

Computer Architecture 1 Final Exam

ELE319, Hanyang University, 2019 Spring.
ID: _____ Name: _____

Department: _____

The first two problems are mandatory. If you fail to answer the questions, you will not receive any credit.

- (5pt) Specify the 5-stage pipeline and explain what operation is performed at each stage.
- (5pt) Specify three hazards in processor pipelining and explain hardware and software approaches to solve the hazards.
- (5pt) Write the output value (C) for the given circuits if $A=1$ and $B=1$.



- (5pt) We construct a 2-bit multiplier using Mux as following. Two inputs are provided to a selector in Mux. For instance, $01 * 01 = 0001$ and $00 * 00 = 0000$ in the following figure. Fill the remained constant input values in the Mux to complete the multiplier. (1.5pt)



- (5pt) Similarly, we are constructing a divider using a ROM as following. In the example, if dividend is 5 and divisor is 2 then quotient is 2 and remainder is 1. Hence, $0x21$ is stored at address $0x52$. What value should be stored at address $0x53$ in the ROM to support the divider? (1.5pt)



- (5pt) What is the difference between latch and flip-flop? (5pt)
- (5pt) For the following arithmetic unit, we want to compute $A-B$ where 2's complement number is used. Determine proper values for $S1, S0, Cin$ to make $F = A-B$.



- (24pt) The following figure shows single cycle implementation for datapath and control path for MIPS architecture.



Fill 0, 1 or X(don't care) in the following table to implement for the architecture.

Instruction	ALU Src	MEMRs rReg	Reg Write	Mem Read	Mem Write	Brn enb
R-type Instruction	(1)	(2)	(3)	(4)	(5)	(6)
Load	(7)	(8)	(9)	(10)	(11)	(12)
Store	(13)	(14)	(15)	(16)	(17)	(18)
branch0	(19)	(20)	(21)	(22)	(23)	(24)

Computer Architecture Final Exam Solutions

Wolfgang Guggemos



Computer Architecture Final Exam Solutions:

United States Air Force Academy United States Air Force Academy, *Annual Catalogue* United States Air Force Academy, 1983 **Engineering Education** John Heywood, 2006-01-24 A synthesis of nearly 2 000 articles to help make engineers better educators While a significant body of knowledge has evolved in the field of engineering education over the years much of the published information has been restricted to scholarly journals and has not found a broad audience This publication rectifies that situation by reviewing the findings of nearly 2 000 scholarly articles to help engineers become better educators devise more effective curricula and be more effective leaders and advocates in curriculum and research development The author s first objective is to provide an illustrative review of research and development in engineering education since 1960 His second objective is with the examples given to encourage the practice of classroom assessment and research and his third objective is to promote the idea of curriculum leadership The publication is divided into four main parts Part I demonstrates how the underpinnings of education history philosophy psychology sociology determine the aims and objectives of the curriculum and the curriculum s internal structure which integrates assessment content teaching and learning Part II focuses on the curriculum itself considering such key issues as content organization trends and change A chapter on interdisciplinary and integrated study and a chapter on project and problem based models of curriculum are included Part III examines problem solving creativity and design Part IV delves into teaching assessment and evaluation beginning with a chapter on the lecture cooperative learning and teamwork The book ends with a brief insightful forecast of the future of engineering education Because this is a practical tool and reference for engineers each chapter is self contained and may be read independently of the others Unlike other works in engineering education which are generally intended for educational researchers this publication is written not only for researchers in the field of engineering education but also for all engineers who teach All readers acquire a host of practical skills and knowledge in the fields of learning philosophy sociology and history as they specifically apply to the process of engineering curriculum improvement and evaluation

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