Final Exam

Due Date: Sunday 12/12/2021 at 11 PM EST

You are required to submit one single "pdf" file including the code summary and screenshots of the output and a zipped folder of the code.

You are required to show up on Thursday 12/16/2021 at lecture time to show the output in the class and be ready for any modifications on the fly that may be requested by the instructor and other students.

This will be the one which will be reported to the school as your final exam.

Develop a program that can take any group of instructions from traditional MIPS instructions and your program can detect the pipelining hazards and generates the timing sequence (IF/ID/…..) showing the hazards. Then, it should use a solution for the detected hazards and regenerate the timing sequence after applying the proposed solution.

Note: Use the pipelining five stages we covered in our course.

In your demonstration, you need to show at least one program of at least four instructions. In other words, a program of four lines should be demonstrated. The instructions do not have to be different. However, instructor can change any part of your program and if it is hardcoded, it will significantly affect your grade.

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- You can program any number of instructions but you must include at least add, sub, lw, sw. Anything else is extra such as branch if you can ;)

- You need to show three outputs of your program...

1. **"without any solution" which means you can just show the dependencies by highlighting the registers, report to the consol or a file both the name of the registers and the type of the hazard, you can show the arrows, ... anything anything to show that there is hazards.**
2. **"with solution 1" which means that you need to show the output (timing diagram F D X M W) with using (only stall) with the forwarding unit disabled.**
3. **"with solution 2" which means that you need to show the output (timing diagram F D X M W) using stall (if needed) with the forwarding unit enabled.**

- The MIPS program that you will test must be at least four lines/instructions.