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1.	Authors:	Himani Goyal	
	Paper Title:	Wireless Display using RF-Module	
	<p>Abstract: Exchange of information has always been important. Without this it is impossible to express one's thoughts and ideas. A study in the various modes of communication has bridged this gap enabling an easy and free flow of information among the people. There has always been an effort to develop various ways and methods to make the transfer of information and data, even more efficient. One such study is in the transfer of serial data over a limited distance i.e., within a particular range. To meet the present day technology needs, data transfer at higher speeds is to be achieved which is possible by RF Communication. This project uses an RF Module to transfer serial data in a better way reducing the cost overhead and limiting the drastic effects of noise. In this project we have two sections, one is transmitter section and the other is receiver section. The transmitter section mainly consists of ATMEL8 and an RF Transmitter. The same is also used in the receiver section. It also involves a wireless LCD Display to display the information transferred. Arduino is used as an ISP (In-System-Programmer). This allows us to use the board to burn the boot loader onto an ATMEL. An antenna is also used at both the transmitter and receiver sections. In this method of serial communication, the maximum baud rate is 8000 bits per second. It can be used within a range of 150metre radius (with obstacles). It also has an error checking feature by which the noise is reduced. For the transfer of information within a short range, this method can be employed as it is more efficient when compared to the prevalent methods of data transfer.</p>		1-3
	<p>Keywords: ATMEL, LCD, RF, ISP, Transmitter, Communication.</p>		
	<p>References:</p> <ol style="list-style-type: none"> 1. Development of an 8-bit RISC microcontroller By Mostafa.G Dept of Electr. & Electron. Engg. 2. Ling Xu ; Dept. of Autom. Control, Henan Mech. & Electr. Eng. Coll., Xinxiang, China ; Gang Liu ; Chao-wei Duan 3. Kang Huaguang. Foundation of electronic technology - digital department. High Education Press, 2001 4. Lu Erhong. Professional integrative circuit designing and automatic electronic designing. Tsinghua Press, 2000 5. Abidi, "A. Direct-conversion radio transceivers for digital communications, " IEEE JSSC, vol. 30, pp. 1399-1409, 1995. 6. H.Okazaki, A.Fukuda, A. Kawai, K. Furuta, T. Narahashi, et al, "Reconfigurable RF Circuits for Future Band-Free Mobile Terminals," 2007 International Symposium on Signals, Systems and Electronics, pp.99-102, July 2007. 7. E. E. Djoumessi, Ke Wu, "Tunable multi-band direct conversion receiver for cognitive radio systems," 2009 IEEE MTT-S International Microwave Symposium Digest, pp.217-220, June 7-12, 2009. 8. Chipcon AS SmartRF. CC2420 Preliminary Datasheet. (rev 1.1), 2004-03-22. 9. S. Dalmia, et.al, "LCP based lumped-element bandpass filters for multiple wireless apps," in IEEE Int. Micr. Symp., 2004. 10. Wartenberg, S.A.: RF Measurements of Die and Packages. Boston/London: Artech House, 2002. 11. John B. Peatman Embedded Design with the PIC18F452 Microcontroller, published by Prentice Hall, ISBN 0-13-046213-6, pp. 83107, pp 275-278, pp275-278 12. HD 44780U (LCDII), Data sheet of Hitachi HD44780 Dot Matrix Liquid Crystal Display Controller Driver Hitachi, viewed on 23 March 2006. 13. Inseok Choi ; Sch. of Comput. Sci. & Eng., Seoul Nat. Univ., South Korea ; Hojun Shim ; Naehyuck Chang 		
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	Paper Title:	Understanding of IC555 Timer and IC 555 Timer Tester	
	<p>Abstract: As 555 timer is robust, stable and most commonly used IC in the area of electronics and also use in many electronic circuits. IC 555 is a square wave generator and its duty cycle range from 50% to 100%. The time delay in the circuit is provided by an oscillator. 555 timer IC got its name from the three 5 kilo-ohm resistor attached as a pattern of voltage divider as shown in the below figure. While in the full circuit 555 timer IC consists of many other components via 16 resistors, 20 transistors and 2 diodes also included flip-flop.</p>		4-6
	<p>Keywords: Ic technology, ic555 timer, ic555 timer tester.</p> <p>References:</p> <ol style="list-style-type: none"> 1. Ward, Jack (2004). The 555 Timer IC – An Interview with Hans Camenzind. The Semiconductor Museum. Retrieved 2010-04-05 2. Jump up^ van Roon, Fig 3 & related text. 3. Jump up^ Scherz, Paul (2000) "Practical Electronics for Inventors", p. 589. McGraw-Hill/TAB Electronics. ISBN 978-0-07-058078-7. Retrieved 2010-04-05. 4. Jump up^ Jung, Walter G. (1983) "IC Timer Cookbook, Second Edition", pp. 40–41. Sams Technical Publishing; 2nd ed. ISBN 978-0-672-21932-0. Retrieved 2010-04-05. 5. Jump up^ van Roon, Chapter "Monostable Mode". (Using the 555 timer as a logic clock) 6. Jump up^ http://www.national.com/ds/LM/LM555.pdf 7. Jump up^ http://www.555-timer-circuits.com/operating-modes.html 8. van Roon Chapter: "Astable operation". 9. Jump up^ http://www.customsiliconsolutions.com/products-for-ASIC-solutions/standard-IC-products.aspx 10. Jump up^ 15 X-REL Semiconductor Data Sheet, 38100 Grenoble France 11. Jump up^ Engdahl, pg 1. 12. Jump up^ Engdahl, "Circuit diagram of PC joystick interface" 		
	Authors:	Majid S. M. Al-Hafidh, Muthana S. Salih	
	Paper Title:	Hybrid Renewable Energy for Residential Loads using HOMER Software & Neuro-Fuzzy Network	

3.	<p>Abstract: Electric load consists of multiple components, residential, commercial, industrial, agricultural. . . Etc. The residential load is the largest component of the electrical load in the Iraqi power system nowadays. The study of residential load connected to the grid with the ability to energy change (buy and sale) has been carried in a previous research. Optimal hybrid renewable energy system has been found using HOMER software. The current research aims to implement HOMER software for different residential load with extent scale of change and to find the optimal hybrid renewable energy system for each load. In this way a database is to be obtained. This database is to be used in the formation of Neuro-Fuzzy system, which can be used to find the optimal hybrid renewable energy system for residential loads in the city of Mosul.</p> <p>Keywords: Hybrid renewable power system ; grid connecting lods; Residential load; HOMER; Neuro-Fuzzy.</p> <p>References:</p> <ol style="list-style-type: none"> 1. N. Acharya, P. Mahat, N. Mithulananthan, "An analytical approach for DG allocation in primary distribution network," International Journal of Electrical Power and Energy Systems, Vol. 28, Dec. 2006, pp. 669–678. 2. J. Wilk, J. O. Gjerde, T. Gjengedal, M. Gustafsson, "Steady state power system issues when planning large wind farms", in Proc. IEEE Power Engineering Society Winter Meeting, 2002, Vol. 1 pp. 199–204. 3. P. Torcellini, S. Pless, M. Deru and D. Crawley "Zero Energy Buildings: A Critical Look at the Definition", ACEEE Summer Study Pacific Grove, California August 14–18, 2006. 4. Majid S.M. Al-Hafidh, Mustafa H. Ibrahim " Zero Energy House in Iraq" International Journal of Inventive Engineering and Science, Vol-2, Issue-7, June 20, 2014. 	7-10				
4.	<table border="1" data-bbox="121 633 1422 728"> <tr> <td data-bbox="121 633 331 683">Authors:</td> <td data-bbox="331 633 1422 683">Ali Al-Helal</td> </tr> <tr> <td data-bbox="121 683 331 728">Paper Title:</td> <td data-bbox="331 683 1422 728">Solar Energy as an Alternative Energy than the Conventional Means of Electricity Generation in Iraq</td> </tr> </table> <p>Abstract: This study aims to show the feasibility of using solar power in Iraq as an alternative source of power generation. This research investigated the profits of using solar power economically and environmentally. Also, it addressed a set of important charts such as generated power, oil production, the amount of gas that used in the power plant, the average of delivered electricity hours, and CO2 emissions. Ten locations are chosen as the best places according to their total annual solar radiation and each location is assumed to have a 10 MW solar park. The results showed saving about 676,000 USD daily (based on 52 USD per barrel) from petrol can be used to generate electricity from the conventional means, offsetting over 200,000 metric tons of carbon dioxide equivalent emissions annually, and around 111 job will be created during the construction stage of each 10 MW.</p> <p>Keywords: Solar energy, CO2 emissions, solar radiation.</p> <p>References:</p> <ol style="list-style-type: none"> 1. al, S. A.-W. (2012). Calculation and Applications of Net Solar Radiation in Iraq. 1 - 9. 2. al, S. A.-W. (2014). Estimation of the Global Horizontal Solar Radiation in Iraq. International Journal of Emerging Technology and Advanced Engineering, 587 - 605. 3. Alasady, A. M. (2011). Solar energy the suitable energy alternative for Iraq beyond oil. 2011 International Conference on Petroleum and Sustainable Development (pp. 11-15). Singapore: IACSIT Press. 4. Alrikabi, N. (2014). Renewable Energy Types. Journal of Clean Energy Technologies, 61-64. 5. Analysis, C. (2013, May 30). http://www.eia.gov/. Retrieved from US energy information administration : http://www.eia.gov/countries/country-data.cfm?fips=IZ#tpe 6. Choi, C. (2013, September 22). http://www.livescience.com/. Retrieved from livescience: http://www.livescience.com/39849-greenhouse-gas-emissions-premature-deaths.html 7. Council, W. E. (2013). World Energy Resources. London: World Energy Council . 8. Jacobson, W. a. (2013). SOLAR FARM FEASIBILITY STUDY. DISTRICT COUNCIL OF MOUNT REMARKABLE. 9. Most, I. (2011, March 30). musingsoniraq.blogspot.com.au . Retrieved from MUSINGS ON IRAQ: http://musingsoniraq.blogspot.com.au/2011/03/iraq-most-oil-dependent-country-in.html 10. Office, U. S. (2007). Integrated Strategic. Washington : GAO . 11. TEAM, I. O. (2013). http://www.iraqoilgas.com/. Retrieved from http://www.iraqoilgas.com/sector_in_iraq.html 12. Unemployment, I. (n.d). http://www.tradingeconomics.com/. Retrieved from tradingeconomics: http://www.tradingeconomics.com/iraq/unemployment-rate 13. Years, I. I. (2013, March 20). http://www.bbc.com/. Retrieved from http://www.bbc.com/news/world-middle-east-21752819 	Authors:	Ali Al-Helal	Paper Title:	Solar Energy as an Alternative Energy than the Conventional Means of Electricity Generation in Iraq	11-14
Authors:	Ali Al-Helal					
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	<table border="1" data-bbox="121 1563 1422 1653"> <tr> <td data-bbox="121 1563 331 1608">Authors:</td> <td data-bbox="331 1563 1422 1608">Vijendra V</td> </tr> <tr> <td data-bbox="121 1608 331 1653">Paper Title:</td> <td data-bbox="331 1608 1422 1653">Fabrication of a PLDC Cell using Near Infrared OLED</td> </tr> </table> <p>Abstract: The fabrication of a single-layer NIR OLED by a new luminescent material. Demonstrate vertically stacked device consisting of organic photovoltaic device (OPV) and organic light-emitting diode (OLED) inside a polymer dispersed liquid crystal (PDLC) cell. In such a device, OLED and PDLC acted as transmissive (T-) and reflective (R-) mode respectively, of a transmissive display without the tradeoff of aperture ratio between R- and T- modes in a conventional transmissive LC display. The characteristics of this diode is considered and investigated with different thicknesses. Electroluminescence is observed with the peak at 800 nm. Storage lifetime of OLED increased in the stacked device because LC material helped to prevent the water and oxygen attack. Driving voltage of PDLC increased due to the insertion of passivation layer upon the electrode which was used protect the OLED and OPV underneath.</p> <p>Keywords: DVS, HOMO, low power design, LUMO, OPV, OLED, PLDC.</p> <p>References:</p> <ol style="list-style-type: none"> 1. C. W. Tang and S. A. VanSlyke, "Organic electroluminescent diodes," Appl. Phys. Lett., vol. 51, no. 12, p. 913, 1987. 2. C. W. Tang, S. A. Vanslyke, and C. H. Chen, "Electroluminescence of doped organic thin films," J. Appl. Phys., vol. 65, p. 3610, 1989. 3. C. L. Lin, C. C. Hung, P. Y. Kuo, and M. H. Cheng, "New LTPS pixel circuit with AC driving method to reduce OLED degradation for 3D AMOLED displays," J. Display Technol., vol. 8, no. , pp. 681–683, 2012. 	Authors:	Vijendra V	Paper Title:	Fabrication of a PLDC Cell using Near Infrared OLED	
Authors:	Vijendra V					
Paper Title:	Fabrication of a PLDC Cell using Near Infrared OLED					

5.

4. M. Yokoyama, C. M. Wu, and S. H. Su, "Enhancing the efficiency and contrast ratio of white organic light-emitting diode using energy-recycle photovoltaic cells," *Jpn. J. Appl. Phys.*, vol. 51, p. 032102, 2012.
5. Y. H. Kim, S. Y. Lee, W. Song, M. Meng, Z. H. Lu, and W. Y. Kim, "High contrast green OLEDs using inorganic metal multilayer," *Synth. Met.*, vol. 161, p. 2211, 2011.
6. S. Chen, J. Xie, Y. Yang, C. Chen, and W. Huang, "High-contrast top-emitting organic light-emitting diodes with a Ni/ZnS/CuPc/Ni contrast-enhancing stack and a ZnS anti-reflection layer," *J. Phys. D: Appl. Phys.*, vol. 43, p. 365101, 2010.
7. H. Cho and S. Yoo, "Polarizer-free, high-contrast inverted top-emitting organic light emitting diodes: Effect of the electrode structure," *Opt. Express*, vol. 20, p. 1816, 2012.
8. T. L. Chiu, K. H. Chuang, C. F. Lin, Y. H. Ho, J. H. Lee, C. C. Chao, M. K. Leung, D. H. Wan, C. Y. Li, and H. L. Chen, "Low reflection and photo-sensitive organic light-emitting device with perylene diimide and double-metal structure," *Thin Solid Films*, vol. 517, no. 13, pp. 3712–3716, 2009
9. S. W. Liu, C. F. Lin, C. C. Lee, W. C. Su, C. T. Chen, and J. H. Lee, "High open-circuit voltage planar heterojunction organic photovoltaics exhibiting red electroluminescence," *J. Electrochem. Soc.*, vol. 159, no. 2, p. H191, 2012.
10. C. J. Yang, T. Y. Cho, C.-L. Lin, and C. C. Wu, "Organic light-emitting devices integrated with solar cells: High contrast and energy recycling," *Appl. Phys. Lett.*, vol. 90, no. 17, 2007.
11. T. Douseki, T. Yamada, J. Yamada, K. Ito, and K. Nishi, "Photovoltaic display module in a mobile GPS," *Solar Energy Mater. Solar Cells*, vol. 67, p. 543, 2001.
12. T. Nakamura, H. Hayashi, M. Fuchi, M. Tada, T. Imai, H. Nakamura, K. Shigehiro, S. Hirota, S. Maruyama, A. Saitoh, and H. Kimura, "Display architecture suitable for multiple ambient light-sensor integration. using LTPS technology," in *SID 08 Dig.*, 2008, pp. 720–723.
13. S. H. Kim, E. B. Kim, H. Y. Choi, D. H. Kang, W. H. Park, J. H. Oh, E. Y. Lee, S. H. Lee, D. H. Oh, K. H. Kim, M. H. Kang, J. H. Hur, J. Jang, J. W. Lee, J. R. Choi, S. H. Ahn, and S. W. Hong, "A 2 inch a-Si:H TFT-LCD with backlight control TFT sensors," in *SID 07 Dig.*, 2007, pp. 1093–1096.
14. H. Hayashi, T. Nakamura, N. Tada, T. Imai, M. Yoshida, and H. Nakamura, "Optical sensor embedded input display usable under high-ambient-light conditions," in *SID 07 Dig.*, 2007, pp. 1105–1108.
15. J. H. Lee, C. C. Liao, P. J. Hu, and Y. Chang, "High contrast ratio organic light-emitting devices based on CuPC as electron transport material," *Synth. Met.*, vol. 144, p. 279, 2004.
16. S. T. Wu and D. K. Yang, *Reflective Liquid Crystal Displays*. New York, NY, USA: Wiley, 2001.
17. C. T. Wang and T. H. Lin, "Bistable reflective polarizer-free optical switch based on dye-doped cholesteric liquid crystal," *Opt. Mater. Express*, vol. 1, p. 1457, 2011.
18. B. R. Yang, K. H. Liu, and H. P. D. Shieh, "Emiflective display device with attribute of high glare-free-ambient-contrast-ratio," *Jpn. J. Appl. Phys.*, vol. 46, p. 7418, 2007.
19. J. H. Lee, X. Zhu, Y. H. Lin, W. K. Choi, T. C. Lin, S. C. Hsu, H. Y. Lin, and S. T. Wu, "High ambient-contrast-ratio display using tandem reflective liquid crystal display and organic light-emitting device," *Opt. Exp.*, vol. 13, no. 23, pp. 9431–9438, 2005.
20. H. M. Zhang, W. C. H. Choy, Y. F. Dai, and D. G. Ma, "The structural composite effect of Au-WO₃-Al interconnecting electrode on performance of each unit in stacked OLEDs," *Organ. Electron.*, vol. 10, pp. 402–407, 2009.
21. C. F. Lin, S. W. Liu, W. F. Hsu, M. Zhang, T. L. Chiu, Y. Wu, and J. H. Lee, "Modification of silver anode and cathode for top-illuminated organic photovoltaic device," *J. Phys. D, Appl. Phys.*, vol. 43, no. 39, p. 395101, 2010.
22. C. C. Wu, C. F. Lin, J. H. Lee, W. F. Chang, T. L. Chiu, and S. W. Liu, "Fully Integration of Transflective Hybrid Device Consisting of PSCT and In-cell OLED," in *SID 11 Dig.*, 2011, pp. 1602–1605.
23. C. F. Lin, S. W. Liu, C. C. Lee, J. C. Huang, W. C. Su, T. L. Chiu, C. T. Chen, and J. H. Lee, "Open-circuit voltage and efficiency improvement of subphthalocyanine-based organic photovoltaic device through deposition rate control," *Sol. Energy Mater. Sol. Cells.*, vol. 103, p. 69, 2012
24. C. C. Wu, C. F. Lin, J. H. Lee, W. F. Chang, T. L. Chiu, and S. W. Liu, "Fully Integration of Transflective Hybrid Device Consisting of PSCT and In-cell OLED," in *SID 11 Dig.*, 2011, pp. 1602–1605.
25. C. F. Lin, S. W. Liu, C. C. Lee, J. C. Huang, W. C. Su, T. L. Chiu, C. T. Chen, and J. H. Lee, "Open-circuit voltage and efficiency improvement of subphthalocyanine-based organic photovoltaic device through deposition rate control," *Sol. Energy Mater. Sol. Cells.*, vol. 103, p. 69, 2012.
26. P. Schilinsky, C. Waldauf, J. Hauch, and C. J. Brabec, "Simulation of light intensity dependent current characteristics of polymer solar cells," *J. Appl. Phys.*, vol. 95, p. 2816, 2004.
27. J. H. Lee, K. Y. Chen, C. C. Hsiao, H. C. Chen, C. H. Chang, Y. W. Kiang, and C. C. Yang, "Radiation simulations of top-emission organic light-emitting devices with two- and three-microcavity structures," *J. Display Technol.*, vol. 2, no. 2, p. 130, Jun. 2006.
28. C. H. Hsiao, Y. H. Chen, T. C. Lin, C. C. Hsiao, and J. H. Lee, "Recombination zone in mixed-host organic light-emitting devices," *Appl. Phys. Lett.*, vol. 89, p. 163511, 2006.
29. Z. D. Popovic and H. Aziz, "Reliability and degradation of small molecule-based organic light-emitting devices (OLEDs)," *IEEE J. Quantum. Electron.*, vol. 8, no. , p. 362, 2002.
30. H. C. Chen, J. H. Lee, C. C. Shiao, C. C. Yang, and Y. W. Kiang, "Electromagnetic modeling of organic light-emitting devices," *J. Lightwave Technol.*, vol. 24, no. , p. 2450, 2006.
31. J. McElvain, H. Antoniadis, M. R. Hueschen, J. N. Miller, D. M. Roitman, J. R. Sheats, and R. L. Moon, "Formation and growth of black spots in organic light-emitting diodes," *J. Appl. Phys.*, vol. 80, p. 6002, 1996.
32. C. D. Wang and W. C. H. Choy, "Efficient hole collection by introducing ultra-thin UV-ozone treated Au in polymer solar cells," *Sol. Energy Mater. Sol. Cells*, vol. 95, p. 904, 2011.
33. Q. L. Song, M. L. Wang, E. G. Obbard, X. Y. Sun, X. M. Ding, X. Y. Hou, and C. M. Li, "Degradation of small-molecule organic solar cells," *Appl. Phys. Lett.*, vol. 89, p. 251118, 2006.
34. S. W. Liu, C. C. Lee, C. F. Lin, J. C. Huang, C. T. Chen, and J. H. Lee, "Degradation of small-molecule organic solar cells," *J. Mater. Chem.*, vol. 20, p. 7800, 2010.
35. C. Y. Chang and F. Y. Tsai, "Efficient and air-stable plastics-based polymer solar cells enabled by atomic layer deposition," *J. Mater. Chem.*, vol. 21, p. 5710, 2011.
36. H. K. Kim, S. W. Kim, D. G. Kim, J. W. Kang, M. S. Kim, and W. J. Cho, "Thin film passivation of organic light emitting diodes by inductively coupled plasma chemical vapor deposition," *Thin Solid Films*, vol. 515, p. 4758, 2007.
37. H. Ren and S. T. Wu, "Reflective reversed-mode polymer stabilized cholesteric texture light switches," *J. Appl. Phys.*, vol. 92, p. 797, 2002.
38. Y. S. Ha, H. J. Kim, H. G. Park, and D. S. Seo, "Enhancement of electro-optic properties in liquid crystal devices.

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Paper Title: Secure Smart Grid Network

Abstract: The Smart Grid is formed by many sub-networks such as the Home Area Network (HAN), which are at risk and can be attacked remotely. A Smart grid designing a mutual authentication scheme and a key management protocol. This paper proposes an efficient scheme that mutually authenticates a smart grid. In this paper we analyzed three cases first we show the normal execution then execution along with attackers. Using mutual authentication we overcome attacks. A number of anonymous routing schemes have been proposed for grid networks in recent years, and they provide different level of privacy protection at different cost. First, an anonymous key establishment process is performed to construct secret session keys. By using NS-2 the performance analysis such as energy, bandwidth etc., are simulated. Here we find the attacks.

6.	<p>Keywords: Privacy, Public key, smart grid (SG) mutual authentication, and Routing.</p> <p>References:</p> <ol style="list-style-type: none"> 1. Z. Fan, P. Kulkarni, S. Gormus, C. Efthymiou, G. Kalogridis, M. Sooriyabandara, Z. Zhu, S. Lambotharan, and W. H. Chin, "Smart grid communications: Overview of research challenges, solutions, and standardization activities," <i>IEEE Commun. Surveys Tuts.</i>, vol. 15, no. 1, pp. 21–38, 2013. 2. J. Wang and V. Leung, "A survey of technical requirements and Consumer application standards for IP-based smart grid AMI network," in <i>Proc. ICOIN</i>, 2011, pp. 114–119. 3. H. Nicanfar, P. Jokar, and V. Leung, "Smart grid authentication and key management for unicast and multicast communications," in <i>Proc. IEEE PES ISGT</i>, 2011, pp. 1–8. 4. D. Cooper, S. Santesson, S. Farrell, S. Boeyen, R. Housley, and W. Polk, "Internet X.509 Public Key Infrastructure Certificate and Certificate Revocation List (CRL) Profile," Internet Engineering Task Force, Fremont, CA, USA, 2008. 5. M. Amin, "Challenges in reliability, security, efficiency, and resilience of energy infrastructure: Toward smart self-healing electric power grid," in <i>Power and Energy Society General Meeting – Conversion and Delivery of Electrical Energy in the 21st Century</i>, 2008 IEEE, Jul. 2008, pp. 1–5. 6. A. Metke and R. Ekl, "Security technology for smart grid networks," <i>Smart Grid, IEEE Transactions on</i>, vol. 1, no. 1, pp. 99–107, Jun. 2010. 7. Z. Fadlullah, N. Kato, R. Lu, X. Shen, and Y. Nozaki, "Towards secure targeted broadcast in smart grid," <i>IEEE Commun. Mag.</i>, vol. 50, no. 5, pp. 150–156, May 2012 [Online]. Available: http://bcr.uwaterloo.ca/h8liang/sg/Papesgcommx.pdf 8. J. Xia and Y. Wang, "Secure key distribution for the smart grid," <i>IEEE Trans. Smart Grid</i>, vol. 3, no. 3, pp. 1437–1443, Sep. 2012. 9. M. Fouda, Z. M. Fadlullah, N. Kato, R. Lu, and X. S. Shen, "A light-weight message authentication scheme for smart grid communications," <i>IEEE Trans. Smart Grid</i>, vol. 2, no. 4, pp. 675–685, 2011. 10. S. R. Rajagopalan, L. Sankar, S. Mohajer, and H. V. Poor, "Smartmeter privacy: A utility-privacy framework," <i>Proc. IEEE SmartGridComm</i>, 2011. 	23-25
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