

King Fahd University of Petroleum and Minerals
College of Computer Sciences and Engineering
Department of Computer Engineering

COE 308 – Computer Architecture (T041)

Homework # 01 (due date: Sunday 03/10/2004)

***** Show all your work. No credit will be given if work is not shown! *****

Suppose that a program is being run on a processor consists of the following instruction mix:

Operation	Frequency	Clock cycle count per instruction
ALU operations	25%	3
Loads	45%	2
Stores	10%	2
Branches	20%	3

With the current processor, only **30%** of all ALU operations **read** operands directly from memory, the remaining ALU operations **read** operands from registers. A designer decides to investigate a modified architecture for the processor by forcing all ALU operations **not** to read operands from registers (i.e. all ALU operations are forced to read operands directly from memory). Thus, total **loads** in the program will be reduced. The modified architecture causes the “Loads” operations’ clock cycle to increase by 50%. The clock cycle of the modified processor is 10% **slower** than the current processor’s clock cycle. Which CPU is faster?