King Mongkut's University of Technology Thonburi
Faculty of Engineering, Department of Computer Engineering
CPE 224 Computer Architecture

PROBLEM SESSION 8: Pipelining

Introduction

To improve execution throughput, most modern processors deploy pipeline which will overlap stages of executions resulting in many instructions can be in a pipeline at the same time. However, the efficiency of a processor will be degraded due to several types of hazards that could occur in the sequence of instructions and number of control lines and executing unit. Data hazard is one of the hazards that might occur easily in simple programming. We are going to take a look at C codes and compile them into assembly. Then we will identify the hazards and suggest the way to resolve them with the techniques we study in class.

Follow these instructions

1. You will download a bundle of C source codes announced in class. Extract the file you will see three source files: pipeline_01.c pipeline_02.c and pipeline_03.c.
2. Compile each file with gnu toolchain gcc to generate assembly files with –S flag.
   gcc-arm\bin\arm-none-eabi-gcc.exe -O0 -S pipeline_01.c -o pipeline_01_O0.s

Question

1. Examine each assembly file and identify hazards in those file. Create a report discussing how you can avoid those hazards in C level and assembly level

Submission

Create your report in PDF format and submit your report as a group of 4 people in LEB2 by 6 p.m. You must include group members on the cover of your report.