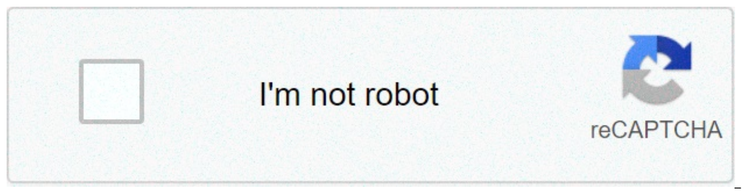

Continue

Computer architecture and organization course

Required Course: Patterson, D.A., and J.L. Hennessy. Computer Organization and Design: The Hardware/Software Interface. 4th ed. Morgan Kaufmann Publishers, 2011. Schedule 150 minutes lecture, 150 minutes laboratory per week Course Description Computer architecture is the science and art of selecting and interconnecting hardware components to create a computer that meets functional, performance and cost goals. This course qualitatively and quantitatively examines computer design trade-offs and teaches the fundamentals of computer architecture and organization, including CPU, memory, registers, arithmetic unit, control unit, and input/output components. Topics include reduced instruction set computer architectures (RISC), using the MIPS central processor as an example, interface between assembly and high-level programming constructs and hardware, instruction and memory cache systems, performance evaluation, benchmarks, and use of the SPIM/WinDLX/Verilog simulators for the MIPS architecture. For students who continue in computer architecture, it lays the foundation of the latest techniques implemented in current and future high-performance computing platforms. For students not continuing in computer architecture, it gives an overview of the techniques used in today's microprocessors. Learning Outcomes By the end of this course, the student will be able to: Understand the fundamentals of computer architecture Explore the computer architecture field on their own Articulate the design issues involved in computer architecture at theoretical and application levels Design and implement single-cycle and pipelined datapaths for a given instruction set architecture Evaluate the close relation between instruction set architecture design, datapath design, and algorithm design Understand the performance trade-offs involved in designing the memory subsystem, including cache, main memory and virtual memory Discuss the modern multicore architectures, such as the NVIDIA graphics processing unit Evaluate analytically the performance of a hypothetical architecture Course Topics Computer abstractions and technology (4 lectures) Arithmetic for computers (4 lectures) Instruction sets and software systems (7 lectures) MIPS CPU and control unit organization (8 lectures) Pipelining in MIPS CPU (6 lectures) Exploiting memory hierarchy (6 lectures) Storage and I/O (2 lectures) Multicores, multiprocessors and clusters (4 lectures) Relationship to Student Outcomes ECE 369A contributes directly to the following specific electrical and computer engineering student outcomes of the ECE department: Ability to apply knowledge of mathematics, science and engineering (medium) Ability to design and conduct experiments, as well as to analyze and interpret data (high) Ability to design a system, component or process to meet desired needs within realistic constraints, such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability (high) Ability to identify, formulate and solve engineering problems (high) Ability to communicate effectively (medium) Recognition of the need for, and an ability to engage in, life-long learning (low) Knowledge of contemporary issues (medium) Ability to use the techniques, skills and modern engineering tools necessary for engineering practice (high) Syllabus Prepared By Learn to design the computer architecture of complex modern microprocessors. This course can help learners form a strong foundation in the understanding and design of modern computing systems. Building on a computer organization base, this course explores techniques that go into designing a modern microprocessor. Fundamental understanding of computer architecture is key not only for students interested in hardware and processor design, but is a foundation for students interested in compilers, operating systems, and high performance programming. This course will explore how the computer architect can utilize the increasing number of transistors available to improve the performance of a processor. Focus will be given to architectures that can exploit different forms of parallelism, whether they be implicit or explicit. This course covers architectural techniques such as multi-issue superscalar processors, out-of-order processors, Very Long Instruction Word (VLIW) processors, advanced caching, and multiprocessor systems. British Columbia Institute of Technologywww.bcit.ca/study/courses/comp2825 BCIT is planning for a substantial return to on-campus activity for the fall 2021 term as informed by BC Public Health Officer guidelines. Refer to each course listing for details. Computer architecture and computer organization are fundamental topics for computer programmers and computer systems developers. This applied course is a study of the rules and methods used to describe the functionality and implementation of computer systems. The hierarchy of computer levels and functions are discussed and analyzed in detail. Through exercises and labs students evaluate modern computer system hardware architectures. They are shown how to build performance into their software applications and computer systems. Topics include pipelining, error-correcting code in theory and in practice, performance enhancement, hard-disk drives and solid-state drives, cache and main memory, addressing, microprogramming the CPU, registers and circuits. Additional topics include the ALU and data path, logarithms, bus clocking, bus arbitration, and address decoding. COMP 2825 is required for the Computer Systems Certificate, CSC in PTS and it is equivalent to COMP 2721 in the full-time CST Diploma. Upon successful completion students will use software at the hardware level to optimize how code is managed by the datapath inside the CPU. They will have skills to evaluate and recommend the appropriate computer system architecture for specific applications. Prerequisite(s) COMP 1113 and COMP 1451 or COMP 2522 or COMP 2526 Credits 4.0 Cost $559.52 - $569.52 See individual course offerings below for actual costs. Spring/Summer 2021 Fall 2021 Below are three offerings of this course for the Spring/Summer 2021 term. Thu Apr 29 - Thu Jul 22 12 Weeks Dates Days Times Locations Apr 29 - Jul 22 Thu 18:00 - 21:30 Online DeliverySee Notes below Apr 29 - Jul 22 Online DeliverySee Notes below Departmental approval needed Please email cstpts@bcit.ca for Departmental approval. Include your Student number (A0#) and COMP__ and preferred CRN __ and Program Declaration____. Course is 48 hours - 42 hours synchronous remote classes and 6 hours asynchronous remote activities/labs. The class meets once per week for 3.5 hours face to face (virtual classroom) and requires an additional 0.5 hours per week online. Please sign in to the Learning Hub (learn.bcit.ca) on the course start date and time (not before) for details on how the course will be delivered online. Late registration is not permitted. No class on July 1 (Canada Day). This course offering is in progress. Please check this page for other currently available offerings, subscribe to receive email updates or contact us with your comments or questions. In Progress Sun May 02 - Sun Jul 25 12 Weeks Dates Days Times Locations May 02 - Jul 25 Sun 09:00 - 12:30 Online DeliverySee Notes below May 02 - Jul 25 Online DeliverySee Notes below Departmental approval needed Please email cstpts@bcit.ca for Departmental approval. Include your Student number (A0#) and COMP__ and preferred CRN __ and Program Declaration____. Course is 48 hours - 42 hours synchronous remote classes and 6 hours asynchronous remote activities/labs. The class meets once per week for 3.5 hours face to face (virtual classroom) and requires an additional 0.5 hours per week online. Please sign in to the Learning Hub (learn.bcit.ca) on the course start date and time (not before) for details on how the course will be delivered online. Late registration is not permitted. No class on May 23. This course offering is in progress. Please check this page for other currently available offerings, subscribe to receive email updates or contact us with your comments or questions. In Progress Tue May 04 - Tue Jul 20 12 Weeks Dates Days Times Locations May 04 - Jul 20 Tue 18:00 - 21:30 Online DeliverySee Notes below May 04 - Jul 20 Online DeliverySee Notes below Departmental approval needed Please email cstpts@bcit.ca for Departmental approval. Include your Student number (A0#) and COMP__ and preferred CRN __ and Program Declaration____. Course is 48 hours - 42 hours synchronous remote classes and 6 hours asynchronous remote activities/labs. The class meets once per week for 3.5 hours face to face (virtual classroom) and requires an additional 0.5 hour per week online. Please sign in to the Learning Hub (learn.bcit.ca) on the course start date and time (not before) for details on how the course will be delivered online. Late registration is not permitted. This course offering is in progress. Please check this page for other currently available offerings, subscribe to receive email updates or contact us with your comments or questions. In Progress Below is one offering of this course for the Fall 2021 term. Sun Sep 12 - Sun Nov 28 12 Weeks Dates Days Times Locations Sep 12 - Nov 28 Sun 09:00 - 12:30 Online Sep 12 - Nov 28 Online TBD – see Learning Outcomes in the interim Internet delivery format. Departmental approval needed Please email cstpts@bcit.ca for Departmental approval. Include your Student number (A0#) and COMP__ and preferred CRN __ and Program Declaration____. Course is 48 hours - 42 hours synchronous online classes and 6 hours asynchronous activities/labs. The class meets once per week for 3.5 hours online and requires an additional 0.5 hours per week asynchronously. Late registration is not permitted. A portion of seats are temporarily held for domestic students. International students: this may impact your ability to register. Learn why. } 15 seats available as of May 29, 2021 8:37 am (PDT). Of these 15, 10 are currently reserved for domestic students only. Availability may change at any time. Upon successful completion of this course, the student will be able to: Explain the basic concepts and terminology related to computer architecture and organization. Discuss and compare modern machine architectures. Explain and describe the characteristics of current CPU architectures. Explain the three lowest levels of computer organization: digital logic level, microarchitecture level, and instruction set architecture level. Solve problems related to the design of each level. Evaluate modern computers from the point of view of performance. Determine the latency, bandwidth, and important relevant features of pipelines. Create codes capable of detecting and possibly correcting errors in code-words. Determine whether a Hamming code word contains errors, and possibly also fix the errors. Calculate the time required to read different hard-disk drives and compare them to solid-state drives. Create various circuits including adders, shifters, latches, and multiplexers. Determine the timing and negotiations necessary between the CPU and memory. Describe how computers handle bus arbitration. Describe in detail how computers fetch, decode, and execute instructions, including micropramming the datapath inside the CPU. Effective as of Spring/Summer 2020 COMP 2825 is offered as a part of the following programs: School of Computing and Academic Studies Computer SystemsPart-time Certificate Interested in being notified about future offerings of COMP 2825 - Computer Architecture and Organization? If so, fill out the information below and we'll notify you by email when courses for each new term are displayed here. Programs and courses are subject to change without notice. We've changed the way we accept payments. Find out more computer architecture and organization course outline. computer architecture and organization coursera. computer architecture and organization course description. computer architecture and organization course file. course outcomes of computer organization and architecture. computer organization and architecture online course. computer organization and architecture full course. course objective of computer architecture and organization

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