King Fahd University of Petroleum and Minerals
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COE 301: Computer Architecture

LAB 06: Integer Multiplication and Division

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Agenda

- Integer Multiplication
- Integer Division
- Live Examples
- Tasks

Integer Multiplication

- The result of multiplying n bit number by another n bit number is n + n bits
- Multiplication is done through addition and shifting operations.
- MIPS has two special register for the result of multiplication: HI, LO
- MIPS Multiplication Instructions:
- mult $t0, $t1 # for signed multiplication
- multu $t0, $t1 # for unsigned multiplication
- mul $t2, $t0, $t1 # $t2 contains LO register value

Integer Division

- Binary division produces a quotient and a remainder.
- Division is done through subtraction and shifting operations.
- MIPS has two special register for the result of division: HI, LO
  - HI contains the remainder
  - LO contains the quotient
- MIPS Division Instructions:
- div $t0, $t1 # for signed division
- divu $t0, $t1 # for unsigned division

Special Instructions

- MIPS has special instructions that allow copying the values of the special registers HI, LO
  - mfhi $t0 # copy the contents of the HI register to $t0
  - mflo $t0 # copy the contents of the LO register to $t0

Live Examples