

NATIONAL UNIVERSITY OF SINGAPORE
Department of Electrical and Computer Engineering

CG2028 Computer Organization

Tutorial 6
Pipelining Basics

1. Insert NOPs in the code below to ensure correct operation in a 5-stage pipelined ARM processor.
L1: AND R8, R9, R11
L2: ADD R1, R2, #8
L3: SUB R2, R5, R7
L4: LDR R3, [R1, #4]
L5: CMP R0, #0
L6: BNE SKIP
2. Can the instructions in the code above be rearranged to reduce the number of NOPs to be inserted to eliminate data hazards?
3. What is the total number of cycles required for executing the code you obtained in Q.2 if the branch is not taken?