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RESEARCH GUIDE:

LOGIC CIRCUITS AND SWITCHING THEORY

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RESEARCH GUIDES

LOGIC CIRCUITS AND SWITCHING THEORY

I. SCOPE NOTE

Switching Theory is about using switches to implement Boolean expressions and logic gates for the logic design of digital circuits. Switching Theory allows us to understand the operation and relationship between Boolean algebra and two-level logic functions with regards to Digital Logic Gates. *electronics-tutorials.ws*

II. SEARCH AIDS (BT: Broader Term, RT: Related Term, NT: Narrow Term)

BT:

- Logic Circuits
- Switching Theory

RT:

- Digital system
- Combinational logic
- Digital concept
- Hardware description language
- Combinational circuits
- Sequential circuits
- Boolean function
- Logic programming
- Switching circuits
- Systems design
- Circuit design
- Algorithms
- Logic design
- Design engineering
- Circuits
- Memory devices
- Random access memory
- Logic circuits
- Gates (circuits)
- State and machine equivalence
- Algorithmic state machines
- Design of digital subsystems
- Logic family

NT:

- Asynchronous sequential circuits
- Canonical and standard forms
- Map method

- NAND and NOR implementation
- Adders and subtracter
- Code conversion
- Decoders and encoder
- Multiplexers and demultiplexer
- Comparator
- Read-Only Memory (ROM)
- Programmable logic array
- HDL
- Levels of modeling
- Abstraction in Verilog
- Discrete circuit logic chip
- Integrated circuit logic chip
- PLD

III. INFORMATION RESOURCES

A. LIBRARY RESOURCES

Note: For the appropriate access credentials, please contact the Letran Bataan Library

➢ **E-JOURNALS**

- Russian Microelectronics. https://www.proquest.com/publication/publications_2043758
- IET Optoelectronics. https://www.proquest.com/publication/publications_1936356
- Circuits, Systems, and Signal Processing: CSSP. https://www.proquest.com/publication/publications_30136
- IEEE Transactions on Magnetics. https://www.proquest.com/publication/publications_85461
- Neural Computing & Applications. https://www.proquest.com/publication/publications_2043988
- IEEE Transactions on Neural Networks and Learning Systems. https://www.proquest.com/publication/publications_85436
- IEEE Transactions on Electron Devices. https://www.proquest.com/publication/publications_85466
- Journal of Nano Research. https://www.proquest.com/publication/publications_2029176
- Sensors. https://www.proquest.com/publication/publications_2032333
- International Journal of Electrical and Computer Engineering. https://www.proquest.com/publication/publications_1686344
- IET Circuits, Devices & Systems. https://www.proquest.com/publication/publications_1936358
- ISRN Electronics. https://www.proquest.com/publication/publications_1256346
- Electronics. https://www.proquest.com/publication/publications_2032404

- IEEE Transactions on Applied Superconductivity. https://www.proquest.com/publication/publications_85434
- International Journal of Electrical Engineering & Education. https://search.proquest.com/central/publication/publications_37651
- IET Computers & Digital Techniques. https://search.proquest.com/central/docview/1558845889/B11D0DD7E9774375PQ/11
- Journal of Low Power Electronics and Applications. https://search.proquest.com/central/publication/publications_2032378

➢ **E-THESES**

- Midde, B. R. (2016). Design, analysis, and synthesis of 16 bit arithmetic logic unit using reversible logic gate (Order No. 10099864). Available from ProQuest Central. (1783575354). Retrieved from https://www.proquest.com/dissertations-theses/design-analysis-synthesis-16-bit-arithmetic-logic/docview/1783575354/se-2?accountid=190548
- Farah, S. (2014). Dynamic load-based power and clock gating techniques for high-speed digital circuits (Order No. 3622218). Available from ProQuest Central. (1547732306). Retrieved from https://www.proquest.com/dissertations-theses/dynamic-load-based-power-clock-gating-techniques/docview/1547732306/se-2?accountid=190548
- Chadzynski, T. (2020). An efficient design methodology for complex sequential asynchronous digital circuits (Order No. 28264063). Available from ProQuest Central. (2488138653). Retrieved from https://www.proquest.com/dissertations-theses/efficient-design-methodology-complex-sequential/docview/2488138653/se-2?accountid=190548
- Azhar, M. J. (2018). Duty-cycle based physical unclonable functions (PUFs) for hardware security applications (Order No. 10980455). Available from ProQuest Central. (2167538890). Retrieved from https://www.proquest.com/dissertations-theses/duty-cycle-based-physical-unclonable-functions/docview/2167538890/se-2?accountid=190548
- Oberg, O. T. (2011). Superconducting logic circuits operating with reciprocal magnetic flux quanta (Order No. 3495583). Available from ProQuest Central. (923614769). Retrieved from https://search.proquest.com/docview/923614769?accountid=190548
- Stamness, R. L. (2010). Improvement of a propagation delay model for CMOS digital logic circuits (Order No. 1477363). Available from ProQuest Central. (597940807). Retrieved from https://search.proquest.com/docview/597940807?accountid=190548
- Pabbati Reddy, S. R. (2016). Design of aging-aware variable-latency multiplier based on adaptive hold logic (Order No. 1606098). Available from ProQuest Central. (1755951390). Retrieved from https://search.proquest.com/docview/1755951390?accountid=190548
- Spencer, M. E. (2015). Design considerations for nano-electromechanical relay circuits (Order No. 3733438). Available from ProQuest Central. (1731232880). Retrieved from https://search.proquest.com/docview/1731232880?accountid=190548
- Palit, I. (2017). Design and evaluation of circuits and architectures based on beyondCMOS device technologies (Order No. 13836459). Available from ProQuest Central. (2179190579). Retrieved from https://search.proquest.com/docview/2179190579?accountid=190548

B. OPEN ACCESS

➢ FREE E-BOOKS

- Rao, V.Seshagiri. (2012). Switching Theory And Logic Design https://www.pdfdrive.com/switching-theory-and-logic-design-d60366021.html
- Astola, Jaakko T. (2006). Fundamentals of Switching Theory and Logic Design A Hands on Approach. Netherlands: Springer. https://www.pdfdrive.com/fundamentals-ofswitching-theory-and-logic-design-d17528650.html
- Mano, Morris M. (2006). Digital Logic and Computer Design. https://www.pdfdrive.com/digital-logic-and-computer-design-by-m-morris-mano-e34332016.html
- Roth, Charles H. and Kinney, Larry L. (2014). Fundamentals of Logic Design, 7th edition. U.S.A: Cengage Learning. https://www.pdfdrive.com/fundamentals-of-logic-design-e165496486.html

➢ FREE E-JOURNALS

- Logic Circuits. https://www.sciencedirect.com/topics/engineering/logic-circuits
- International Journal of Electronics. https://www.sciencedirect.com/topics/engineering/logic-circuits
- Micro electrochemical Logic Circuits. https://pubs.acs.org/doi/10.1021/ja0366585
- IEEE Open Journal of Circuits and Systems. https://ieee-cas.org/publications/openjournal-circuits-and-systems
- Electronics – Open Access Journal. https://www.mdpi.com/journal/electronics
- Electrical & Electronic Technology Open Access Journal. https://publons.com/journal/60863/electrical-electronic-technology-open-access-journ/

➢ FREE E-THESES

- Jaiswal, A. R. (2019). Exploiting Voltage Driven Switching of Ferromagnets for Novel Spin based devices and circuits. (Thesis). Purdue University. Retrieved from http://hdl.handle.net/10.25394/pgs.8044376.v1
- Kazemi, M. (2019). Scalable spin torque driven devices and circuits for high performance memory and computing. (Doctoral Dissertation). University of Rochester. Retrieved from http://hdl.handle.net/1802/35238
- Al-Shahrablee, A. A. H. (2018). Reconfigurable three-terminal logic devices using phase-change materials. (Doctoral Dissertation). University of Exeter. Retrieved from http://hdl.handle.net/10871/35293
- Saifhashemi, A. (2012). Power optimization of asynchronous pipelines using conditioning and reconditioning based on a three-valued logic model. (Doctoral Dissertation). University of Southern California. Retrieved from http://digitallibrary.usc.edu/cdm/compoundobject/collection/p15799coll3/id/123889/rec/5158

- Ha, M. (2013). Printed electrolyte-gated transistors and circuits for flexible electronics. (Doctoral Dissertation). University of Minnesota. Retrieved from http://hdl.handle.net/11299/163531
- Cutitaru, M. T. (2014). IDPAL – A Partially-Adiabatic Energy-Efficient Logic Family: Theory and Applications to Secure Computing. (Doctoral Dissertation). Old Dominion University. Retrieved from https://digitalcommons.odu.edu/ece_etds/63
- Al-Jassani, b. A. (2011). Computer aided synthesis and optimization of electronic logic circuits. (Doctoral Dissertation). Edinburgh Napier University. Retrieved from https://ethos.bl.uk/OrderDetails.do?uin=uk.bl.ethos.555244
- Kim, J. (2016). Spin-Based Logic and Memory Technologies for Low-Power Systems. (Doctoral Dissertation). University of Minnesota. Retrieved from http://hdl.handle.net/11299/178949
- Liang, Z. (2019). Design, Simulation, and Optimization of Spintronic Logic Devices. (Doctoral Dissertation). University of Minnesota. Retrieved from http://hdl.handle.net/11299/202437

C. PROFESSIONAL ORGANIZATIONS

- The Institution of Engineering & Technology. https://www.theiet.org/
- Institution of Electrical & Electronics Engineer. https://www.ieee.org/
- American Society for Engineering Education. http://www.asee.org/

D. OTHER RELATED WEB PORTALS

- Virtual Labs. https://www.vlab.co.in/
- MIT Open Courseware. https://ocw.mit.edu/index.htm
- Makezine. https://makezine.com/
- Electronics Weekly. https://www.electronicsweekly.com/
- Tutorials Point. https://www.tutorialspoint.com/index.htm
- Wolfram. https://demonstrations.wolfram.com/
- All about Circuits. https://www.allaboutcircuits.com/
- Electrical 4 U. https://www.electrical4u.com/
- Electronics. http://electronics.wisc-online.com/
- Electrical Engineering Portal. https://electrical-engineering-portal.com/

E. RELATED RESEARCH GUIDES

- Gad & Birgit Rausing Library. https://libguides.lums.edu.pk/c.php?g=776070&p=5567231
- Wash U Law. https://libguides.law.wustl.edu/c.php?g=187378&p=1238109
- University Houston Library. https://guides.lib.uh.edu/ece
- University of Melbourne. https://unimelb.libguides.com/elec_eng
- Bloomsburg Library. https://guides.library.bloomu.edu/c.php?g=318635&p=2127019

IV. TUTORIALS

- Logic Gates, Truth Tables, Boolean Algebra AND, OR, NOT, NAND & NOR. https://www.youtube.com/watch?v=JQBRzsPhw2w

- Logic Gate Combinations. https://www.youtube.com/watch?v=BnB2m1nXZ84
- Introduction to Logic Gates & Boolean Algebra. https://www.youtube.com/watch?v=zfMxkjOtCws
- Diode Logic Gates - OR, NOR, AND, & NAND. https://www.youtube.com/watch?v=9lqwSaIDm2g
- Digital Electronics: Logic Gates - Integrated Circuits Part 1. https://www.youtube.com/watch?v=cdMJvFT-Afc
- Logical Gates / Logic Gates Made Easy , Part 1. https://www.youtube.com/watch?v=6s0AR3_-i0k
- Intro to Logic Gates Tutorial. https://www.youtube.com/watch?v=3impspHZQis
- Logic Gates and Circuit Simplification Tutorial. https://www.youtube.com/watch?v=q2OBYz3K6PM
- Logic Gates Tutorial. https://www.youtube.com/watch?v=Aw53UIwnJqU
- Introduction to Logic Gates. https://www.youtube.com/watch?v=fw-N9P38mi4
- Logic Ly. https://logic.ly/demo
- Electronics Tutorial. https://www.electronics-tutorials.ws/combination/comb_1.html
- Edraw Max. https://www.edrawmax.com/logic-gate/
- Tutorials Point. https://www.tutorialspoint.com/computer_logical_organization/logic_gates.htm
- All about Circuits. https://www.allaboutcircuits.com/video-tutorials/

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