal 14 Juni 2019)
- [36] Francisco G. Montoya Antonio Pena-Garcia Adel Juaidi Francisco Manzano-Agugliaro “Indoor Lighting Techniques: an overview of evolution and new trends for energy saving” Energy and Building
- [37] Gordon Lowry” *Energy saving claims for lighting controls in commercial buildings*” Energy and Building 2016’
- [38] Immanuel Warangkiran, Ir. S.T G Kaunang, MT, Arie. S.M Lumenta, ST, MT, Arthur. M Rumagit, ST, MT. e-journal Teknik Elektro dan Komputer (2014)

- [39] Ilahi, N. I., S. Baco, A. S. A. Achmad and E. Umrianah (2018). Early Leakage Protection Sistem of LPG (Liquefied Petroleum Gas) Based on ATMega 16 Microcontroller. IOP Conference Series: Materials Science and Engineering, IOP Publishing.
- [40] Mikrokontroller <http://www.labelektronika.com> (diakses tanggal 30 Juni 2019)
- [41] Mikroavr <https://mikroavr.com> (diakses tanggal 23 Juli 2019)
- [42] MQ.2 <https://components101.com/mq2-gas-sensor> (diakses tanggal 25 Juli 2019)
- [43] PinOut Atmega2560: <https://lastminuteengineers.com> (diakses tanggal 30 Juli 2019)
- [44] Product and service <https://www.mobilestatistik.com/statistical-product-and-service-solution-spss/> (diakses tanggal 14 Januari 2019).
- [45] Rangkaian <https://gksteel.ru/id/installation/capacity-for-parallel-connection-electrical-capacitors-parallel-and-serial-connection-calculation-of-required-capacitance-with-examples.htm> (diakses tanggal 1 Agustus 2019)
- [46] Republik Indonesia, Peraturan Menteri Kesehatan Nomor 261/MENKES/SK/II/1998 tentang Temperatur dalam Ruangan yang Sehat adalah Temperatur yang Berkisar Antara 18°C-26°C
- [47] Walgito, B. 2004. *Pengantar Psikologi Umum*. Jakarta: Penerbit Andi.
- [48] Weiliang Zhao, Lan Ding, Paul Cooper, Pascal Perez, Duane A. Robinson "Smarthome sistem: integration of energi facilities and environmental factors" University of Wollongong Research Online 2014
- [49] Zhou, B., W. Li, K. W. Chan, Y. Cao, Y. Kuang, X. Liu, X. J. R. Wang and S. E. Reviews (2016). "Smarthome energi management sistems: Concept, configurations, and scheduling strategies." **61**: 30-40.

## LAMPIRAN



Lampiran 1. Kontrol Panel Sensor



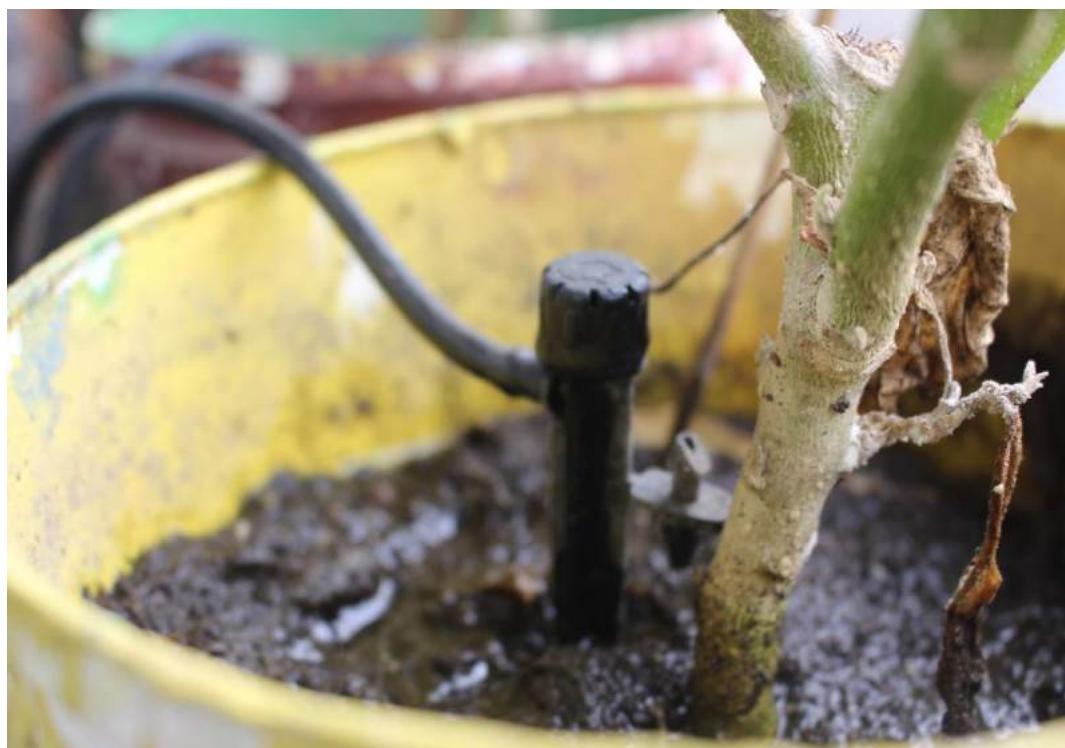
Lampiran 2. Panel Instalasi sistem smarthome



Lampiran 3. Sensor gas terdeteksi ada gas (warna tombol merah)



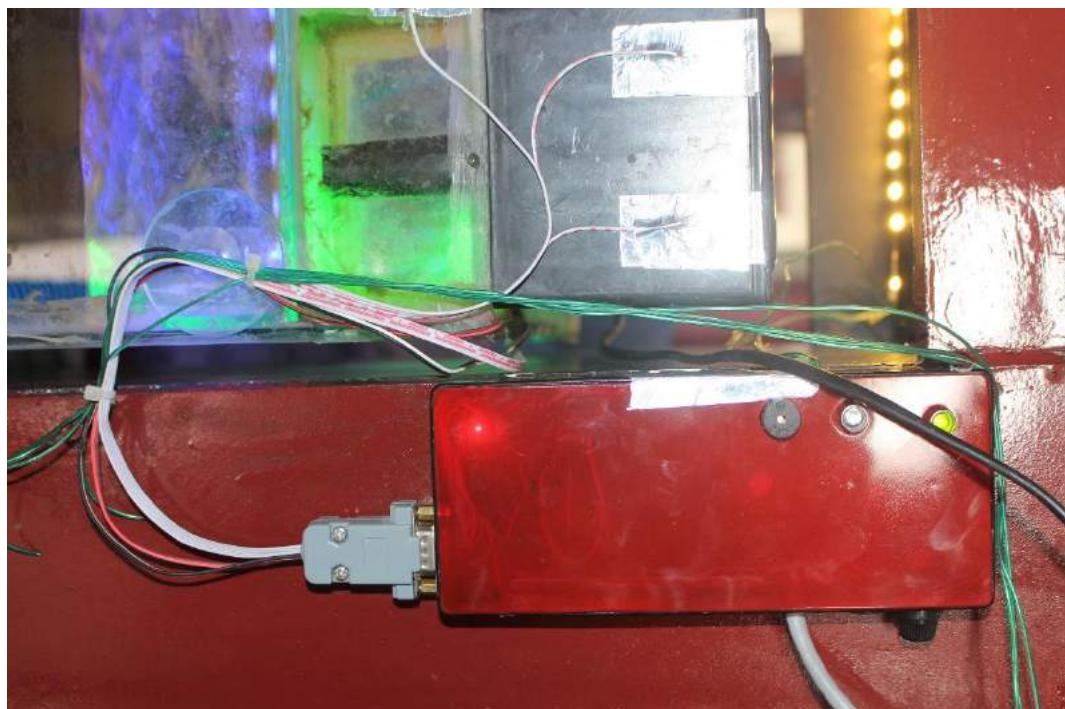
Lampiran 4. Sensor gas lampu warna hijau (tidak ada gas)



Lampiran 5. Sensor Gerak



Lampiran 6. Sensor gerak untuk ambil wudhu



Lampiran 6. Sensor level air pada aquarium



Lampiran 7. Accumulator

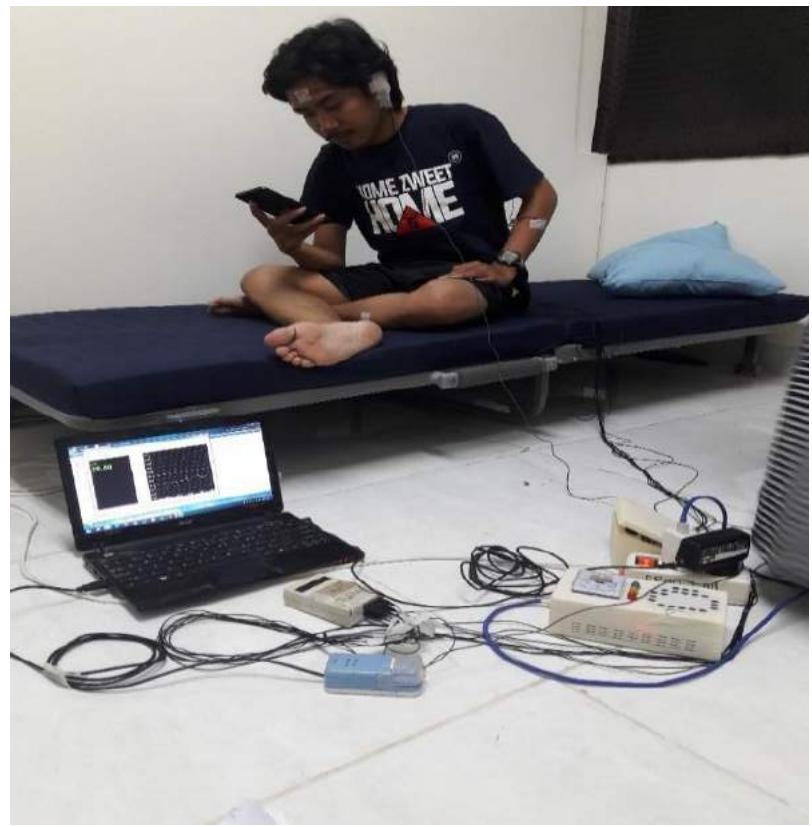


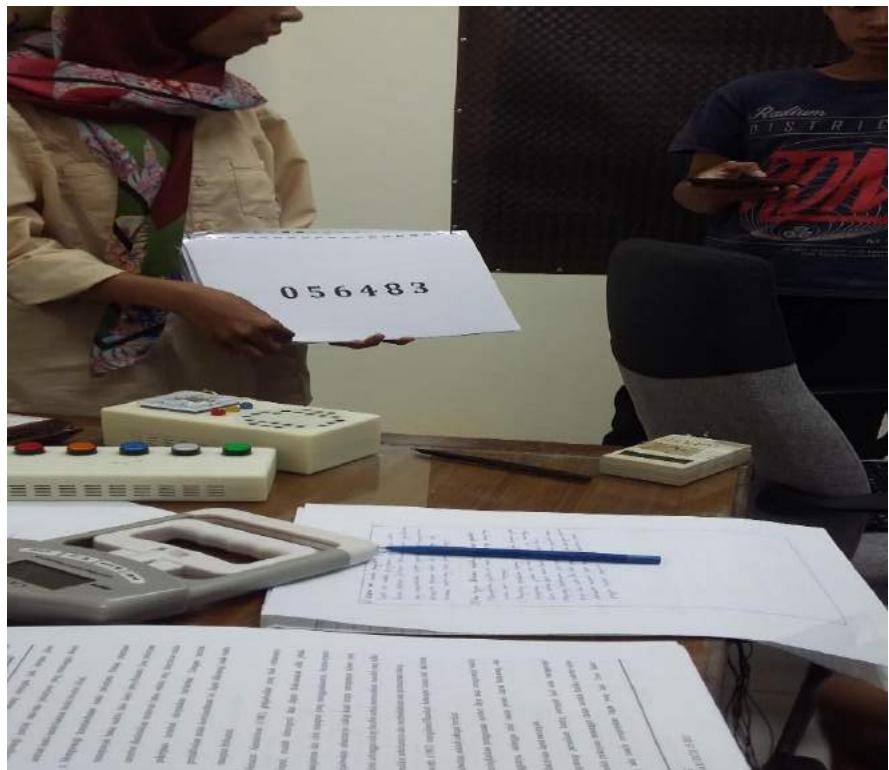


Lampiran 8. Panel surya

Lampiran 9 : Ilustrasi pengambilan data di lab.Ergonomik





















Lampiran 10. Data Responden Laki-laki Usia 35-45 tahun

A. Rata-rata *Reaction Time* Kondisi Suhu Ruangan 18°C

Nama	Stimulus teratur		Stimulus acak	
	Rata-Rata	Standar Deviasi	Rata-Rata	Standar Deviasi
Pak Akbar	0.96	0.24	1.11	0.01
Pak John	0.99	0.17	1.12	0.20
Pak Nur Syam	0.61	0.19	1.25	0.46
Pak Khairuddin	0.54	0.09	1.15	0.18
Pak Ramli	0.66	0.34	1.09	0.40
Pak Zul	0.67	0.08	1.00	0.17
Pak Tahir	0.70	0.14	1.18	0.11
Pak Heri	0.52	0.21	1.01	0.15
<b>Rata-rata</b>	<b>0.71</b>	<b>0.18</b>	<b>1.11</b>	<b>0.21</b>
<b>Standar Deviasi</b>	<b>0.18</b>	<b>0.09</b>	<b>0.08</b>	<b>0.15</b>

B. Rata-rata *Reaction Time* Kondisi Suhu Ruangan 24°C

Nama	Stimulus teratur		Stimulus acak	
	Rata-Rata	Standar Deviasi	Rata-Rata	Standar Deviasi
Pak Akbar	0.64	0.18	0.88	0.13
Pak John	0.94	0.13	1.60	0.40
Pak Nur Syam	0.41	0.10	0.73	0.10
Pak Khairuddin	0.44	0.17	1.27	0.54
Pak Ramli	0.96	0.64	1.82	0.76
Pak Zul	0.63	0.17	0.91	0.23
Pak Tahir	0.58	0.19	0.85	0.12
Pak Heri	0.52	0.09	1.16	0.30
<b>Rata-rata</b>	<b>0.64</b>	<b>0.21</b>	<b>1.15</b>	<b>0.32</b>
<b>Standar Deviasi</b>	<b>0.21</b>	<b>0.18</b>	<b>0.39</b>	<b>0.23</b>

C. Rata-rata *Reaction Time* Kondisi Suhu Ruangan Non AC

Nama	Stimulus teratur		Stimulus acak	
	Rata-Rata	Standar Deviasi	Rata-Rata	Standar Deviasi
Pak Akbar	0.66	0.27	0.92	0.22
Pak John	0.57	0.10	1.19	0.38
Pak Nur Syam	0.39	0.11	0.96	0.00
Pak Khairuddin	0.37	0.05	1.10	0.04
Pak Ramli	0.72	0.47	0.86	0.39
Pak Zul	0.53	0.15	0.78	0.12
Pak Tahir	0.50	0.13	0.75	0.15
Pak Heri	0.35	0.08	0.73	0.15
<b>Rata-rata</b>	<b>0.51</b>	<b>0.17</b>	<b>0.91</b>	<b>0.18</b>
<b>Standar Deviasi</b>	<b>0.14</b>	<b>0.14</b>	<b>0.17</b>	<b>0.14</b>

Rata-rata *memory recall*

A.Suhu 18°C										
Pak Akbar	7	6	4	6	5	8	9	6		
	6	7	8	6	6	7	7	8		
	10	Pak John	6	Pak Nur Syam	7	Pak Khairuddin	7	Pak Ramli	6	Pak Zul
	8	6	7	4	5	9	7	8	Pak Tahir	Pak Heri
	8	5	7	6	5	8	7	7		
	7	6	8	5	6	8	7	8		
<b>Rata-Rata</b>	<b>7.67</b>	<b>6.00</b>	<b>6.83</b>	<b>5.67</b>	<b>5.50</b>	<b>7.83</b>	<b>7.50</b>	<b>7.33</b>		
<b>Standar Deviasi</b>	<b>1.37</b>	<b>0.63</b>	<b>1.47</b>	<b>1.03</b>	<b>0.55</b>	<b>0.75</b>	<b>0.84</b>	<b>0.82</b>		

B. Suhu 24°C

Pak Akbar	7	6	7	6	7	8	7	7		
	7	8	8	6	7	8	7	7		
	7	8	8	6	7	8	7	7	Pak Tahir	Pak Heri
	8	6	10	6	4	9	7	7		
	8	9	8	6	6	10	5	5		
	8	7	7	5	5	8	7	6		
<b>Rata-Rata</b>	<b>7.50</b>	<b>7.33</b>	<b>8.33</b>	<b>6.17</b>	<b>5.67</b>	<b>8.50</b>	<b>6.50</b>	<b>6.67</b>		
<b>Standar Deviasi</b>	<b>0.55</b>	<b>1.21</b>	<b>1.37</b>	<b>0.98</b>	<b>1.21</b>	<b>0.84</b>	<b>0.84</b>	<b>0.52</b>		

C. Non AC											
Pak Akbar	7	7	7	6	8	10	7	8	7	7	8
	7	7	9	7	6	8	7	8	7	7	7
	6	Pak John	7	Pak Nur Syam	10	Pak Khairuddin	7	Pak Ramli	7	Pak Zul	9
	7	7	8	7	6	8	7	8	6	8	8
	7	7	8	8	7	8	7	8	8	8	9
	7	8	7	7	5	9	7	9	7	7	9
Rata-Rata	<b>6.83</b>		<b>7.17</b>		<b>8.17</b>		<b>7.00</b>		<b>6.50</b>		<b>8.67</b>
Standar Deviasi	<b>0.41</b>		<b>0.41</b>		<b>1.17</b>		<b>0.63</b>		<b>1.05</b>		<b>0.82</b>
										<b>0.75</b>	<b>0.89</b>

### Sensasi Subjektif Termal

**A. Suhu 18 Derajat**

Nama	Skala					
Pak Akbar	-2	-2	-2	-3	-3	-3
Pak John	0	0	-1	-1	-2	-3
Pak Nur Syam	1	0	-1	-1	-2	-2
Pak Khairuddin	-1	-2	-2	-2	-3	-3
Pak Ramli	-1	-1	-1	-1	-1	-1
Pak Zul	-1	-1	-1	-2	-2	-2
Pak Tahir	Pak Akbar	-1	-1	-2	-2	-2
Pak Heri	Pak John	-1	-1	-1	-1	-1
<b>Rata-Rata</b>	Pak Nur Syam	-1	-2	-2	-2	
<b>Standar Deviasi</b>	Pak Khairuddin	0	1	1	1	

**B. Suhu 24 Derajat**

Nama	Skala					
Pak Akbar	0	0	0	0	0	-1
Pak John	0	0	0	0	-1	-1
Pak Nur Syam	1	1	1	1	1	1
Pak Khairuddin	0	0	0	0	0	0
Pak Ramli	-1	-1	-1	-1	-1	-1
Pak Zul	0	0	0	0	0	0
Pak Tahir	0	0	0	1	1	-1
Pak Heri	0	0	2	2	2	-1
<b>Rata-Rata</b>	0	2	2	2	2	-1
<b>Standar Deviasi</b>	2	2	2	2	1	1

Pak Ramli	C	Non AC	0	0	0	0	0
Pak Zul	Nama						2 2 2 2 2 2
Pak Tahir			2	2	2	2	2 2 2 2
Pak Heri			1	1	1	2	2 2 2
<b>Rata-Rata</b>			1	1	1	2	2 2 2
<b>Standar Deviasi</b>			1	1	1	1	1 1 1

### Sensasi Kenyamanan Termal

<b>A. Suhu 18 Derajat</b>						
<b>Nama</b>	<b>Skala</b>					
Pak Akbar	-2	-2	-2	-2	-2	-2
Pak John	2	2	-1	-1	-2	-2
Pak Nur Syam	2	2	2	2	2	2
Pak Khairuddin	2	2	2	2	2	2
Pak Ramli	2	2	2	2	2	2
Pak Zul	0	0	0	-1	-1	-1
Pak Tahir	-1	-1	-1	-1	-2	-2
Pak Heri	2	2	2	2	2	-1
<b>Rata-rata</b>	1	1	1	0	0	0
<b>standar Deviasi</b>	2	2	2	2	2	2

<b>B. Suhu 24 Derajat</b>						
<b>Nama</b>	<b>Skala</b>					
Pak Akbar	0	0	0	0	0	0
Pak John	2	2	2	2	2	2
Pak Nur Syam	2	2	2	2	2	2
Pak Khairuddin	2	2	2	2	2	2
Pak Ramli	2	2	2	2	-2	-2
Pak Zul	2	2	2	2	2	2
Pak Tahir	2	2	2	2	2	2
Pak Heri	0	0	0	2	2	2
<b>Rata-rata</b>	2	2	2	2	1	1
<b>standar Deviasi</b>	1	1	1	1	1	1

<b>C. Non AC</b>						
<b>Nama</b>	<b>Skala</b>					
Pak Akbar	0	0	0	2	2	2
Pak John	2	2	2	2	2	2
Pak Nur Syam	2	2	2	2	2	2
Pak Khairuddin	-1	-1	-1	-1	-1	-1
Pak Ramli	1	1	1	1	1	1
Pak Zul	-1	-1	-1	-1	-1	0
Pak Tahir	1	1	1	1	0	0
Pak Heri	-1	-1	-2	-2	-2	-2
<b>Rata-rata</b>	0	0	0	1	0	1
<b>standar Deviasi</b>	1	1	1	2	2	2

A.Rata-rata Heart Rate Kondisi Suhu Ruangan 18°C

Nama	Menit Ke-									
	30	60	90	120	150	Rata-rata	S.Deviasi	Rata-rata	S.Deviasi	Rata-rata
Pak Akbar	107.64	34.40	107.64	34.40	107.63	34.40	107.64	34.40	107.64	34.39
Pak John	64.21	20.58	64.18	20.57	64.26	20.54	64.33	20.52	64.37	20.51
Pak Nur Syam	76.59	10.33	76.53	10.19	76.49	10.19	76.43	10.17	76.45	10.19
Pak Khaeruddin	84.16	13.03	84.16	13.02	84.14	13.06	84.35	13.06	84.70	12.89
Pak Ramli	75.30	13.43	75.31	13.42	75.31	13.43	75.32	13.43	75.30	13.43
Pak Tahir	70.80	9.54	70.80	9.53	70.85	9.53	70.90	9.53	70.92	9.54
Pak Heri	79.98	7.36	80.03	7.39	79.94	7.26	79.88	7.00	79.94	7.07
Pak Zul	84.66	15.50	84.38	14.84	84.24	14.82	84.33	15.09	83.92	14.47
Rata-Rata	80.42		80.38		80.36		80.40		80.41	
Standar Deviasi	12.93		12.92		12.89		12.89		12.88	

B.Rata-rata Heart Rate Kondisi Suhu Ruangan 24°C

	Menit Ke-				
	30	60	90	120	150
Rata-Rata	85.27	85.16	86.00	87.25	87.78
Standar Deviasi	15.07	14.82	16.55	19.42	20.65

Pak Akbar	93.85	25.61	93.93	25.60	94.00	25.59	94.04	25.58	94.05	25.57
Pak John	62.95	5.38	62.94	5.35	63.02	5.33	63.08	5.36	63.10	5.38
Pak Nur Syam	73.65	4.69	73.65	4.69	73.71	4.71	73.71	4.71	73.78	4.70
Pak Khaeruddin	93.05	17.34	93.08	17.32	93.19	17.28	93.25	17.25	93.29	17.24
Pak Ramli	113.16	59.22	112.16	58.16	118.58	61.45	128.39	64.84	132.46	66.25
Pak Tahir	84.02	11.30	84.02	11.31	84.04	11.29	84.09	11.29	84.10	11.29
Pak Heri	79.70	3.91	79.71	3.91	79.71	3.91	79.71	3.91	79.72	3.91
Pak Zul	81.78	5.40	81.78	5.41	81.76	5.42	81.76	5.42	81.75	5.42

C.Rata-rata *Heart Rate* Kondisi Suhu Ruangan *air conditioner* tidak digunakan

Nama	Menit Ke-								
	30	60	90	120	150	Rata- Rata S.Deviasi	S.Deviasi Rata-rata	S.Deviasi Rata-rata	S.Deviasi Rata-rata
Pak Akbar	85.35	5.60	85.36	5.60	85.36	5.60	85.35	5.60	85.35
Pak John	75.37	31.53	75.47	31.48	75.52	31.47	75.52	31.47	75.52
Pak Nur Syam	73.67	5.10	73.68	5.10	73.71	5.14	73.72	5.17	73.67
Pak Khaeruddin	90.41	6.92	90.42	6.92	90.47	6.89	90.45	6.87	90.49
Pak Ramli	82.49	23.44	80.77	18.54	81.35	20.31	81.65	21.14	81.83
Pak Tahir	99.03	22.54	99.02	22.54	99.15	22.58	99.22	22.59	99.23
Pak Heri	79.32	3.12	79.33	3.12	79.32	3.07	79.36	3.09	79.38
Pak Zul	81.73	4.23	81.69	4.22	81.68	4.22	81.69	4.22	81.69
Rata-Rata	83.42		83.22		83.32		83.37		83.40
Standar Deviasi	8.25		8.28		8.29		8.30		8.31

A.Rata-rata *Membrane Tympanic Temperature* Kondisi Suhu Ruangan 18°C

Nama	Menit Ke-											
	30	60	90	120	150	rata- Rata	S.Deviasi	Rata-rata	S.Deviasi Rata-rata	S.Deviasi Rata-rata	S.Deviasi Rata-rata	S.Deviasi Rata-rata
Pak Akbar	37.11	0.19	37.11	0.17	37.03	0.20	36.99	0.20	36.98	0.18		
Pak John	36.36	0.07	36.38	0.06	36.40	0.06	36.42	0.07	36.41	0.07		
Pak Nur Syam	37.65	0.38	36.91	0.36	36.95	0.31	36.98	0.27	36.99	0.25		
Pak Khaeruddin	37.65	0.02	37.58	0.09	37.49	0.25	37.42	0.18	37.39	0.17		
Pak Ramli	37.27	0.19	37.29	0.19	37.23	0.25	37.15	0.33	37.17	0.33		
Pak Tahir	36.96	0.10	37.04	0.11	37.05	0.09	37.03	0.10	37.02	0.09		
Pak Heri	36.73	0.48	36.78	0.46	36.76	0.45	36.76	0.45	36.79	0.45		
Pak Zul	37.08	0.19	37.07	0.21	36.96	0.26	36.91	0.30	36.91	0.30		
Rata-Rata	37.10		37.02		36.98		36.96		36.96			
Standar Deviasi	0.44		0.35		0.32		0.29		0.29			

B.Rata-rata Membrane Tympanic Temperature Kondisi Suhu Ruangan 24°C

Nama	Menit Ke-									
	30		60		90		120		150	
rata- Rata	S.Deviasi	Rata-rata	S.Deviasi	Rata-rata	S.Deviasi	Rata-rata	S.Deviasi	Rata-rata	S.Deviasi	
Pak Akbar	37.11	0.19	37.11	0.17	37.03	0.20	36.99	0.20	36.98	0.18
Pak John	36.36	0.07	36.38	0.06	36.40	0.06	36.42	0.07	36.41	0.07
Pak Nur Syam	37.65	0.38	36.91	0.36	36.95	0.31	36.98	0.27	36.99	0.25
Pak Khaeruddin	37.65	0.02	37.58	0.09	37.49	0.25	37.42	0.18	37.39	0.17
Pak Ramli	37.27	0.19	37.29	0.19	37.23	0.25	37.15	0.33	37.17	0.33
Pak Tahir	36.96	0.10	37.04	0.11	37.05	0.09	37.03	0.10	37.02	0.09
Pak Heri	36.73	0.48	36.78	0.46	36.76	0.45	36.76	0.45	36.79	0.45
Pak Zul	37.08	0.19	37.07	0.21	36.96	0.26	36.91	0.30	36.91	0.30
<b>Rata-Rata</b>	37.10		37.02		36.98		36.96		36.96	
<b>Standar Deviasi</b>	0.44		0.35		0.32		0.29		0.29	

C. Rata-rata Membrane Tympanic Temperature Kondisi Suhu Ruangan Air Conditioner tidak digunakan

Nama	Menit Ke-									
	30		60		90		120		150	
Rata-rata	S.Deviasi	Rata-rata	S.Deviasi	Rata-rata	S.Deviasi	Rata-rata	S.Deviasi	Rata-rata	S.Deviasi	
Pak Akbar	37.17	0.17	37.25	0.14	37.28	0.14	37.27	0.14	37.24	0.14
Pak John	36.60	0.18	36.55	0.26	36.68	0.46	36.76	0.55	36.58	0.63
Pak Nur Syam	37.58	0.10	37.38	0.09	37.36	0.09	37.35	0.08	37.34	0.09
Pak Khaeruddin	37.58	0.15	37.57	0.11	37.55	0.27	37.54	0.08	37.52	0.09
Pak Ramli	37.62	0.17	37.64	0.17	37.58	0.27	37.52	0.33	37.47	0.35
Pak Tahir	37.29	0.02	37.27	0.06	37.27	0.05	37.26	0.05	37.25	0.16
Pak Heri	36.88	0.23	36.99	0.29	37.05	0.29	37.03	0.27	37.04	0.25
Pak Zul	37.42	0.34	37.97	0.90	38.60	1.19	39.00	1.27	39.19	1.21
<b>Rata-Rata</b>	37.27		37.33		37.42		37.47		37.45	
<b>Standar Deviasi</b>	0.37		0.43		0.56		0.67		0.76	

Rata-rata Skin Temperature kondisi suhu ruangan 18°C

	PAK AKBAR		PAK KHAE		PAK ZUL		PAK HERI		PAK TAHIR		PAK RAMLI		Pak Nur SYAM		PAK JOHN			
	Mean	STDEV	Mean	STDEV	Mean	STDEV	Mean	STDEV	Mean	STDEV	Mean	STDEV	Mean	STDEV	Mean	STDEV	MEAN	STDEV
30	33.19	0.28	34.72	0.26	34.01	0.08	31.50	0.33	33.43	0.07	32.49	0.29	33.98	0.20	32.07	0.20	33.17	1.09
60	32.70	0.11	34.16	0.32	33.45	0.12	30.72	0.14	33.39	0.09	31.99	0.24	33.33	0.10	31.62	0.21	32.67	1.14
90	32.48	0.20	34.54	0.18	33.13	0.22	30.94	0.23	33.36	0.08	31.52	0.23	33.02	0.09	31.38	0.13	32.55	1.20
120	32.28	0.13	34.47	0.23	32.78	0.18	30.85	0.20	33.24	0.05	31.19	0.20	32.78	0.16	31.26	0.17	32.36	1.22
150	32.23	0.04	34.10	0.38	32.35	0.11	31.05	0.11	33.13	0.06	30.61	0.15	32.44	0.12	31.51	0.09	32.18	1.13

Rata-rata Skin Temperature kondisi suhu ruangan 24°C

	PAK AKBAR		PAK KHAE		PAK TAHIR		PAK RAMLI		PAK NUR SYAM		PAK HERI		PAK ZUL		PAK JOHN			
	MEAN	STDEV	MEAN	STDEV	MEAN	STDEV	MEAN	STDEV	MEAN	STDEV	MEAN	STDEV	MEAN	STDEV	MEAN	STDEV	MEAN	STDEV
30	34.10	0.05	34.72	0.26	34.20	0.11	33.90	0.30	34.20	0.16	34.10	0.05	33.69	0.09	33.56	0.11	34.06	0.36
60	34.29	0.08	34.16	0.32	34.55	0.07	34.12	0.13	34.47	0.14	34.29	0.08	33.95	0.10	33.77	0.12	34.20	0.26
90	33.63	0.22	34.54	0.18	34.70	0.24	34.17	0.16	34.29	0.10	33.63	0.22	34.12	0.07	33.82	0.04	34.11	0.40
120	33.29	0.33	34.47	0.23	34.58	0.09	33.72	0.33	34.00	0.08	33.29	0.33	33.79	0.12	33.90	0.05	33.88	0.48
150	32.85	0.14	34.10	0.38	34.71	0.30	33.20	0.17	33.85	0.12	32.85	0.14	33.60	0.19	33.79	0.07	33.62	0.64

Rata-rata Skin Temperature kondisi suhu ruangan air conditioner tidak digunakan

	PAK AKBAR		PAK KHAE		PAK ZUL		PAK TAHIR		PAK HERI		PAK RAMLI		PAK NUR SYAM					
	Mean	STDEV	Mean	STDEV	Mean	STDEV	Mean	STDEV	Mean	STDEV	Mean	STDEV	Mean	STDEV	Mean	STDEV	MEAN	STDEV
30	33.70	0.08	33.19	0.28	34.36	0.12	34.33	0.22	34.42	0.09	33.97	0.07	34.79	0.14	32.07	0.20	33.85	0.87
60	34.09	0.12	32.70	0.11	34.37	0.11	34.70	0.20	34.59	0.10	34.14	0.05	35.00	0.09	31.62	0.21	33.90	1.15
90	34.39	0.10	32.48	0.20	34.36	0.09	35.06	0.17	34.57	0.08	34.21	0.06	34.94	0.08	31.38	0.13	33.93	1.30
120	33.93	0.25	32.28	0.13	34.70	0.10	34.73	0.19	34.36	0.08	34.27	0.06	34.77	0.17	31.26	0.17	33.79	1.31
150	33.98	0.23	32.23	0.04	34.65	0.08	34.45	0.13	34.21	0.08	34.21	0.07	34.46	0.29	31.51	0.09	33.71	1.17

Lampiran 11 : Data Responden Rentang Usia 18-22 tahun

A. Data Rata-rata *Reaction Time* Kondisi suhu 18°C

Nama	Stimulus teratur		Stimulus acak	
	Rata-Rata	Standar Deviasi	Rata-Rata	Standar Deviasi
Sesario	0.99	0.44	1.05	0.43
Nanda	0.68	0.64	0.77	0.23
Reza	0.92	0.39	1.03	0.03
Alief	0.97	0.29	1.16	0.30
Fadil	0.51	0.14	0.72	0.03
Laode	0.78	0.12	0.87	0.02
Ihwan	0.63	0.04	0.70	0.07
Lukman	0.59	0.37	0.93	0.07
Rata-rata	0.76	0.30	0.90	0.15
Standar Deviasi	0.19	0.20	0.17	0.16

B. Data Rata-rata *Reaction Time* Kondisi suhu 24°C

Nama	Stimulus teratur		Stimulus acak	
	Rata-Rata	Standar Deviasi	Rata-Rata	Standar Deviasi
Sesario	0.63	0.28	1.08	0.04
Nanda	0.79	0.83	1.02	0.18
Reza	0.64	0.29	0.95	0.11
Alief	0.32	0.03	0.77	0.02
Fadil	0.55	0.36	0.84	0.13
Laode	0.72	0.08	0.73	0.03
Ihwan	0.49	0.09	0.94	0.54
Lukman	0.55	0.16	1.00	0.32
Rata-rata	0.59	0.27	0.92	0.17
Standar Deviasi	0.14	0.26	0.12	0.18

C. Data Rata-rata *Reaction Time* Kondisi suhu 24°C

Nama	Stimulus teratur		Stimulus acak	
	Rata-Rata	Standar Deviasi	Rata-Rata	Standar Deviasi
Sesario	0.40	0.08	0.98	0.44
Nanda	0.49	0.24	0.86	0.03
Reza	0.35	0.19	0.82	0.24
Alief	0.32	0.16	0.81	0.24
Fadil	0.25	0.03	0.71	0.21
Laode	0.46	0.09	0.88	0.34
Ihwan	0.45	0.23	0.70	0.08
Lukman	0.42	0.03	0.71	0.24
Rata-rata	<b>0.39</b>	<b>0.13</b>	<b>0.81</b>	<b>0.23</b>
Standar Deviasi	<b>0.08</b>	<b>0.08</b>	<b>0.10</b>	<b>0.13</b>

Data Rata-rata Memory Recall

A Suhu 18 Derajat										
Sesario	8		7	7	7	9	5	7		8
	7		6	5	7	10	8		7	8
	9	Nanda	8	Reza	6	Alief	8	Fadil	8	Ihwan
	10		6		6		8		7	Lukman
	9		6		6		8		8	
	8		7		6		7		9	
Rata-Rata	8.50		6.67		6.00		7.50		8.50	
Standar Deviasi	1.05		0.82		0.63		0.55		0.84	

B. Suhu 24 Derajat										
Sesario	9		6	9	9	7	6	12		8
	10		8	8	9	7	7	9		8
	10	Nanda	8	Reza	6	Alief	7	Fadil	8	Ihwan
	7		7		9		8		7	Lukman
	9		8		5		8		8	
	8		7		6		8		8	
Rata-Rata	8.83		7.33		7.17		8.17		7.67	
Standar Deviasi	1.17		0.82		1.72		0.75		0.52	

C.Non Ac												
Sesario	9	8	6	8	8	8	8	10	8	9	Lukman	7
	9	8	9	8	8	8	8	10	9	10	Ihwan	7
	8	Nanda	7	Reza	10	Alief	8	Fadil	7	Laode	7	8
	8		7		7		9		8		7	7
	8		8		8		9		8		9	10
	8		7		8		9		7		9	11
Rata-Rata	<b>8.33</b>		<b>7.50</b>		<b>8.00</b>		<b>8.50</b>		<b>7.67</b>		<b>8.00</b>	<b>9.67</b>
Standar Deviasi	<b>0.52</b>		<b>0.55</b>		<b>1.41</b>		<b>0.55</b>		<b>0.52</b>		<b>0.89</b>	<b>1.03</b>
												<b>7.33</b>

### Data Rata-rata Sensasi Subjektif Termal

<b>A.Suhu 18 Derajat</b>						
<b>Nama</b>	<b>Skala</b>					
Sesario	-2	-2	-2	-2	-2	-2
Nanda	-1	-1	-1	-2	-2	-2
Reza	-1	-1	-1	-1	-1	-1
Alief	-1	-1	-2	-2	-2	-2
Fadil	-1	-1	-1	-1	-2	-2
Laode	-1	-1	-2	-2	-2	-2
Ihwan	-1	-1	-2	-2	-2	-3
Lukman	-1	-1	-2	-2	-2	-3
<b>Rata-rata</b>	<b>-1</b>	<b>-1</b>	<b>-2</b>	<b>-2</b>	<b>-2</b>	<b>-2</b>
<b>Standar Deviasi</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>1</b>

<b>3.Suhu 24 Derajat</b>						
<b>Nama</b>	<b>Skala</b>					
Sesario	0	0	0	-1	-1	-1
Nanda	0	0	0	0	0	0
Reza	0	0	0	0	-1	-1
Alief	0	0	0	0	-1	-1
Fadil	-1	-1	-1	-1	-1	-1
Laode	-1	-1	-1	-2	-2	-2
Ihwan	-1	-1	-1	-1	-2	-2
Lukman	-1	-1	-1	-1	-2	-2
<b>Rata-rata</b>	<b>-1</b>	<b>-1</b>	<b>-1</b>	<b>-1</b>	<b>-1</b>	<b>-1</b>
<b>Standar Deviasi</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>

<b>C.Non AC</b>						
<b>Nama</b>	<b>Skala</b>					
Sesario	2	2	2	2	2	2
Nanda	1	1	2	2	2	2
Reza	1	1	2	2	2	2
Alief	1	1	1	1	2	2
Fadil	0	0	0	2	2	2
Laode	2	2	2	2	2	2
Ihwan	1	1	2	2	2	2
Lukman	2	2	2	2	3	3
<b>Rata-rata</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>
<b>Standar Deviasi</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>

Sensasi Kenyamanan termal

**A.Suhu 18 Derajat**

		<b>Skala</b>					
	<b>Nama</b>	1	1	1	1	1	-1
Sesario		1	1	1	-1	-1	-1
Nanda		1	1	1	-1	-1	-1
Reza		2	2	2	2	2	2
Alief		2	2	2	2	2	2
Fadil		1	1	1	-1	-1	-1
Laode		2	2	-2	-2	-2	-2
Ihwan		1	1	1	-1	-1	-1
Lukman		2	2	2	-2	-2	-2
<b>Rata-rata</b>		<b>2</b>	<b>2</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>-1</b>
<b>Standar Deviasi</b>		<b>1</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>2</b>

**B.Suhu 24 Derajat**

		<b>Skala</b>					
	<b>Nama</b>	1	1	1	1	-1	-1
Sesario		1	1	1	-2	-2	-2
Nanda		2	2	2	2	2	2
Reza		2	2	2	2	2	2
Alief		2	2	2	2	2	2
Fadil		2	2	2	2	1	1
Laode		2	2	2	2	1	1
Ihwan		2	2	2	2	2	2
Lukman		2	2	2	2	2	2
<b>Rata-rata</b>		<b>2</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>1</b>
<b>Standar Deviasi</b>		<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>2</b>

**C.Non AC**

		<b>Skala</b>					
	<b>Nama</b>	-1	-1	-1	-1	-2	-2
Sesario		-1	-1	-1	-2	-2	-2
Nanda		-1	-1	-1	-2	-2	-2
Reza		-1	-1	-1	-2	-2	-2
Alief		2	2	2	2	2	2
Fadil		2	2	2	-1	-1	-1
Laode		-1	-1	-1	-1	-1	-1
Ihwan		2	2	2	2	2	2
Lukman		-2	-2	-2	-2	-2	-2
<b>Rata-rata</b>		<b>0</b>	<b>0</b>	<b>0</b>	<b>-1</b>	<b>-1</b>	<b>-1</b>
<b>standar Deviasi</b>		<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>

### A.Data Rata-rata Heart Rate Suhu Ruangan 18°C

Nama	Menit Ke-									
	30		60		90		120		150	
Rata-rata	S.Deviasi	Rata-rata	S.Deviasi	Rata-rata	S.Deviasi	Rata-rata	S.Deviasi	Rata-rata	S.Deviasi	
Sesario	87.22	7.93	87.21	7.94	87.23	7.93	87.14	7.86	87.14	7.90
Nanda	77.98	6.90	77.98	6.90	77.97	6.90	77.97	6.90	77.97	6.90
Reza	80.90	7.03	80.92	7.02	80.93	7.01	80.93	7.01	80.93	7.01
Alief	64.21	20.58	64.18	20.57	64.26	20.54	64.33	20.52	64.37	20.51
Fadil	74.26	6.83	74.29	6.84	74.34	6.82	74.39	6.80	74.37	6.78
Laode	67.36	3.80	67.12	4.13	66.95	4.30	66.85	4.37	66.73	4.40
Ihwan	84.70	5.99	84.49	5.95	84.56	5.94	84.63	5.91	84.46	5.86
Lukman	80.90	7.03	80.93	7.01	80.94	7.01	80.93	7.01	80.94	7.01
<b>Rata-Rata</b>	77.19		77.14		77.15		77.15		77.11	
<b>Standar Deviasi</b>	8.10		8.12		8.14		8.14		8.12	

### B.Data Rata-rata Heart Rate Suhu Ruangan 24°C

Nama	Menit Ke-									
	30		60		90		120		150	
Rata-rata	S.Deviasi	Rata-rata	S.Deviasi	Rata-rata	S.Deviasi	Rata-rata	S.Deviasi	Rata-rata	S.Deviasi	
Sesario	75.97	11.22	75.96	11.23	75.96	11.22	75.96	11.22	75.96	11.22
Nanda	82.67	5.31	82.67	5.31	82.66	5.31	82.66	5.31	82.66	5.31
Reza	71.25	8.94	71.26	8.93	71.42	8.98	71.38	8.92	71.31	8.98
Alief	79.70	3.91	79.71	3.90	79.72	3.91	79.71	3.91	79.72	3.91
Fadil	158.24	50.64	157.01	50.95	155.97	51.42	157.77	50.91	157.16	51.27
Laode	77.69	9.69	77.64	9.67	77.65	9.67	77.66	9.68	77.66	9.68
Ihwan	83.20	6.23	83.17	6.17	83.11	6.10	83.19	6.19	83.14	6.14
Lukman	87.24	5.84	87.35	5.86	87.36	5.88	87.34	5.91	87.31	5.91
<b>Rata-Rata</b>	89.50		89.35		89.23		89.46		89.37	
<b>Standar Deviasi</b>	28.20		27.78		27.40		28.03		27.83	

### C.Data Rata-rata Heart Rate Kondisi Suhu Ruangan Air Conditioner tidak digunakan

Nama	Menit Ke-									
	30		60		90		120		150	
Rata-rata	S.Deviasi	Rata-rata	S.Deviasi	Rata-rata	S.Deviasi	Rata-rata	S.Deviasi	Rata-rata	S.Deviasi	
Sesario	98.96	22.30	98.97	22.29	98.97	22.29	98.97	22.28	98.97	22.28
Nanda	89.51	7.17	90.05	6.95	90.34	6.81	90.42	6.69	90.51	6.65
Reza	75.57	4.45	75.56	4.45	75.54	4.43	75.55	4.43	75.55	4.44
Alief	79.76	6.28	79.73	6.26	79.72	6.25	79.70	6.26	79.70	6.26
Fadil	88.56	8.41	88.51	8.39	88.54	8.37	88.56	8.36	88.58	8.36
Laode	71.09	4.46	71.13	4.49	71.12	4.48	71.13	4.48	71.13	4.49
Ihwan	87.53	6.72	87.69	7.06	87.82	7.22	87.95	7.37	88.13	7.45
Lukman	82.10	4.92	82.09	4.91	82.09	4.91	82.09	4.91	82.09	4.91
<b>Rata-Rata</b>	84.13		84.21		84.27		84.30		84.33	
<b>Standar Deviasi</b>	8.84		8.89		8.93		8.95		8.97	

A. Data Rata-rata *Membrane Tympanic Temperature* Kondisi Suhu Ruangan 18°C

Nama	Menit Ke-									
	30	60	90	120	150					
Sesario	37.03	0.08	36.90	0.16	36.81	0.18	36.75	0.20	36.68	0.23
Nanda	37.32	0.05	37.20	0.16	37.08	0.30	36.86	0.97	36.85	0.89
Reza	37.01	0.08	36.90	0.16	36.81	0.18	36.75	0.20	36.68	0.23
Alief	37.01	0.08	36.90	0.14	36.79	0.09	36.69	0.23	36.63	0.25
Fadil	36.51	0.08	36.48	0.07	36.44	0.09	36.37	0.14	36.32	0.17
Laode	37.07	0.04	37.00	0.07	36.99	0.06	36.97	0.07	36.94	0.08
Ihwan	37.13	0.03	37.05	0.08	37.00	0.10	36.94	0.14	36.89	0.16
Lukman	35.94	0.36	36.32	0.55	36.37	0.54	36.32	0.49	36.24	0.48
<b>Rata-Rata</b>	36.88		36.84		36.79		36.71		36.65	
<b>Standar Deviasi</b>	0.44		0.29		0.26		0.24		0.26	

B. Data Rata-rata *Membrane Tympanic Temperature* Kondisi Suhu Ruangan 24°C

Nama	Menit Ke-									
	30	60	90	120	150					
Sesario	36.69	0.09	36.70	0.11	36.71	0.16	36.69	0.15	36.64	0.17
Nanda	37.27	0.25	37.18	0.31	37.06	0.38	37.03	0.41	36.92	0.47
Reza	36.26	0.26	36.77	0.23	36.70	0.24	36.67	0.22	36.62	0.22
Alief	36.26	0.71	36.39	0.63	36.47	0.50	36.57	0.67	36.60	0.62
Fadil	37.17	0.33	37.13	0.45	37.21	0.50	37.17	0.50	37.19	0.49
Laode	37.18	0.05	37.17	0.04	37.16	0.04	37.18	0.06	37.21	0.08
Ihwan	35.76	0.47	35.86	0.35	35.94	0.31	36.00	0.29	36.01	0.27
Lukman	36.50	0.07	36.43	0.10	36.46	0.10	36.47	0.09	36.46	0.09
<b>Rata-Rata</b>	36.64		36.70		36.71		36.72		36.71	
<b>Standar Deviasi</b>	0.54		0.46		0.43		0.40		0.40	

C. Data Rata-rata *Membrane Tympanic Temperature* Suhu Ruangan Air Conditioner tidak digunakan

Nama	Menit Ke-									
	30	60	90	120	150					
Sesario	36.74	0.18	36.73	0.19	36.73	0.21	36.73	0.19	36.73	0.20
Nanda	37.29	0.35	37.27	0.30	37.20	0.32	37.13	0.37	37.14	0.38
Reza	37.08	0.16	37.43	0.16	37.36	0.22	37.26	0.32	37.18	0.37
Alief	37.08	0.08	37.13	0.09	37.17	0.04	37.14	0.10	37.12	0.18
Fadil	37.22	0.05	37.20	0.04	37.20	0.04	37.19	0.04	37.18	0.04
Laode	37.22	0.05	37.20	0.04	37.20	0.04	37.19	0.04	37.18	0.04
Ihwan	37.15	0.12	37.19	0.15	37.20	0.14	37.19	0.14	37.19	0.13
Lukman	36.59	0.20	36.60	0.14	36.55	0.13	36.56	0.12	36.55	0.11
<b>Rata-Rata</b>	37.05		37.09		37.08		37.05		37.03	
<b>Standar Deviasi</b>	0.25		0.28		0.28		0.26		0.25	

**Data Rata-rata Skin Temperature Kondisi Suhu Ruangan 18°C**

ALIEF		FADIL		RIO		LUKMAN		REZA		NANDA		IHWAN		LAODE				
	Mean	STDEV	Mean	STDEV	Mean	STDEV	Mean	STDEV	Mean	STDEV	Mean	STDEV	Mean	STDEV	Mean	STDEV	MEAN	STDEV
30	33.86	0.37	33.97	0.13	33.24	0.16	33.29	0.09	33.29	0.09	34.32	0.23	33.76	0.13	33.88	0.13	33.70	0.39
60	34.60	0.13	33.60	0.12	33.33	0.12	33.19	0.10	33.19	0.10	33.74	0.10	32.94	0.40	33.29	0.18	33.48	0.52
90	34.84	0.14	33.33	0.14	32.75	0.16	32.79	0.07	32.79	0.07	33.89	0.18	32.87	0.38	32.87	0.16	33.27	0.75
120	34.85	0.14	32.86	0.13	32.12	0.15	32.64	0.11	32.64	0.11	34.02	0.15	33.25	0.14	32.65	0.17	33.13	0.89
150	34.91	0.10	32.86	0.13	31.81	0.22	32.32	0.09	32.32	0.09	33.92	0.09	32.96	0.08	32.37	0.14	32.93	1.02

**Data Rata-rata SkinTemperature Kondisi Suhu Ruangan 24°C**

ALIEF		FADIL		NANDA		LUKMAN		REZA		LAODE		RIO		IHWAN				
MEAN	STDEV	MEAN	STDEV	MEAN	STDEV	MEAN	STDEV	MEAN	STDEV	MEAN	STDEV	MEAN	STDEV	MEAN	STDEV	MEAN	STDEV	
30	33.86	0.37	33.09	0.24	34.32	0.23	34.02	0.23	32.72	0.33	33.88	0.13	32.58	0.22	33.87	0.18	33.54	0.65
60	34.60	0.13	33.62	0.11	33.74	0.10	33.64	0.18	32.52	0.30	33.29	0.18	32.41	0.20	33.52	0.23	33.42	0.70
90	34.84	0.14	33.32	0.30	33.89	0.18	33.98	0.22	32.22	0.68	32.87	0.16	32.47	0.18	34.06	0.07	33.46	0.90
120	34.85	0.14	33.34	0.11	34.02	0.15	33.98	0.24	32.63	0.32	32.65	0.17	32.40	0.07	34.06	0.08	33.49	0.87
150	34.92	0.10	33.12	0.25	33.92	0.09	33.60	0.38	32.38	0.43	32.37	0.14	32.37	0.09	34.04	0.06	33.34	0.95

Data Rata-rata SkinTemperature Kondisi Suhu Ruangan Air Conditioner tidak digunakan

ALIEF		FADIL		RIO		LUKMAN		REZA		NANDA		IHWAN		LAODE				
Mean	STDEV	Mean	STDEV	Mean	STDEV	Mean	STDEV	Mean	STDEV	Mean	STDEV	Mean	STDEV	Mean	STDEV	MEAN	STDEV	
30	34.60	0.15	34.94	0.14	32.85	0.16	33.79	0.09	33.46	0.29	35.49	0.15	34.97	0.18	34.79	0.07	34.36	0.90
60	34.80	0.09	35.13	0.07	32.69	0.16	33.49	0.09	33.42	0.27	35.79	0.07	35.06	0.07	34.08	0.45	34.31	1.06
90	34.83	0.12	35.31	0.07	32.46	0.08	33.48	0.19	33.32	0.19	35.36	0.23	34.97	0.05	34.37	0.26	34.26	1.06
120	34.55	0.11	35.24	0.13	32.24	0.12	34.13	0.24	33.29	0.23	34.92	0.22	35.00	0.06	33.77	0.30	34.14	1.01
150	34.36	0.21	35.21	0.18	32.06	0.21	34.36	0.17	33.40	0.14	34.73	0.12	34.87	0.06	34.10	0.22	34.13	1.00

## Lampiran 12.

### **LIST PROGRAM (FIRMWARE) ARDUINO MEGA 2560 UNTUK SMARTHOME**

```
void (* resset)(void)=0;  
#include <video_gen.h>  
#include<Wire.h>  
#include<LCD.h>  
#include<DS3231.h>  
#include<LiquidCrystal_I2C.h>  
  
LiquidCrystal_I2C lcd(0x3F,2,1,0,4,5,6,7);  
DS3231 rtc(SDA,SCL);  
  
#include <SoftwareSerial.h> //memanggil library SoftwareSerial  
//#include <DFPlayer_Mini_Mp3.h> //memanggil library DFPlayer mini  
#include <DFRobotDFPlayerMini.h>  
  
DFRobotDFPlayerMini myMP3;  
  
SoftwareSerial mp3(3, 2); // Declare pin RX & TX  
//TX DF Player ke pin D2  
//RX DF Player ke pin D3 (melalui R10K)  
SoftwareSerial bluetooth(12, 13); // Declare pin RX & TX  
  
#include<dht.h>  
#define dht_apin A8  
dht DHT;  
  
SoftwareSerial gsm(10,11); // Declare pin RX & TX  
  
  
String Nomor="AT+CMGS=\\"082188088844\\\";  
  
  
String bt="";  
String sms0="";  
String sms1="";  
  
  
String LG="";  
String LS="";
```

```
String LM="";
String LT="";
String ST="";
String KA="";
String IN="";
String LR="";
String LGR="";
String LL="";
String LBLK="";
String BZ1="";
String PMNS="";
String AC1="";
String AC2="";

// Variable untuk al on/off
String LGON="";//untuk perintah gantung
String LSON="";//untuk perintah sorot
String LMON="";//untuk perintah makan
String LTON="";//untuk perintah lampu TV
String STON="";//untuk perintah siram
String KAON="";//untuk kipas angin
String INON="";//untuk inverter
String LRON="";//untuk lampu rotary
String LGRON="";//untuk lampu garasi
String LLON="";//untuk lampu luar
String BLKON="";//untuk lampu belakang
String BZDON="";//untuk buzzer dapur
String PMNSON="";//untuk pemanas air
String AC1ON="";//untuk AC1
String AC2ON="";//untuk AC2
```

```
int mo=0;

//DELAY SENSOR
int waktu=0; //delay waktu wudu
int waktu1=0; //dela waktu garasi
int waktu2=0; //delay waktu sensor
int waktu3=0; //delay waktu sensor dapur

//TEMP MODUL
int sorot=0;
int gantung=0;
int makan=0;
int tv=0;
int fan=0;
int valve=0;
int buzzer1=0;//buzzer dapur
int buzzer2=0;//buzzer garasi
int buzzer3=0;//buzzer panel
int pintu=0;//temp pintu
int gempa = 0 ; //temp gempa/getar
int vl = 0 ; //siram
int kp = 0;// kipas
int LPG=0;//tempLPG

//untuk status beban
int STTSL=0;//sensor listrik
int STTSI=0;//status Inverter
int STTSG=0;//status sensor Getar
int STTSAC1=0;//Status AC1
```

```
int STTSAC2=0;//stattus AC2
int STTSH=0;//Status Pemanas air
int STTSPT=0;//status Penyiram Tanaman
int STTSA=0;//status sensor api
```

```
//val Gantung
```

```
int val1=0;
int old_val1=0;
int state1=0;
```

```
//val Sorot
```

```
int val2=0;
int old_val2=0;
int state2=0;
```

```
//val ruang makan
```

```
int val3=0;
int old_val3=0;
int state3=0;
```

```
//val atas tv
```

```
int val4=0;
int old_val4=0;
int state4=0;
```

```
//val
```

```
int val5=0;
int old_val5=0;
int state5=0;
```

```
//val valve
int val6=0;
int old_val6=0;
int state6=0;
```

```
//val kipas
int val7=0;
int old_val7=0;
int state7=0;
```

```
//val Inverter
int val8=0;
int old_val8=0;
int state8=0;
int tinv=0;
int cd = 0;
```

```
//val lampu rotary
int val9=0;
int old_val9=0;
int state9=0;
int rl=0;//l rotary
```

```
//val L.belakang
int belakang=0;
int val10=0;
int old_val10=0;
int state10=0;
int tlb=0;
```

```
//val garasi
```

```
int garasi=0;//garasi
int val11=0;
int old_val11=0;
int state11=0;
int tlgr=0;
```

```
//val lampu luar
int luar=0;// 
int val12=0;
int old_val12=0;
int state12=0;
int tll=0;
```

```
//val buzzer dapur
int dapur=0;// 
int val13=0;
int old_val13=0;
int state13=0;
int bdpr=0;
```

```
//val pemanas air
int pemanas=0;// 
int val14=0;
int old_val14=0;
int state14=0;
```

```
//val AC 1
int ac1=0;// 
int val15=0;
int old_val15=0;
int state15=0;
```

```
//val AC 2
int ac2=0;//
int val16=0;
int old_val16=0;
int state16=0;

//sensor
int SLPG=0;//sensor LPG
int SAPI=0;//sensor API
int SGG=0;//gerak garasi
int SGD=0;//gerak dapur
int SGB=0;//gerak belakang
int SASP=0;//sensor asap
int SCHY=0;//sensor cahaya
int SGT=0;//sensor cahaya

int LoadGNT=0;
int LoadTV=0;
int LoadSRT=0;
int LoadMKN=0;

//temp DTMF
int tempdtmf=0;
int temp1=0;
int temp2=0;
int temp3=0;
int temp4=0;

//VARIABLE ASAP && MP3
```

```
int asap=0;

//temp valve
int kran=0;

Time t;

uint8_t hh = 0, mm = 0, ss = 0, dd = 0, bb = 0; //variable Unsigned int 0-255
int yy = 0; //variable integer

void setup() {
    // put your setup code here, to run once:
    Serial.begin (9600);
    delay(10);
    gsm.begin (9600);
    delay(10);
    mp3.begin (9600);
    delay(10);
    bluetooth.begin (9600);
    //mp3_set_serial (mp3); //set softwareSerial for DFPlayer
    myMP3.begin(mp3);
    delay(10);

    myMP3.reset(); //soft-Reset module DFPlayer

    delay(10); //wait 1ms for respon command

    pinMode(4,INPUT_PULLUP);//DTMF1
    pinMode(5,INPUT_PULLUP);//DTMF2
    pinMode(6,INPUT_PULLUP);//DTMF3
    pinMode(7,INPUT_PULLUP);//DTMF4
    //pinMode(8,INPUT_PULLUP);//
```

```
//pinMode(9,INPUT_PULLUP);//
//pinMode(10,OUTPUT);//buzzer
//pinMode(11,OUTPUT);//
//pinMode(12,OUTPUT);//
//pinMode(13,OUTPUT);//
pinMode(14,OUTPUT);//Power sensor gerak dapur
pinMode(15,OUTPUT);//led indikator
pinMode(16,OUTPUT);//
pinMode(17,OUTPUT);//
pinMode(18,OUTPUT);//
pinMode(19,OUTPUT);//

//Komunikasi I2C
//pinMode(20,OUTPUT);//SCL
//pinMode(21,OUTPUT);//SDA

pinMode(22,OUTPUT);//
pinMode(23,OUTPUT);//
pinMode(24,OUTPUT);//
pinMode(25,OUTPUT);//
pinMode(26,OUTPUT);//
pinMode(27,OUTPUT);//
pinMode(28,OUTPUT);//
pinMode(29,OUTPUT);//
pinMode(30,OUTPUT);//
pinMode(31,OUTPUT);//
pinMode(32,OUTPUT);//
pinMode(33,OUTPUT);//
pinMode(34,OUTPUT);//
pinMode(35,OUTPUT);//
pinMode(36,OUTPUT);//
```

```
pinMode(37,OUTPUT);//
pinMode(38,OUTPUT);//
pinMode(39,OUTPUT);//
pinMode(40,OUTPUT);//
pinMode(41,OUTPUT);//
pinMode(42,OUTPUT);//
pinMode(43,OUTPUT);//
pinMode(44,OUTPUT);//
pinMode(45,OUTPUT);//
pinMode(46,OUTPUT);//
pinMode(47,OUTPUT);//
pinMode(48,INPUT_PULLUP);//listrik input
pinMode(49,INPUT_PULLUP);//inverter input

//KOMUNIKASI SPI
//pinMode(50,OUTPUT);//
//pinMode(51,OUTPUT);//
//pinMode(52,OUTPUT);//
//pinMode(53,OUTPUT);//

digitalWrite(4,HIGH);//
digitalWrite(5,HIGH);//
digitalWrite(6,HIGH);//
digitalWrite(7,HIGH);//
//digitalWrite(8,HIGH);//
//digitalWrite(9,HIGH);//
//digitalWrite(11,HIGH);//
//digitalWrite(12,HIGH);//
//digitalWrite(13,HIGH);//
digitalWrite(14,LOW);//Power sensor gerak dapur
digitalWrite(15,LOW);//Power Sensor gerak wudhu
```

```
digitalWrite(16,LOW);//Power SGG
digitalWrite(17,HIGH);//lampu dapur
digitalWrite(18,HIGH);//Exhaust Dapur
digitalWrite(19,HIGH);//
//digitalWrite(20,HIGH);//SCL
//digitalWrite(21,LOW);//SDA
digitalWrite(22,HIGH);//
digitalWrite(23,HIGH);//
digitalWrite(24,HIGH);//
digitalWrite(25,HIGH);//
digitalWrite(26,HIGH);//lampu atas tv
digitalWrite(27,HIGH);//lampu makan
digitalWrite(28,HIGH);//
digitalWrite(29,HIGH);//kipas angin
digitalWrite(30,HIGH);//lampu gantung
digitalWrite(31,HIGH);//lampu Sorot
digitalWrite(32,HIGH);//lampugarasi
digitalWrite(33,HIGH);//Lampu wudhu
digitalWrite(34,HIGH);//Solenoid siram
digitalWrite(35,HIGH);//Lampu Belakang
digitalWrite(36,HIGH);//Lampu Depan
digitalWrite(37,HIGH);//Lampu rotari
digitalWrite(38,HIGH);//
digitalWrite(39,HIGH);//
digitalWrite(40,HIGH);//
digitalWrite(41,HIGH);//pemanas air
digitalWrite(42,HIGH);//
digitalWrite(43,HIGH);//
digitalWrite(44,HIGH);//
digitalWrite(45,HIGH);//
digitalWrite(46,HIGH);//
```

```
digitalWrite(47,HIGH);//
digitalWrite(48,HIGH); //listrik
digitalWrite(49,HIGH); //inverter
//SPI
//digitalWrite(50,HIGH);//
//digitalWrite(51,HIGH);//
//digitalWrite(52,LOW);//
//digitalWrite(53,LOW);//

rtc.begin();
// The following lines can be uncommented to set the date and time
//rtc.setDOW(MONDAY); // Set Day-of-Week to SUNDAY
//rtc.setTime(15,44,00); // Set the time to 12:00:00 (24hr format)
//rtc.setDate(25,01,2020); // Set the date to January 1st, 2014

lcd.begin (20,4);
lcd.setBacklightPin(3,POSITIVE);
lcd.setBacklight(HIGH);
lcd.clear();
lcd.setCursor(0,0); // baris pertama LCD
lcd.print("----->IKHSAN<-----"); //tulis ke lcd
lcd.setCursor(0,1); // baris pertama LCD
lcd.print("-----SMART*HOME-----"); //tulis ke lcd
delay (1000);
lcd.clear();
lcd.setCursor(0,0); // baris pertama LCD
lcd.print("---PENDETEKSI GAS---"); //tulis ke lcd
lcd.setCursor(0,1); // baris pertama LCD
lcd.print("---SMOKE DETEKTOR---"); //tulis ke lcd
delay (1000);
lcd.clear();
```

```

lcd.setCursor(0,0); // baris pertama LCD
lcd.print("---FLAME DETEKTOR---"); //tulis ke lcd
lcd.setCursor(0,1); // baris pertama LCD
lcd.print("--MOTIONS DETECTOR--"); //tulis ke lcd
delay (1000);
lcd.clear();
lcd.setCursor(0,0); // baris pertama LCD
lcd.print("----TIMER SWITCH----"); //tulis ke lcd
lcd.setCursor(0,1); // baris pertama LCD
lcd.print("----DANGER ALARM----"); //tulis ke lcd

gsm.print("AT+CMGF=1");
delay(50);
gsm.print("AT+CNMI=2,2,0,0,0");
delay(50);
Serial.print("AT+CMGF=1");
delay(50);
Serial.print("AT+CNMI=2,2,0,0,0");
delay(50);
myMP3.volume(15);
delay(50);
}

//=====PROGRAM=====
/*
*#####
*# MAIN PROGRAM #
*#####
*/
void loop() {
t=rtc.getTime();

```

```
hh = t.hour,DEC; //pengambilan data jam
mm = t.min,DEC; //pengambilan data menit
ss = t.sec,DEC; //pengambilan data detik
dd = t.date,DEC; //pengambilan data hari
bb = t.mon,DEC; //pengambilan data bulan (dalam desimal)
yy = t.year,DEC; //pengambilan data tahun

//=====
///////////
//TAMPILAN LCD//
///////////
lcd.clear();
lcd.setCursor(0,0); // baris pertama LCD
lcd.print(rtc.getTimeStr()); //tulis ke lcd
lcd.setCursor(10,0); // baris pertama LCD
lcd.print(rtc.getDateStr()); //tulis ke lcd

lcd.setCursor(0,1); // baris pertama LCD
lcd.print("S.ASP :"); //tulis ke lcd
lcd.setCursor(7,1); // baris pertama LCD
lcd.print(SASP); //tulis ke lcd

lcd.setCursor(11,1); // baris kedua LCD
lcd.print(SCHY); //tulis ke lcd

lcd.setCursor(16,1); // baris kedua LCD
lcd.print(SGT); //tulis ke lcd

lcd.setCursor(0,2); // baris kedua LCD
lcd.print("S.LPG :"); //tulis ke lcd
lcd.setCursor(7,2); // baris kedua LCD
```

```
lcd.print(SLPG); //tulis ke lcd

lcd.setCursor(11,2); // baris kedua LCD
lcd.print(SGD); //tulis ke lcd

lcd.setCursor(16,2); // baris kedua LCD
lcd.print(tempdtmpf); //tulis ke lcd

lcd.setCursor(0,3); // baris kedua LCD
lcd.print(digitalRead(48)); //tulis ke lcd

lcd.setCursor(2,3); // baris kedua LCD
lcd.print(digitalRead(49)); //tulis ke lcd

lcd.setCursor(4,3); // baris kedua LCD
lcd.print(SAPI); //tulis ke lcd

//=====BLUETOOTH
READ=====

///////////
//PROGRAM BLUETOOTH//
///////////

while(bluetooth.available())
{
bt=bluetooth.readString();
//bluetooth.print(bt);
}

//=====SMS READ=====
//untuk serial
while(Serial.available())
{
sms0=Serial.readString();
```

```
}

while(gsm.available())
{
    sms1=gsm.readString();
}

/*
if(sms0.indexOf("RING")>=0){
    sms1="ATA";
    Serial.print(sms1);
    //delay(100);
    //sms0="";
}
*/

//=====SENSOR ANALOG=====
SASP=analogRead(A0);//SASP
//SGG=analogRead(A1);//SGG di program lampu garasi
SAPI=analogRead(A2);//SAPI
SLPG=analogRead(A3);//SLPG
//SGD=analogRead(A4);//SGD di program lampu dapur
//SGB=analogRead(A5);//SGB di program lampu wudhu
SCHY=analogRead(A6);//sensor cahaya
SGT=analogRead(A7);//sensor getar (gempa)
LoadGNT=analogRead(8);//sensor lampu gantung
LoadTV=analogRead(9);//sensor lampu tv
LoadSRT=analogRead(10);//sensor lampu sorot
LoadMKN=analogRead(11);//sensor lampu makan

//=====INPUT DTMF=====
//bit DTMF
temp1=digitalRead(4);
```

```

temp2=digitalRead(5);
temp3=digitalRead(6);
temp4=digitalRead(7);

//=====LAMPU DAPUR=====
if(hh > 17 || hh < 5){
    digitalWrite(14,HIGH);//power sensor
    SGD=analogRead(A4);
    if(SGD > 300){
        waktu3 = 0 ;
    }
    waktu3 =waktu3 + 1;
    if(waktu3 > 200){
        waktu3 = 150 ;
    }
    if(waktu3 < 150){
        digitalWrite(17,LOW);//SSR lampu dapur
    }
    else{
        digitalWrite(17,HIGH);//SSR lampu dapur
    }
}
else{
    digitalWrite(14,LOW);//power sensor
    digitalWrite(17,HIGH);//SSR lampu dapur
}

//=====LAMPU WUDHU=====
if(hh > 17 || hh < 5){
    digitalWrite(15,HIGH);//power sensor
    SGB=analogRead(A5);
    if(SGB > 600){

```

```

waktu = 0 ;
}

waktu =waktu + 1;
if(waktu > 200){
waktu = 150 ;
}

if(waktu < 150){
digitalWrite(33,LOW);
}

else{
digitalWrite(33,HIGH);
}

}

else{
digitalWrite(15,LOW);//power sensor
}

//=====MUSIK PLAYER=====

if(bt.indexOf("playm")>=0){

myMP3.play(); //start play
digitalWrite(39,LOW);

bt="";
}

if(bt.indexOf("nextm")>=0){

myMP3.next(); //next
bt="";
}

if(bt.indexOf("prevm")>=0){

myMP3.previous (); //start prev
bt="";
}

if(bt.indexOf("stopm")>=0){

```

```

myMP3.stop(); //stop
digitalWrite(39,HIGH);
bt="";
}

if(bt.indexOf("kurangv")>=0){
    myMP3.volumeDown ();
    bt="";
}

if(bt.indexOf("tambahv")>=0){
    myMP3.volumeUp();
    bt="";
}

if(bt.indexOf("folder1")>=0 ){
    myMP3.playFolder(1,1); //myMP3.playFolder(folder,file);
    myMP3.loopFolder(1); //Folder Name(1~99); File Name(1~255)
    digitalWrite(39,LOW);
    bt="";
}

if(bt.indexOf("folder2")>=0){
    myMP3.playFolder(2,1); //myMP3.playFolder(folder,file);
    myMP3.loopFolder(2); //Folder Name(1~99); File Name(1~255)
    digitalWrite(39,LOW);
    bt="";
}

if(bt.indexOf("folder3")>=0){
    myMP3.playFolder(3,1); //myMP3.playFolder(folder,file);
    myMP3.loopFolder(3); //Folder Name(1~99); File Name(1~255)
    digitalWrite(39,LOW);
    bt="";
}

if(bt.indexOf("folder4")>=0){

```

```

myMP3.playFolder(4,1);      //myMP3.playFolder(folder,file);
myMP3.loopFolder(4);        //Folder Name(1~99); File Name(1~255)
digitalWrite(39,LOW);
bt="";
}

if(bt.indexOf("folder5")>=0){
    myMP3.playFolder(5,1);      //myMP3.playFolder(folder,file);
    myMP3.loopFolder(5);        //Folder Name(1~99); File Name(1~255)
    digitalWrite(39,LOW);
    bt="";
}

if(bt.indexOf("folder6")>=0){
    myMP3.playFolder(6,1);      //myMP3.playFolder(folder,file);
    myMP3.loopFolder(6);        //Folder Name(1~99); File Name(1~255)
    digitalWrite(39,LOW);
    bt="";
}

if(bt.indexOf("folder7")>=0){
    myMP3.playFolder(7,1);      //myMP3.playFolder(folder,file);
    myMP3.loopFolder(7);        //Folder Name(1~99); File Name(1~255)
    digitalWrite(39,LOW);
    bt="";
}

if(bt.indexOf("folder8")>=0){
    myMP3.playFolder(8,1);      //myMP3.playFolder(folder,file);
    myMP3.loopFolder(8);        //Folder Name(1~99); File Name(1~255)
    digitalWrite(39,LOW);
    bt="";
}

//=====LAMPU GANTUNG=====
if(bt.indexOf("LGantung")>=0 || sms0.indexOf("LGantung")>=0){

```

```

LG="LGantung";
bt="";
sms0="";
}

if(LG=="LGantung"){
    gantung=HIGH;
    LG="";
}
else{
    gantung=LOW;
}

{val1=gantung;
if((val1==HIGH)&&(old_val1==LOW)){
    state1=1-state1;
    old_val1=val1;
    if(state1==1){
        digitalWrite(30,LOW);
    }
    else{
        digitalWrite(30,HIGH);
    }
}
}

//ON VOICE

if(bt.indexOf("gantungon")>=0 || sms0.indexOf("gantungon")>=0){
    LGON="LGon";
    bt="";
    sms0="";
}
if(LGON=="LGon" && LoadGNT < 500){
    LG="LGantung";
    LGON="";
}

```

```
}

//OFF VOICE

if(bt.indexOf("gantungoff")>=0 || sms0.indexOf("gantungoff")>=0){

LGON="LGoff";
bt="";
sms0="";
}

if(LGON=="LGoff" && LoadGNT > 600){

LG="LGantung";
LGON="";
}

//=====LAMPU
SOROT=====

if(bt.indexOf("LSorot")>=0 || sms0.indexOf("LSorot")>=0){

bluetooth.println(bt);

LS="LSorot";
bt="";
sms0="";
}

if(LS=="LSorot"){

sorot=HIGH;
LS="";
}

else{

sorot=LOW;
}

{val2=sorot;

if((val2==HIGH)&&(old_val2==LOW)){

state2=1-state2;

old_val2=val2;

if(state2==1){
```

```

digitalWrite(31,LOW);
}

else{
digitalWrite(31,HIGH);
}

}

if(bt.indexOf("soroton")>=0 || sms0.indexOf("soroton")>=0){
LSON="LSon";
bt="";
sms0="";
}

if(LSON=="LSon" && LoadSRT < 500){

LS="LSorot";
LSON="";
}

if(bt.indexOf("sorotoff")>=0 || sms0.indexOf("sorotoff")>=0){
LSON="LSoff";
bt="";
sms0="";
}

if(LSON=="LSoff" && LoadSRT > 600){

LS="LSorot";
LSON="";
}

//=====LAMPU MAKAN=====
if(bt.indexOf("LMakan")>=0 || sms0.indexOf("LMakan")>=0){
bluetooth.println(bt);
LM="LMakan";
bt="";
}

```

```

sms0="";
}

if(LM=="LMakan"){
    makan=HIGH;
    LM="";
}
else{
    makan=LOW;
}
{val3=makan;
if((val3==HIGH)&&(old_val3==LOW)){
    state3=1-state3;
    old_val3=val3;
    if(state3==1){
        digitalWrite(27,LOW);
    }
    else{
        digitalWrite(27,HIGH);
    }
}

if(bt.indexOf("makanon")>=0 || sms0.indexOf("makanon")>=0){
    LMON="LMon";
    bt="";
    sms0="";
}
if(LMON=="LMon" && LoadMKN < 500){
    LM="LMakan";
    LMON="";
}
if(bt.indexOf("makanoff")>=0 || sms0.indexOf("makanoff")>=0){

```

```

LMON="LMoff";
bt="";
sms0="";
}

if(LMON=="LMoff" && LoadMKN > 600){
    LM="LMakan";
    LMON="";
}

//=====LAMPU
TV=====

if(bt.indexOf("LTvled")>=0 ||sms0.indexOf("LTvled")>=0){
    bluetooth.println(bt);
    LT="LTvled";
    bt="";
    sms0="";
}
if(LT=="LTvled"){
    tv=HIGH;
    LT="";
}
else{
    tv=LOW;
}
{val4=tv;
if((val4==HIGH)&&(old_val4==LOW)){
    state4=1-state4;
    old_val4=val4;
    if(state4==1){
        digitalWrite(26,LOW);
    }
}

```

```

else{
    digitalWrite(26,HIGH);
}
}

if(bt.indexOf("LTVon")>=0 || sms0.indexOf("LTVon")>=0){
    LTON="LTon";
    bt="";
    sms0="";
}

if(LTON=="LTon" && LoadTV < 500){
    LT="LTvled";
    LTON="";
}

if(bt.indexOf("LTVoff")>=0 || sms0.indexOf("LTVoff")>=0){
    LTON="LToff";
    bt="";
    sms0="";
}

if(LTON=="LToff" && LoadTV > 600){
    LT="LTvled";
    LTON="";
}

//=====PENYIRAM TANAMAN=====

if(bt.indexOf("valves")>=0 || sms0.indexOf("valves")>=0){
    bluetooth.println(bt);
    ST="valves";
    bt="";
    sms0="";
}

if(ST=="valves"){

```

```

vl=HIGH;
ST="";
}
else{
vl=LOW;
}
{val6=vl;
if((val6==HIGH)&&(old_val6==LOW)){
state6=1-state6;}
old_val6=val6;
if(state6==1){
digitalWrite(34,LOW);
}
else{
digitalWrite(34,HIGH);
}
}

if(bt.indexOf("siramon")>=0 || sms0.indexOf("siramon")>=0){
STON="siramon";
bt="";
sms0="";
}
if(STON=="siramon" && digitalRead(34)==HIGH){
ST="valves";
STON="";
}
if(bt.indexOf("siramoff")>=0 || sms0.indexOf("siramoff")>=0){
STON="siramoff";
bt="";
sms0="";
}

```

```

}

if(STON=="siramoff" && digitalRead(34)==LOW){

    ST="valves";
    STON="";
}

//=====PENYIRAM
TANAMAN=====

if(digitalRead(34)==LOW && STTSPT !=1){

    Serial.println(Nomor);
    delay(250);
    Serial.println("Penyiram Tanaman Telah Dihidupkan");
    Serial.print(rtc.getTimeStr());
    delay(250);
    Serial.write((byte)26);
    STTSPT=1;
    sms0="";
}

if (digitalRead(34)==HIGH && STTSPT !=0){

    Serial.println(Nomor);
    delay(250);
    Serial.println("Penyiram Tanaman Telah Dimatikan");
    Serial.print(rtc.getTimeStr());
    delay(250);
    Serial.write((byte)26);
    STTSPT=0;
    sms0="";
}

//=====KIPAS ANGIN=====

if(bt.indexOf("kipast")>=0 ||sms0.indexOf("kipast")>=0){

    bluetooth.println(bt);
}

```

```

KA="kipast";
bt="";
sms0="";
}

if(KA=="kipast"){
kp=HIGH;
KA="";
}

else{
kp=LOW;
}

{val7=kp;
if((val7==HIGH)&&(old_val7==LOW)){
state7=1-state7;}
old_val7=val7;
if(state7==1){
digitalWrite(29,LOW);
}
else{
digitalWrite(29,HIGH);
}
}

}

if(bt.indexOf("kipason")>=0 || sms0.indexOf("kipason")>=0){
KAON="kipason";
bt="";
sms0="";
}

if(KAON=="kipason" && digitalRead(29)==HIGH){

KA="kipast";
STON="",
```

```

}

if(bt.indexOf("kipasoff")>=0 || sms0.indexOf("kipasoff")>=0){
    KAON="kipasoff";
    bt="";
    sms0="";
}

if(KAON=="kipasoff" && digitalRead(29)==LOW){
    KA="kipast";
    STON="";
}

//=====INVERTER=====
if(bt.indexOf("invertert")>=0 || sms0.indexOf("invertert")>=0){
    bluetooth.println(bt);
    IN="invertert";
    bt="";
    sms0="";
}

if(IN=="invertert"){
    cd=HIGH;
    IN="";
}

else{
    cd=LOW;
}

{val8=cd;
if((val8==HIGH)&&(old_val8==LOW)){
    state8=1-state8;
    old_val8=val8;
    if(state8==1){
        digitalWrite(40,LOW);
}
}
}

```

```

        }

        else{
            digitalWrite(40,HIGH);
        }

    }

if(bt.indexOf("inverton")>=0 || sms0.indexOf("inverton")>=0){

    INON="inverton";
    bt="";
    sms0="";
}

if(INON=="inverton" && digitalRead(40)==HIGH){

    IN="invertert";
    INON="";
}

if(bt.indexOf("invertoff")>=0 || sms0.indexOf("invertoff")>=0){

    INON="invertoff";
    bt="";
    sms0="";
}

if(INON=="invertoff" && digitalRead(40)==LOW){

    IN="invertert";
    INON="";
}

}

if( hh >= 8 && hh < 16 && tinv != 1 ){

    INON="inverton";
    tinv=1;
}

if(hh == 16 && tinv !=2) {

```

```

INON = "invertoff";
tinv= 2;
}
if( hh >= 18 && tinv != 3 ){
    INON="inverton";
    tinv=3;
}
if( hh == 1 && tinv != 4 ){
    INON="invertoff";
    tinv=4;
}

//=====================================================================STATUSINVERTER=====
=
if(digitalRead(49)==LOW && STTSI !=1){
    Serial.println(Nomor);
    delay(250);
    Serial.println("Inverter Telah Dihidupkan");
    Serial.print(rtc.getTimeStr());
    delay(250);
    Serial.write((byte)26);
    STTSI=1;
    sms0="";
}
if (digitalRead(49)==HIGH && STTSI !=0){
    Serial.println(Nomor);
    delay(250);
    Serial.println("Inverter Telah Dimatikan");
    Serial.print(rtc.getTimeStr());
    delay(250);
    Serial.write((byte)26);
    STTSI=0;
}

```

```

sms0="";
}

//=====STATUSPLN=====
if(digitalRead(48)==HIGH && STTSL !=1){
    Serial.println(Nomor);
    delay(250);
    Serial.println("Listrik PLN mati");
    Serial.print(rtc.getTimeStr());
    delay(250);
    Serial.write((byte)26);
    STTSL=1;
    sms0="";
}
if (digitalRead(48)==LOW && STTSL !=0){
    Serial.println(Nomor);
    delay(250);
    Serial.println("Listrik PLN telah Hidup");
    Serial.print(rtc.getTimeStr());
    delay(250);
    Serial.write((byte)26);
    STTSL=0;
    sms0="";
}
}

//=====LAMPU
ROTARY=====

if(bt.indexOf("rotaryl")>=0 ||sms0.indexOf("rotaryl")>=0){
    bluetooth.println(bt);
    LR="rotaryl";
    bt="";
}

```

```

sms0="";
}

if(LR=="rotaryl"){
    rl=HIGH;
    LR="";
}
else{
    rl=LOW;
}
{val9=rl;
if((val9==HIGH)&&(old_val9==LOW)){
    state9=1-state9;
    old_val9=val9;
    if(state9==1){
        digitalWrite(37,LOW);
    }
    else{
        digitalWrite(37,HIGH);
    }
}

if(bt.indexOf("rotaryon")>=0 || sms0.indexOf("rotaryon")>=0){
    LRON="rotaryon";
    bt="";
    sms0="";
}
if(LRON=="rotaryon" && digitalRead(37)==HIGH){
    LR="rotaryl";
    LRON="";
}
if(bt.indexOf("rotaryoff")>=0 || sms0.indexOf("rotaryoff")>=0){

```

```

LRON="rotaryoff";
bt="";
sms0="";
}

if(LRON=="rotaryoff" && digitalRead(37)==LOW){
    LR="rotaryl";
    LRON="";
}

//=====LAMPU BELAKANG=====
if(hh > 17 && SCHY > 500){
    if(digitalRead(35)==HIGH && tlb !=1){
        BLKON="BLKon";
        tlb = 1 ;
    }
}

if(hh == 3 && SCHY > 500){
    if(digitalRead(35)==LOW && tlb !=2){
        BLKON="BLKoff";
        tlb = 2 ;
    }
}

if(bt.indexOf("Lbelakang")>=0 || sms0.indexOf("Lbelakang")>=0){
    LBLK="Lbelakang";
    bt="";
    sms0="";
}

if(LBLK=="Lbelakang"){
    belakang=HIGH;
    LBLK="";
}

```

```

    }

else{
    belakang=LOW;
}

{val10=belakang;

if((val10==HIGH)&&(old_val10==LOW)){
    state10=1-state10;
    old_val10=val10;
    if(state10==1){
        digitalWrite(35,LOW);

    }
    else{
        digitalWrite(35,HIGH);
    }
}

//ON VOICE

if(bt.indexOf("belakangon")>=0 || sms0.indexOf("belakangon")>=0){
    BLKON="BLKon";
    bt="";
    sms0="";
}

if(BLKON=="BLKon" && digitalRead(35)==HIGH){
    LBLK="Lbelakang";
    BLKON="";
}

//OFF VOICE

if(bt.indexOf("belakangoff")>=0 || sms0.indexOf("belakangoff")>=0){
    BLKON="BLKoff";
    bt="";
    sms0="";
}

```

```

}

if(BLKON=="BLKoff" && digitalRead(35)==LOW){
    LBLK="Lbelakang";
    BLKON="";
}

//=====LAMPU GARASI=====
if((hh > 17 || hh < 5)&& SCHY > 500){
    digitalWrite(16,HIGH);//power sensor
    SGG=analogRead(A1);
    if(SGG > 600){
        waktu1 = 0 ;
    }
    waktu1 =waktu1 + 1;
    if(waktu1 > 200){
        waktu1 = 150 ;
    }
    if(waktu1 < 150 && tlgr != 1){
        LGRON = "LGRon";
        tlgr = 1;
    }
    if(waktu1 > 150 && tlgr != 2){
        LGRON = "LGROff";
        tlgr = 2 ;
    }
}
else{
    digitalWrite(16,LOW);//power sensor
}

```

```

if(bt.indexOf("LGArasi")>=0 || sms0.indexOf("LGArasi")>=0){
    LGR="LGArasi";
    bt="";
    sms0="";
}

if(LGR=="LGArasi"){
    garasi=HIGH;
    LGR="";
}
else{
    garasi=LOW;
}

{val11=garasi;

if((val11==HIGH)&&(old_val11==LOW)){
    state11=1-state11;
    old_val11=val11;
    if(state11==1){
        digitalWrite(32,LOW);

    }
    else{
        digitalWrite(32,HIGH);
    }
}

//ON VOICE

if(bt.indexOf("garasion")>=0 || sms0.indexOf("garasion")>=0){
    LGRON="LGRon";
    bt="";
    sms0="";
}

if(LGRON=="LGRon" && digitalRead(32)==HIGH){

}

```

```

LGR="LGาระสิ";
LGRON="";
}

//OFF VOICE

if(bt.indexOf("garasioff")>=0 || sms0.indexOf("garasioff")>=0){
LGRON="LGRoff";
bt="";
sms0="";
}

if(LGRON=="LGRoff" && digitalRead(32)==LOW){

LGR="LGาระสิ";
LGRON="";
}

//=====LAMPU LUAR=====

if( hh > 17 && tll != 1 && SCHY > 500){

LLON="LLon";
tll = 1;
}

if(SCHY < 400 && tll != 2){

LLON="LLoff";
tll = 2;
}

if(bt.indexOf("Lluar")>=0 || sms0.indexOf("Lluar")>=0){

LL="Lluar";
bt="";
sms0="";
}

if(LL=="Lluar"){

```

```

luar=HIGH;
LL="";
}
else{
    luar=LOW;
}
{val12=luar;
if((val12==HIGH)&&(old_val12==LOW)){
    state12=1-state12;
    old_val12=val12;
if(state12==1){
    digitalWrite(36,LOW);
}

}
else{
    digitalWrite(36,HIGH);
}
}

//ON VOICE
if(bt.indexOf("luaron")>=0 || sms0.indexOf("luaron")>=0){
    LLON="LLon";
    bt="";
    sms0="";
}
if(LLON=="LLon" && digitalRead(36)==HIGH){
    LL="Lluar";
    LLON="";
}
//OFF VOICE
if(bt.indexOf("luaroff")>=0 || sms0.indexOf("luaroff")>=0){
    LLON="Lloff";
}

```

```

bt="";
sms0="";
}

if(LLON=="LLOff" && digitalRead(36)==LOW){
    LL="Lluar";
    LLON="";
}

//=====BUZZER DAPUR=====
if(bt.indexOf("Bdapur")>=0 || sms0.indexOf("Bdapur")>=0){

    BZ1="Bdapur";
    bt="";
    sms0="";
}

if(BZ1=="Bdapur"){
    dapur=HIGH;
    BZ1="";
}
else{
    dapur=LOW;
}

{val13=dapur;
if((val13==HIGH)&&(old_val13==LOW)){
    state13=1-state13;
    old_val13=val13;
    if(state13==1){
        digitalWrite(38,LOW);

    }
    else{
        digitalWrite(38,HIGH);
    }
}

```

```

}

//ON VOICE

if(bt.indexOf("dapuron")>=0 || sms0.indexOf("dapuron")>=0){

BZDON="BZDon";
bt="";
sms0="";
}

if(BZDON=="BZDon" && digitalRead(38)==HIGH){

BZ1="Bdapur";
BZDON="";
}

//OFF VOICE

if(bt.indexOf("dapuroff")>=0 || sms0.indexOf("dapuroff")>=0){

BZDON="BZDoff";
bt="";
sms0="";
}

if(BZDON=="BZDoff" && digitalRead(38)==LOW){

BZ1="Bdapur";
BZDON="";
}

if(SLPG > 350 && bdpr != 1){

BZDON="BZDon";
bdpr = 1 ;

}

if(SLPG < 250 && bdpr != 2){

BZDON="BZDoff";
bdpr = 2 ;

}

```

```

//=====MODE MUSIK=====
if(bt.indexOf("modemusik")>=0 || sms0.indexOf("modemusik")>=0){
    LGON="LGoff";
    LSON="LSoff";
    LMON="LMoff";
    LTON="LToff";
    LRON="rotaryon";
    myMP3.disableLoop();
    myMP3.playFolder(2,1);      //myMP3.playFolder(folder,file);
    myMP3.loopFolder(2);        //Folder Name(1~99); File Name(1~255)
    digitalWrite(39,LOW);
    bt="";
    sms0="";
}

//=====SEMUA LAMPU HIDUP=====
if(bt.indexOf("ALLon")>=0 || sms0.indexOf("ALLon")>=0){
    LGON="LGon";
    LSON="LSon";
    LMON="LMon";
    LTON="LTon";
    bt="";
    sms0="";
}

//=====SEMUA LAMPU MATI=====
if(bt.indexOf("ALLoff")>=0 || sms0.indexOf("ALLoff")>=0){
    LGON="LGoff";
    LSON="LSoff";
    LMON="LMoff";
    LTON="LToff";
    LRON="rotaryoff";
    bt="";
}

```

```

sms0="";
}

//=====PERINTAH WATER HEATER=====

if(bt.indexOf("pemanasA")>=0 || sms0.indexOf("pemanasA")>=0){

PMNS="pemanasA";

bt="";
sms0="";
}

if(PMNS=="pemanasA"){

pemanas=HIGH;

PMNS="";
}

else{

pemanas=LOW;

}

{val14=pemanas;

if((val14==HIGH)&&(old_val14==LOW)){

state14=1-state14;

old_val14=val14;

if(state14==1){

digitalWrite(41,LOW);

}

else{

digitalWrite(41,HIGH);

}

}

//ON VOICE

if(bt.indexOf("pemanason")>=0 || sms0.indexOf("pemanason")>=0){

PMNISON="PMNSon";

bt="";
}

```

```

sms0="";
}

if(PMNSON=="PMNSon" && digitalRead(41)==HIGH){

    PMNS="pemanasA";
    PMNSON="";
}

//OFF VOICE

if(bt.indexOf("pemanasoff")>=0 || sms0.indexOf("pemanasoff")>=0){

    PMNSON="PMNSoff";
    bt="";
    sms0="";
}

if(PMNSON=="PMNSoff" && digitalRead(41)==LOW){

    PMNS="pemanasA";
    PMNSON="";
}

=====STATUS WATER
HEATER=====

if(digitalRead(41)==LOW && STTSWH !=1){

    Serial.println(Nomor);
    delay(250);
    Serial.println("Pemanas Air Telah Dihidupkan");
    Serial.print(rtc.getTimeStr());
    delay(250);
    Serial.write((byte)26);
    STTSWH=1;
    sms0="";
}

if (digitalRead(41)==HIGH && STTSWH !=0){

    Serial.println(Nomor);
    delay(250);
}

```

```

Serial.println("Pemanas AIR Telah Dimatikan");

Serial.print(rtc.getTimeStr());

delay(250);

Serial.write((byte)26);

STTSWH=0;

sms0="";

}

//=====AC1=====

if(bt.indexOf("AC1")>=0 || sms0.indexOf("AC1")>=0){

    AC1="AC1";

    bt="";

    sms0="";

}

if(AC1=="AC1"){

    ac1=HIGH;

    AC1="";

}

else{

    ac1=LOW;

}

{val15=ac1;

if((val15==HIGH)&&(old_val15==LOW)){

    state15=1-state15;

    old_val15=val15;

    if(state15==1){

        digitalWrite(42,LOW);

    }

    else{

```

```

digitalWrite(42,HIGH);
}

}

//ON VOICE

if(bt.indexOf("ac1on")>=0 || sms0.indexOf("ac1on")>=0){
    AC1ON="ac1on";
    bt="";
    sms0="";
}

if(AC1ON=="ac1on" && digitalRead(42)==HIGH){

    AC1="AC1";
    AC1ON="";
}

//OFF VOICE

if(bt.indexOf("ac1off")>=0 || sms0.indexOf("ac1off")>=0){
    AC1ON="ac1off";
    bt="";
    sms0="";
}

if(AC1ON=="ac1off" && digitalRead(42)==LOW){

    AC1="AC1";
    AC1ON="";
}

=====STATUS
AC1=====

if(digitalRead(42)==LOW && STTSAC1 !=1){

    Serial.println(Nomor);
    delay(250);
    Serial.println("AC kamar utama Telah Dihidupkan");
    Serial.print(rtc.getTimeStr());
    delay(250);
}

```

```
Serial.write((byte)26);
STTSAC1=1;
sms0="";
}

if (digitalRead(42)==HIGH && STTSAC1 !=0){

Serial.println(Nomor);
delay(250);
Serial.println("AC Kamar Utama Telah Dimatikan");
Serial.print(rtc.getTimeStr());
delay(250);
Serial.write((byte)26);
STTSAC1=0;
sms0="";
}
```

```
//=====AC2=====
if(bt.indexOf("AC2")>=0 || sms0.indexOf("AC2")>=0){

AC2="AC2";
bt="";
sms0="";
}

if(AC2=="AC2"){

ac2=HIGH;
AC2="";
}

else{

ac2=LOW;
}

{val16=ac2;

if((val16==HIGH)&&(old_val16==LOW)){


```

```

state16=1-state16;

old_val16=val16;

if(state16==1){

digitalWrite(43,LOW);

}

else{

digitalWrite(43,HIGH);

}

}

//ON VOICE

if(bt.indexOf("ac2on")>=0 || sms0.indexOf("ac2on")>=0){

AC2ON="ac2on";

bt="";

sms0="";

}

if(AC2ON=="ac2on" && digitalRead(43)==HIGH){

AC2="AC2";

AC2ON="";

}

//OFF VOICE

if(bt.indexOf("ac2off")>=0 || sms0.indexOf("ac2off")>=0){

AC2ON="ac2off";

bt="";

sms0="";

}

if(AC2ON=="ac2off" && digitalRead(43)==LOW){

AC2="AC2";

AC2ON="";

}

```

```

//=====STATUS
AC2=====

if(digitalRead(43)==LOW && STTSAC2 !=1){

    Serial.println(Nomor);
    delay(250);
    Serial.println("AC kamar anak Telah Dihidupkan");
    Serial.print(rtc.getTimeStr());
    delay(250);
    Serial.write((byte)26);
    STTSAC2=1;
    sms0="";
}

if (digitalRead(43)==HIGH && STTSAC2 !=0){

    Serial.println(Nomor);
    delay(250);
    Serial.println("AC Kamar Anak Telah Dimatikan");
    Serial.print(rtc.getTimeStr());
    delay(250);
    Serial.write((byte)26);
    STTSAC2=0;
    sms0="";
}

//=====DTMFCOMMAND=====

if (temp1 == HIGH && temp2 == LOW && temp3 == LOW && temp4 == LOW &&
tempdtmf != 1){

    tempdtmf = 1;
    IN="inverter";
}

else if (temp1 == LOW && temp2 == HIGH && temp3 == LOW && temp4 == LOW &&
tempdtmf != 2){
```

```

tempdtmf = 2;
ST="valves";
}

else if (temp1 == HIGH && temp2 == HIGH && temp3 == LOW && temp4 == LOW &&
tempdtmf != 3){

tempdtmf = 3;
AC1="AC1";
}

else if (temp1 == LOW && temp2 == LOW && temp3 == HIGH && temp4 == LOW &&
tempdtmf != 4){

tempdtmf = 4;
AC2="AC2";
}

else if (temp1 == HIGH && temp2 == LOW && temp3 == HIGH && temp4 == LOW &&
tempdtmf != 5){

tempdtmf = 5;
PMNS="pemanasA";
}

else if (temp1 == LOW && temp2 == HIGH && temp3 == HIGH && temp4 == LOW &&
tempdtmf != 6){

tempdtmf = 6;
bt="ALLon";
}

else if (temp1 == HIGH && temp2 == HIGH && temp3 == HIGH && temp4 == LOW &&
tempdtmf != 7){

tempdtmf = 7;
bt="ALLoff";
}

```

```

else if (temp1 == LOW && temp2 == LOW && temp3 == LOW && temp4 == HIGH &&
tempdtmf != 8){

    tempdtmf = 8;

}

else if (temp1 == HIGH && temp2 == LOW && temp3 == LOW && temp4 == HIGH &&
tempdtmf != 9){

    tempdtmf = 9;

}

else if (temp1 == HIGH && temp2 == HIGH && temp3 == LOW && temp4 == HIGH &&
tempdtmf != 10){

    tempdtmf = 10;

}

else if (temp1 == LOW && temp2 == HIGH && temp3 == LOW && temp4 == HIGH &&
tempdtmf != 0){

    tempdtmf = 0;

}

else if (temp1 == LOW && temp2 == LOW && temp3 == HIGH && temp4 == HIGH &&
tempdtmf != 12){

    tempdtmf = 12;

}

//=====SMS PERINGATAN=====
if(SLPG >= 350 && LPG !=1){

    Serial.println("AT+CMGS=\"082188088844\"");
    delay(250);
}

```

```

Serial.println("TERJADI KEBOCORAN GAS.....!");
Serial.print("kadar= ");
Serial.println(SLPG);
delay(250);
Serial.write((byte)26);
digitalWrite(18,LOW);
LPG=1;
sms0="";
}
if(SLPG < 300 && LPG !=0){
  Serial.println("AT+CMGS=\\"082188088844\\\"");
  delay(250);
  Serial.println("GAS TELAH NORMAL");
  Serial.print("kadar= ");
  Serial.println(SLPG);
  delay(250);
  Serial.write((byte)26);
  digitalWrite(18,HIGH);
  LPG=0;
  sms0="";
}

```

```

//=====STATUS
GETAR=====
if(SGT < 500 && STTSG !=1){
  Serial.println(Nomor);
  delay(250);
  Serial.println("Getaran Terdeteksi");
  Serial.print(rtc.getTimeStr());
  delay(250);
  Serial.write((byte)26);
  STTSG=1;
}

```

```

sms0="";
}

if (SGT > 500 && STTSG !=0){

STTSG=0;

sms0="";

}

//=====SENSOR API=====

if(SAPI > 500 && STTSA !=1){

Serial.println(Nomor);

delay(250);

Serial.println("PANAS DIDAPUR TERDETEKSI");

Serial.print(rtc.getTimeStr());

delay(250);

Serial.write((byte)26);

STTSA=1;

sms0="";

}

if (SAPI < 500 && STTSA !=0){

STTSA=0;

sms0="";

}

//-----TEST SMS-----

if(bt.indexOf("TESTSMS")>=0){

Serial.println(Nomor);

delay(150);

Serial.println("PERINTAH TEST DITERIMA");

Serial.print("HAVE A NICE DAY");

delay(100);

```

```
Serial.write((byte)26);
delay(100);
bt="";
sms0="";
}

//=====RESET=====
if(hh==07 && mm==00 && ss<2){

lcd.clear();
lcd.setCursor(0,0); // baris pertama LCD
lcd.print("MODUL AKAN RESET"); //tulis ke lcd
lcd.setCursor(0,1); // baris pertama LCD
lcd.print("*** BYE--BYE ***"); //tulis ke lcd
delay (1000);
resset();
}

delay(250);
}
```

## DAFTAR RIWAYAT HIDUP

### Identitas Diri/Data Personal



Nama Lengkap	<b>SRIWATI</b>
Tempat Tgl. Lahir	Ujung Pandang, 18 Mei 1967.
Jenis Kelamin	Perempuan
Jabatan Fungsional	Lektor Kepala
NIDN	0918056701
Alamat Rumah	Jl.Tinumbu III No.40 Makassar
Nomor Telepon/HP	082196462648/ 08124266076
Alamat Kantor	Jl. Perintis Kemerdekaan Km.9 No.29 Makassar
Nomor Telepon/Fax	(0411) 588167 fax 0411 588167
Email	<a href="mailto:sriwati.dty@uim-makassar.ac.id">sriwati.dty@uim-makassar.ac.id</a> / <a href="mailto:sriwatimadjid@gmail.com">sriwatimadjid@gmail.com</a>

### Latar Belakang Pendidikan

#### Perguruan Tinggi

September 2016- November 2020	Departemen Teknik Elektro, Fakultas Teknik Universitas Hasanuddin, Gowa Indonesia.  <b>Program S3</b> <b>Judul Disertasi</b> Model Smarthome Berbasis Manajemen Energi <b>Promotor</b> Prof. Dr. Ir. Ansar Suyuti, MT. IPU. <b>Co-Pembimbing</b> Prof.Dr.Ir.Andani Ahmad., MT. Dr. A.Ejah Umraeni Salam,ST MT. IPK. 3.98
September 2002 Nopember 2005	Program pascasarjana Universitas Hasanuddin Program Studi Teknik Elektro  <b>Program S2</b> <b>Judul Tesis</b> Implementasi Algoritma Genetik Untuk Optimasi Penentuan Luas Penampang Konduktor Jaring Transmisi <b>Pembimbing</b> Dr. Ir. Salama Manjang, MT. Ir.Yustinus Upa.MT

20 maret 1995	<p>Jurusan Teknik Elektro, Fakultas Teknik Universitas Muslim Indonesia</p> <p><b>Program S1</b>            Judul Tugas Akhir/Skripsi.            Rancangan Instalasi Jaringan Telepon di Universitas Muslim Indonesia</p> <p><b>IPK. 2.83</b></p> <p><b>Pembimbing</b>            Ir.Nien Kanswarani</p> <p><b>Co-Pembimbing</b>            Ir.Sugianto</p>
------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

#### **SEKOLAH DASAR – MENENGAH**

1986	SMA NEGERI 2 MAKASSAR
1983	SMP NEGERI 10 UJUNG PANDANG
1980	SD ISLAM COKROAMINOTO 2 UJUNG PANDANG

#### **Pengalaman Pekerjaan**

1998-2013	Dosen Tidak Tetap Sekolah Tinggi Ilmu Kesehatan Makassar (YAPMA) Makassar
1998- sekarang	Dosen Tidak Tetap, di Akademi Higienes dan Kesehatan Masyarakat (Hiperkes) YAPMA Makassar
Maret 2006- Sekarang	Dosen Tetap Di Universitas Islam Makassar (UIM)
2008-2012	Ketua Program Studi Teknik Elektro, Fakultas Teknik, Universitas Islam Makassar
2008-2012	Ketua Program Studi Teknik Informatika, Fakultas Teknik, Universitas Islam Makassar
2012- 2016	Wakil Dekan II, (Bidang Administrasi dan Keuangan) Fakultas Teknik, Universitas Islam Makassar
2019-2020	Wakil Dekan II, (Bidang Administrasi dan Keuangan) Fakultas Teknik, Universitas Islam Makassar
2020- Sekarang	Ketua Program Studi Teknik Elektro, Fakultas Teknik, Universitas Islam Makassar

PELATIHAN PROFESIONAL			
Tahun	Jenis Pelatihan (Dalam/ Luar)	Penyelenggara	Jangka waktu
1999	Pelatihan Pengembangan Keterampilan Dasar Teknik Instruksional (PEKERTI)	Departemen Pendidikan dan Kebudayaan DIKTI	21-26 Juni 1999
2005	Pelatihan Program Applied Approach (AA) Angkatan III	Departemen Pendidikan dan Kebudayaan DIKTI	20-25 Juni 2005
2006	Pelatihan Metodologi Penelitian	Departemen Pendidikan Nasional Ditjen Pendidikan Tinggi-Kopertis Wil.IX Sulawesi	17-19 April 2006
2006	Pelatihan Penulisan Artikel Ilmiah Terpusat	Departemen Pendidikan Nasional Ditjen Pendidikan Tinggi	7-9 Desember 2006
2006	Pelatihan Penulisan Artikel Ilmiah PTS	Ditjen Dikti-Kopertis Wil IX Sulawesi	19-25 Des.2006
2010	Pelatihan Program Applied Approach (AA)	Kementerian Pendidikan Nasional-Kopertis Wil.IX	30 Nopember – 3 Desember 2010
2010	Workshop Penyusunan dan Pengelolaan Data EPSBED dan Akreditasi Program Studi	Universitas Islam Makassar Lembaga Jaminan Mutu Internal	5-7 Februari 2010
2010	Peningkatan Kemanpuan Penelitian Dosen PTS di Wilayah Sulawesi	DP2M-Ditjen Dikti Kemdiknas-Universitas Islam Makassar	13-14 Desember 2010

2011	Pelatihan dan Lokakarya Proposal Pengabdian pada Masyarakat (PPM) DIT-LITABMAS DIKTI	Balitbangda- FlipMas Provinsi Sulawesi Selatan	24-25 Juni 2011
2018	Pelatihan Verifikator Sinta	Ditjen Pengelolaan kekayaan Intelektual Kementerian Riset-Politani Pangkep	26-27 April 2018
2018	Intensive Training Application of Plagiarism Detection for Accreditation and International Publication	PMC Universitas Hasanuddin	22 Oktober 2018
2019	Workshop Pengusulan Kenaikan Jabatan Akademik dan Pangkat Dosen	Universitas Islam Makassar	13 Februari 2019
2019	Workshop Penyusunan Borang Akreditasi Perguruan Tinggi 3.0 BAN-PT	Universitas Islam Makassar	8-9 Maret 2019
2019	Bimtek Penulisan Artikel Ilmiah Internasional Bereputasi	Ristekdikti	30 Agustus-02 September 2019

### Bidang Keahlian Penelitian

#### Teknik Elektro (Kontrol dan Energi)

#### Pengalaman Penelitian yang di Dana

No	Tahun	Judul Penelitian	Pendanaan	
			Sumber	Jumlah (Juta Rp)
1	2005	Pengaruh Kenaikan Harga Bahan Bakar Minyak Pada Penyediaan Energi Listrik Disulawesi Selatan ( <b>Penelitian Dosen Pemula</b> )	KOPERTIS WIL.IX SULAWESI	5

2	2005	Implementasi Algoritma Genetik Untuk Optimasi Penentuan Luas Penampang Konduktor Jaring Transmisi <b>(Penelitian Dosen Pemula)</b>	DP2M DIKTI	10
3	2008	Studi Efisiensi Pembangkit Listrik Tenaga Mikro Hydro (PLTMH) <b>(Penelitian HIBAH BERSAING)</b>	DP2M DIKTI	30
4	2014	Pengembangan Sistem Pengaman Rumah Dengan Security assword Menggunakan Sensor Gerak Berbasis mikrokontroller ATMEGA8 <b>(Penelitian HIBAH BERSAING)</b>	RISTEKDIKTI	52.5
5	2015	Pengembangan Sistem Pengaman Rumah Dengan Security Password Menggunakan Sensor Gerak Berbasis Mikrokontroller ATMEGA8 <b>(Penelitian HIBAH BERSAING)</b>	RISTEKDIKTI	62.5
6	2016	STUDI EKSPERIMENTAL PENGARUH VARIASI BELOKAN PIPA (ELBOW) TERHADAP KECEPATAN ALIRAN FLUIDA DAN KERUGIAN TEKANAN <b>(Penelitian DOSEN PEMULA)</b>	RISTEKDIKTI	19.30
7	2016	RANCANG BANGUN SISTEM PROTEKSI DINI KEBOCORAN GAS LPG (LIQUEFIED PETROLEUM GAS) BERBASIS MIKROKONTROLLER AT MEGA 16 <b>(Penelitian HIBAH BERSAING)</b>	RISTEKDIKTI	62.5

8	2017	RANCANG BANGUN SISTEM PROTEKSI DINI KEBOCORAN GAS LPG (LIQUEFIED PETROLEUM GAS) BERBASIS MIKROKONTROLLER AT MEGA 16 ( <b>Penelitian HIBAH STRATEGIS NASIONAL</b> ) <b>STRANAS</b>	RISTEKDIKTI	57.5
9	2018	RANCANG BANGUN SISTEM PROTEKSI DINI KEBOCORAN GAS LPG (LIQUEFIED PETROLEUM GAS) BERBASIS MIKROKONTROLLER AT MEGA 16 ( <b>Penelitian HIBAH BERSAING</b> )	RISTEKDIKTI	124.680
10	2019	IMPLEMENTASI SISTEM SMARTHOME UNTUK KEAMANAN DAN KENYAMANAN BERBASIS MANAJEMEN ( <b>Penelitian HIBAH DISERTASI DOKTOR</b> )	RISTEKDIKTI	48.651
11	2020	IMPLEMENTASI SISTEM SMARTHOME UNTUK KEAMANAN DAN KENYAMANAN BERBASIS MANAJEMEN ( <b>Penelitian HIBAH DISERTASI DOKTOR</b> )	RISTEKDIKTI	55.0

### Publikasi Ilmiah

#### JOURNAL INTERNATIONAL

- [1] **Sriwati**, Ansar Suyuti, Andani Ahmad, Andi Ejah Umraeni Salam, Intelligent System of LPG Gas Leakage Detection for Web-Based Living House Security. Published ICIC International. Vol. 10 Numeber 2 February 2019. 89-96. **Indexed in Scopus**, DOI: [10.24507/icicelb.10.02.89](https://doi.org/10.24507/icicelb.10.02.89)
- [2] **Sriwati**, Ansar Suyuti, Andani Ahmad, Andi Ejah Umraeni Salam, IMPLEMENTATION OF SMART HOME INSTALLATION BASED ON ENERGY MANAGEMENT, ARPN Journal of Engineering and Applied Sciences, VOL. xx, NO. xx Bulan XXX 2020 ISSN 1819-6608, **Indexed in Scopus**, DOI: Proses

- [3] **Sriwati**, Ansar Suyuti, Andani Ahmad, Andi Ejah Umraeni Salam, Implementation of Smart Home Installation System Based On Energy Management, International Journal of Advanced Science and Technology, Vol. 29, No. 08, (2020), Published.2020-05-21  
**Indexed in Scopus**,

## JURNAL NASIONAL

- [1] **Sriwati**, Analisis Perubahan Parameter Pentanahan Terhadap Tegangan Sentuh Pada Gardu Induk Daya di Kawasan Industri Makassar ILTEK, Volume 3, Nomor 2, April 2007 ISSN :1907-0772.[\(\)](http://journal-uim-makassar.ac.id/index.php/ILTEK/issue/view/6)
- [2] **Sriwati**, Study Exprimen Korelasi Wallis Aliran Berbalik Arah Pada Pipa Tegak Dengan Ujung Rata. Makassar. ILTEK, Volume 4, Nomor 8, Oktober 2009 ISSN :1907-0772.[\(\)](http://journal-uim-makassar.ac.id/index.php/ILTEK/issue/view/6)
- [3] **Sriwati,Larisang.** Aplikasi E-Commerce Berbasis WAP. ILTEK, Volume 5, Nomor 9, April 2010 ISSN : 1907-0772. [\(\)](http://journal-uim-makassar.ac.id/index.php/ILTEK/issue/view/6)
- [4] **Sriwati**.A.A Bijaksana. Analisis Sistem Jaringan Distribusi Tegangan Rendah di Kecamatan Benteng Kab.Kepulauan Selayar . ILTEK, Volume 6, Nomor 12, Oktober 2011 ISSN : 1907-0772. [\(\)](http://journal-uim-makassar.ac.id/index.php/ILTEK/issue/view/6)
- [5] **Sriwati**, Prakiraan Kebutuhan Daya Listrik di Kabupaten Maros Tahun 2010 sampai 2020 ILTEK, Volume 7, Nomor 14, Oktober 2012.ISSN:1907-0772.[\(\)](http://journal-uim-makassar.ac.id/index.php/ILTEK/issue/view/6)
- [6] **Sriwati**, Prediksi Penggantian Transformator Distribusi Akibat Beban Lebih di Kabupaten Maros, ILTEK, Volume 8, Nomor 15, April 2013 ISSN : 1907-0772. [\(\)](http://journal-uim-makassar.ac.id/index.php/ILTEK/issue/view/6)
- [7] **Sriwati**, Implementasi Smartphone Untuk Deteksi Kebocoran Gas LPG (Liquefied Petroleum Gas), ILTEK, Volume 13, Nomor 26, Oktober 2018. ISSN :1907-0772. [\(\)](http://journal-uim-makassar.ac.id/index.php/ILTEK/)
- [8] Haris Tehuayo, **Sriwati**, Studi Kelayakan Neraca Mesin Packing Pada Pengantongan Semen di PT. Semen Tonasa, Elektrika Borneo, Volume 5, Nomor. 2,2019.p-ISSN: 2443-0986,e-ISSN:2685-001X.

<http://jurnal.borneo.ac.id/index.php/elektrika/article/view/855>.  
DOI: <https://doi.org/10.35334/jeb.v5i2.855>

- [9] Fadli Rahman, **Sriwati**.[Rancang Bangun Sistem Monitoring dan Kontrol Suhu pada Mesin Penetas Telur Otomatis Berbasis Mikrokontroler Esp8266](https://www.neliti.com/publications/326111/rancang-bangun-sistem-monitoring-dan-kontrol-suhu-pada-mesin-penetas-telur-otomatis-berbasis-mikrokontroler-esp8266). ILTEK, Volume 15, Nomor 01, Oktober 2018.ISSN: 1907-0772

<https://www.neliti.com/publications/326111/rancang-bangun-sistem-monitoring-dan-kontrol-suhu-pada-mesin-penetas-telur-otoma>  
DOI : [10.47398/iltek.v15i01.499](https://doi.org/10.47398/iltek.v15i01.499)

## SEMINAR INTERNATIONAL/ INTERNATIONAL CONFERENCE

- [1] **Sriwati**, Ansar Suyuti, Andani Achmad, Eja Umrianah, Implementation of Smart home System Installation Based On Humanity. The 2nd Internasional Conference on Applied Electromagnetic Technology (AEMT) 2018. University Of Mataram. 2018 .
- [2] **Sriwati**, Nur Ikhsan Ilahi, Musrawati, Baco Syarifuddin, Suyuti Ansar, Achmad Andani, Umrianah Ejah , Early Leakage Protection System of LPG (Liquefied Petroleum Gas) Based on ATMega 16 Microcontroller. IOP Conference Series: Materials Science and Engineering, Volume 336, Issue 1, pp. 012021 (2018).Universitas Negeri Surabaya.2018.  
**Indexed in Scopus**, DOI:[10.1088/1757-899X/336/1/012021](https://doi.org/10.1088/1757-899X/336/1/012021)
- [3] S Sriwati, E Eruinsyah, S Karim, F Rahman,[Control of Electronic Devices Using Smartphone-Based Voice Identification](https://doi.org/10.1088/1757-899X/662/2/022004). IOP Conf. Series: Materials Science and Engineering 662 (2019) 022004.  
**Indexed in Scopus**, DOI: [10.1088/1757-899X/662/2/022004](https://doi.org/10.1088/1757-899X/662/2/022004)
- [4] Sriwati, Ansar Suyuti, Andani Ahmad, A.Ejah Umraeni Salam, Control of light Intensity via Microcotroller For the Efficiency of Electrical Energy.Universitas Tadulako. Palu.2019

## SEMINAR NASIONAL

- [1] Sriwati, Musrawati, Syarifuddin Baco, Tahir Malik ,Real-Time Deteksi Kebocoran Gas LPG (Liquified Petroleum Gas) Berbasis Mikrokontroller Atmega16. Seminar Nasional Teknik Elektro dan Informatika (SNTEI) 2019. Politeknik Negeri Ujung Pandang.2019
- [2] Sriwati, Nurlkhsan Ilahi, Musrawati, Syarifuddin Baco, Ansar Suyuti, Andani Ahmad, Ejah Umrianah . Sistem Proteksi Dini Kebocoran Gas LPG (Liquefied Petroleum Gas) Berbasis Mikrokontroller ATMega 16.

Seminar Nasional dan Expo Teknik Elektro. Universitas Syiah Kuala.  
Banda Aceh.2017

- [3] S Sriwati, F Faridah, S Baco ,Pengembangan Sistem Pengaman Rumah Dengan Security Password Menggunakan Sensor Gerak Berbasis Mikrokontroller ATMEGA8. Prosiding SENIATI, 2017. Fakultas Teknologi Industri Institut Teknologi Nasional Malang.
- [4] Sriwati, Pengembangan Sistem Pengaman Rumah Dengan Security Password Menggunakan Sensor Gerak Berbasis Mikrokontroller ATMEGA8Prosiding Seminar Nasional Teknik Energi dan Ketenagalistrikan III (SNTEK 2016), ISBN: 978-602-8509-22-0.

Makassar, 17 Nopember 2020



**Sriwati**