**Computer Architecture**

**Spring 2024**

**Lab Project Evaluation Rubric**

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| **Criteria** | **CEP** | **Ratings** | | | | | **Pts** |
| Task 1 (Assembly Code Initialized in Instruction Memory | **WP4(EA5)** | 10 pts Included in report (Code is tested on simulator) | 7.5 pts  Correct code correctly initialized | 5 pts  correct code but incorrect initialization | 2.5 pts  Incorrect Code | 0 pts  No marks | 10 pts |
| Task 1(Changes in Architecture)  Changes in Verilog modules to  include the instructions that were  not executable | 10 pts  Required changes explained  in report | 7.5 pts  All required changes  are made | 5 pts  All required changes are not made but most of  them are included | 2.5 pts  Very few changes are  accommodated | 0 pts  No  Marks | 10 pts |
| Task 1(Results)  Array Sort Testing | 5 pts  Results /working explained in  report.  Results are verified | 3.75 pts  The code works (try to swap element), results are not 100 % correct | 2.5 pts  Results of sort are  tested but are incorrect | 1.25 pts  Sorting is not Tested but changes are verified by test cases | 0 pts  No Marks | 5 pts |
| Task 2 (Pipelined Processor]  Pipelined Registers are included |  | 10 pts  Included in report all connections  and modules are correct | 7.5 pts  All pipeline reg modules are correct but  complete connections are not made | 5 pts  Pipelined registers are  Mostly correct (few errors) | 2.5 pts  Incorrect addition of  pipelined reg modules | 0 pts  No  Marks | 10 pts |
| Task 2 (Forwarding Unit) | 10 pts  Explained in report Connections with  Forwarding Unit and Forwarding Unit itself is  correct | 7.5 pts  Forwarding Unit is correct (complete logic) | 5 pts  Forwarding Unit logic and conditions are  correct but all conditions are not included | 2.5 pts  Incorrect  Logic | 0 pts  No  Marks | 10 pts |
| Task 2 (Test Cases and Results) | 10 pts  Explained in report all test cases (valid)  with correct results | 7.5 pts  A few test cases with  correct results | 5 pts  Test case (instruction with forwarding,  results are incorrect) | 2.5 pts  Test case (Few instructions without  forwarding) | 0 pts  No  Marks | 10 pts |
| Task 3 (Hazard Detection Unit and Stall) | **WP7** | 10 pts  Included in report Correct Logic and correct connections for Hazard Detection Unit and Pipeline Rush | 7.5 pts Hazard Detection Unit is included with correct connections but pipeline flush logic is not accommodated | 5 pt Hazard Detection Unit is created with correct logic | 2.5 Hazard Detection Unit  / Flush with Incorrect  Logic5 pts | 0 pts No Marks | 10 pts |
| Task 3 (Testing with Hazard Detection Unit and Stall) | 10 pts  Included in report Strong Test cases with  correct results | 7.5 pts  Test Case is Strong but Results are  not all correct | 5 pts  Test Case Checks a few conditions  (Stall / Flush) | 2.5 pts  Test Case is Weak | 0 pts  No Marks | 10 pts |
| Task 3 (Testing with Sorting  Algorithm) | 10 pts  Sorting works, explained and included in report | 7.5 pts  Tried to swap a few elements | 5 pts  No swap at all | 2.5 pts  No idea how to check results | 0 pts  No Marks | 10 pts |
| Task 4 Performance Comparison | **WP1** | 5 pts  Comprehensive analysis with complete justification of the difference in performances | 3.75 pts  The analysis is done with partially justified analysis | 2.5 pts  The analysis is done without any justification | 1.25 pts  The analysis is incomplete and there is not justification | 0 pts  No Marks | 5 pts |
| Viva | 10 pts  Level 4 | 8 pts  Level 3 | 6 pts  Level 2 | 2 pts  Level 1 | 0 pts  No marks | 10 pts |
|  | | | | | | | Total Points:100 |

**Complex Engineering Problem**

This project is a CEP and includes the following Washington Accord (WA) attributes:

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| Depth of Knowledge Required | WP1 | Cannot be resolved without in-depth engineering knowledge at the level of one or more of WK3, WK4, WK5, WK6 or WK8 which allows a fundamentals-based, first principles of analytical approach |
| Familiarity of issues | WP4 | Involve infrequently encountered issues or novel problems |
| Interdependence | WP7 | Address high level problems with many components or sub-problems that may require a systems approach |

**Rubric for assessment of Complex Engineering Problem**

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| Domain | WPs |  | **Unsatisfactory, 0** | **Satisfactory, 1** | **Good, 2** | **Very Good, 3** | **Comprehensive, 4** |
| Preamble | WP1 | 1. Problem Definition | Demonstrates an inability in construction of a problem statement that requires complex engineering activities | Demonstrates a limited ability in identifying a problem statement that requires complex engineering activities | Demonstrate the ability to involve some complex engineering activities, but problem statement does not correctly capture the definition | Demonstrates the ability to construct a problem statement with evidence of complex engineering activities, and problem statement is adequately detailed | Demonstrates the ability to construct a clear and insightful problem statement with detailed outlining of complex engineering activities |
| WP7 | WP7 | 5. Design / detailing of multiple sub-components | Design / Detailing not done | Design / detailing done with sketches, but does not involve multiple sub-components | Design / detailing involves multiple sub-components, and detailing adequately done using unclear sketches / drawings | Design / detailing involves multiple sub-components, and detailing is adequately explained with clear sketches / drawings | Design / detailing involves multiple sub-components, and detailing is perfectly explained with clear sketches / drawings |
| EA5 | WP4 | 6. Familiarity with approaches | Demonstrates no extension of previous experiences in applying principles-based approaches | Demonstrates limited extension of previous experiences in applying principles-based approaches | Demonstrate adequate extension of previous experiences in applying principles-based approaches | Demonstrate reasonable extension of previous experiences in applying principles-based approaches | Demonstrate extension of previous experiences in applying principles-based approaches |