

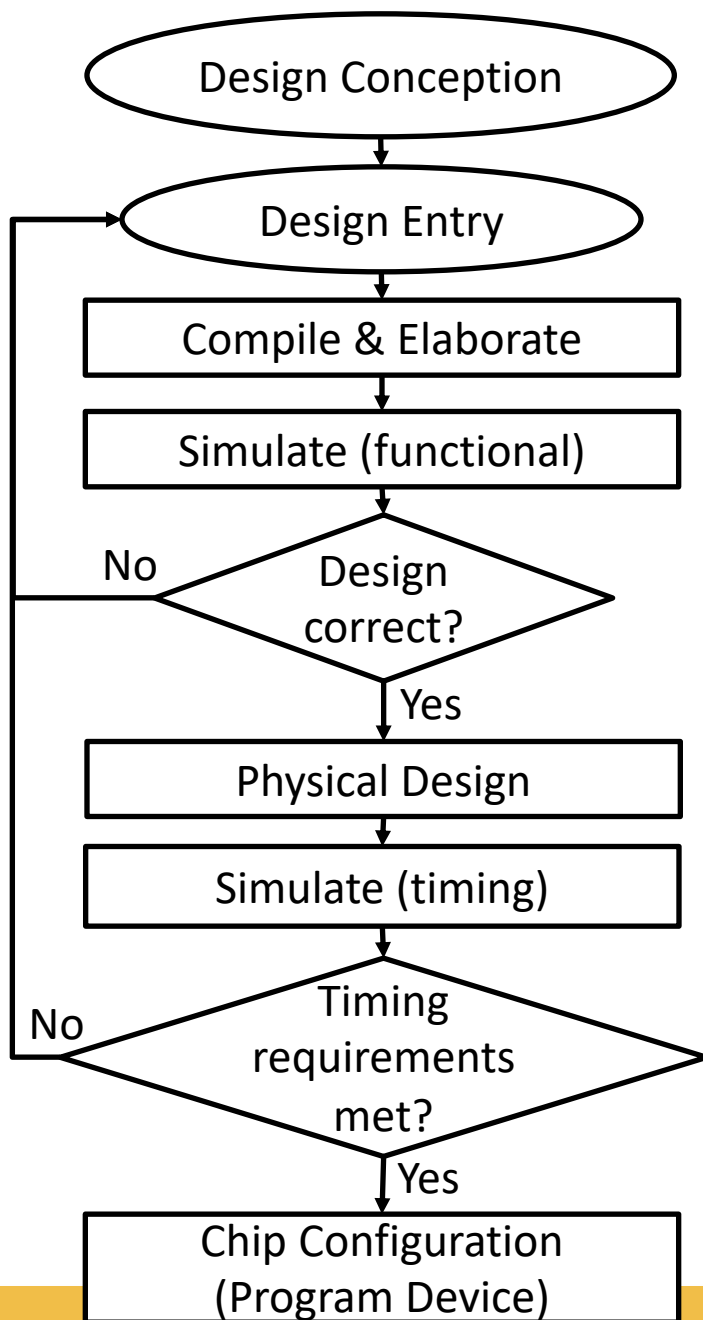
# **CprE 381: Computer Organization and Assembly Level Programming**

Performance (Metrics)

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# Administrative

- OH TODAY ONLY:
  - 2-3pm
  - And.. 3pm-4pm (presentation cancelled ☹)
- HW5 due Mar 4
  - Make sure you have HW5\_v2.pdf
- Term Project
  - Part 1 Demo in Labs
  - Part 2 Posted → 10% of Final Course Grade

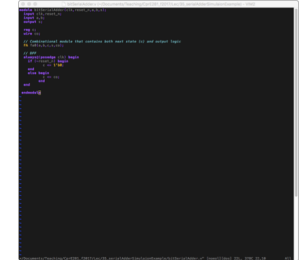


**Tools:**



**ASMs**

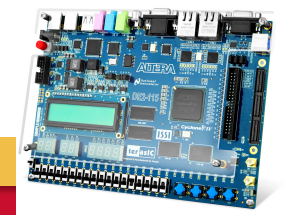
**HDLs**  
(VHDL)



**ModelSim**

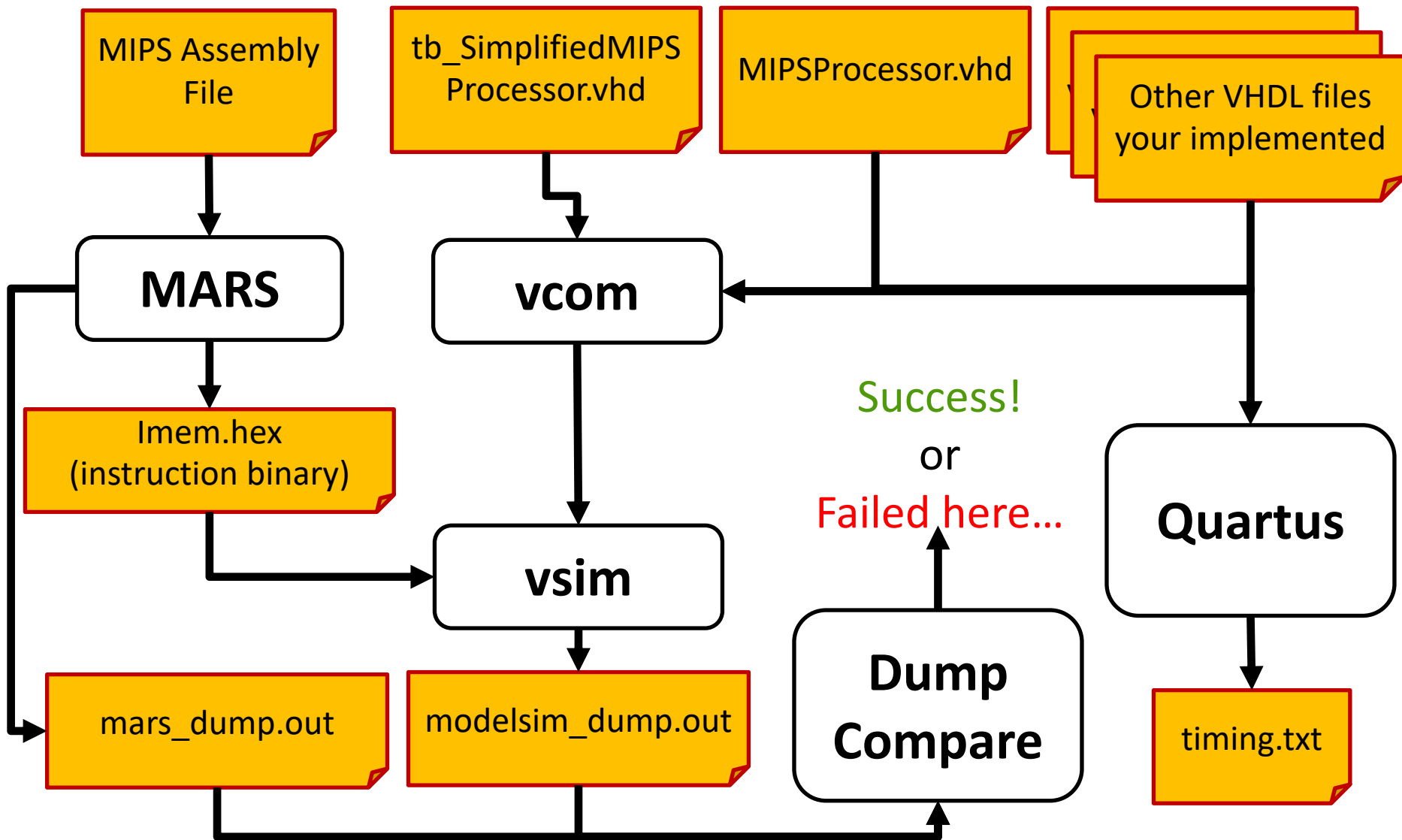


**ModelSim**

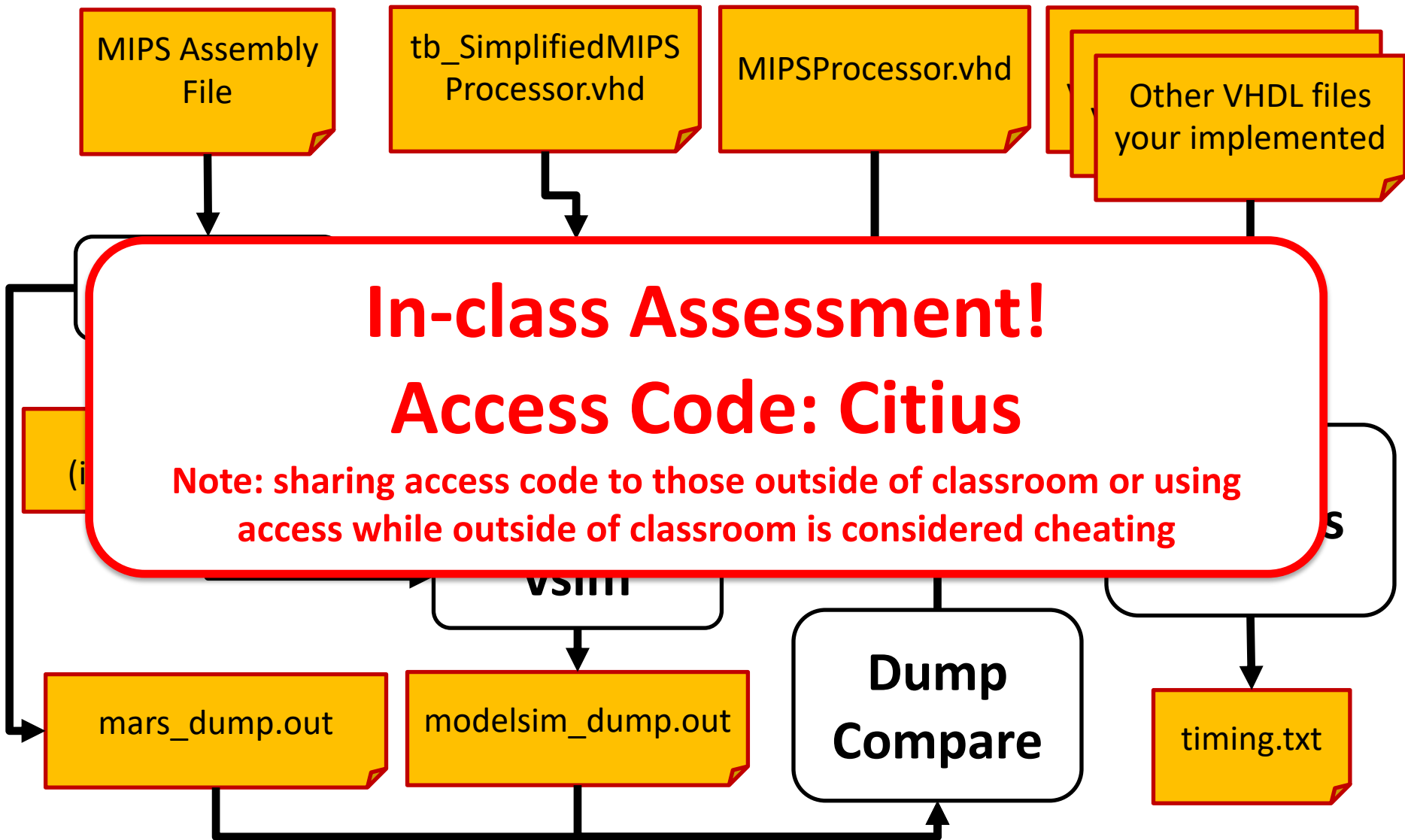


[ MODIFIED Figure 2.35 from the 281 textbook ]

# Automated Testing Framework



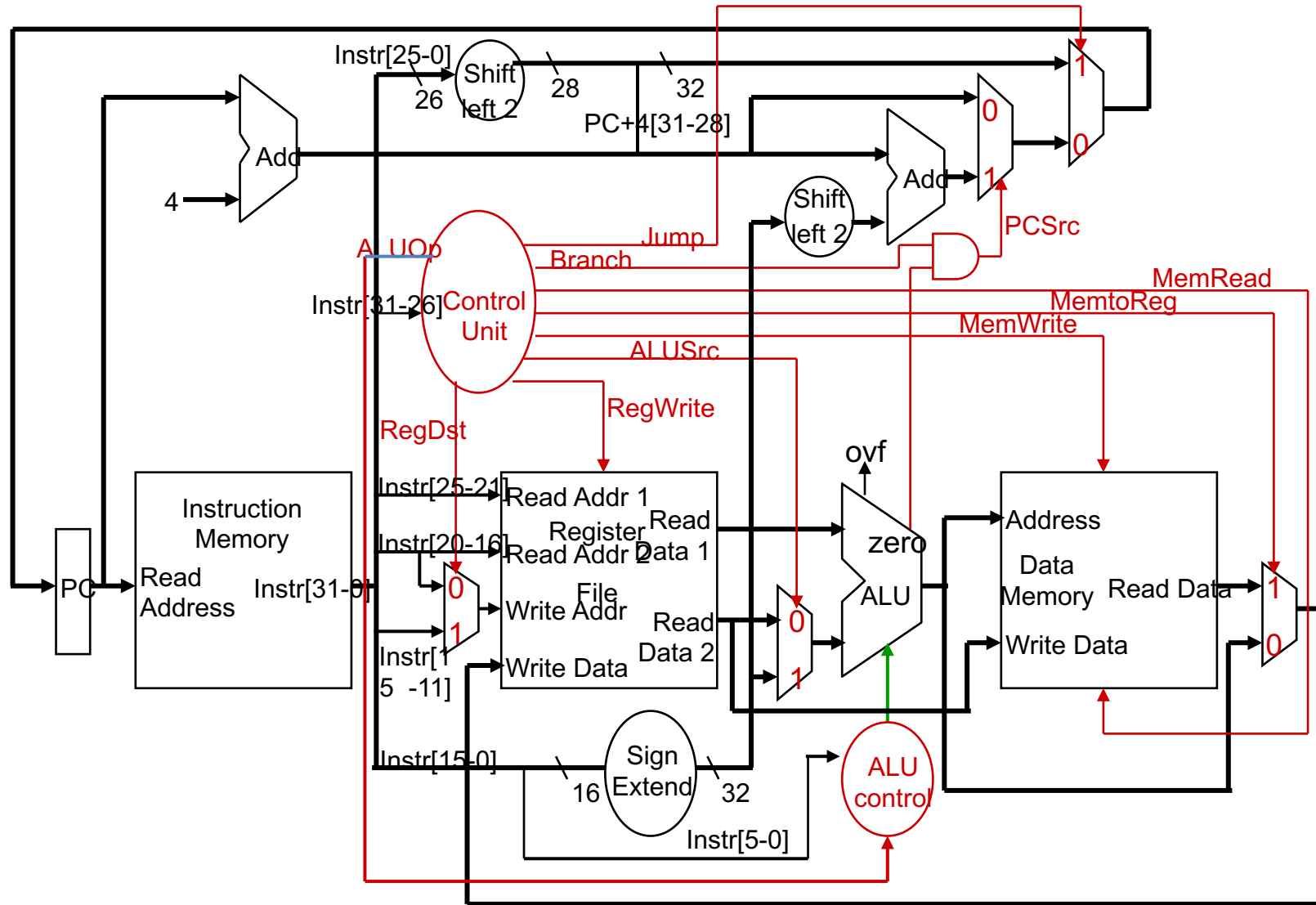
# Automated Testing Framework



# Review: MIPS Programming

```
int fact(int n) {  
    if (n <= 1)  
        return(1);  
    else  
        return  
            (n*fact(n-1));  
}  
  
fact: slti    $t0, $a0, 2      # a0 < 2  
      beq     $t0, $zero, skip # goto skip  
      ori     $v0, $zero, 1    # Return 1  
      jr      $ra              # Return  
skip: addiu   $sp, $sp, -32    # $sp down 32  
      sw      $ra, 20($sp)     # Save $ra  
      sw      $fp, 16($sp)     # Save $fp  
      addiu   $fp, $sp, 28      # Set up $fp  
      sw      $a0, 28($sp)     # Save n  
      addui   $a0, $a0, -1      # n - 1  
      jal     fact             # Call fact  
link: lw      $a0, 28($sp)     # Restore n  
      mul     $v0, $v0, $a0     # n*fact(n-1)  
      lw      $ra, 20($sp)     # Load $ra  
      lw      $fp, 16($sp)     # Load $fp  
      addiu   $sp, $sp, 32      # Pop stack  
      jr      $ra              # Return
```

# Review: Single-Cycle Processor



# Acknowledgments

- These slides contain material developed and copyright by:
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