Single cycle CPU

You need to be alert to (usually minor) changes that may be made to the assignment statement or to the guidelines after the assignment is first put up. Refresh this frame and re-read the assignment carefully before you make your final submission.

Assignment statement

1. Modify the ISA of the CPU of the previous experiment (on CPU Design) so that all the instructions in the instruction set can be executed on a single cycle datapath having a separate instruction memory and one data memory module and only one additional adder module over and above the ALU.
2. Implement a single cycle datapath for the modified ISA satisfying satisfying the aforementioned resource constraints.
3. Design the controller for the processor.

Submissibles

First round of submission (one lab day)

1. Modified ISA specs with clear indication and brief justification of each of the modifications (plain text)

Second round of submission (three lab days)

1. Datapath paper design with diagrams (PDF). Diagram should be neat and drawn using suitable software.
2. Verilog structural coding of the datapath
3. Verilog test bench for data path

Third round of submission (two lab days)

1. Verilog behavioural coding of the controller
2. Verilog test bench for the controller

Final round of submission (one lab day)

1. Overall test bench of CPU demonstration execution of a simple program involving all the instructions

Marking Guidelines

Assignment marking is to be done only after the deadline expires, as submissions gets blocked after the assignment is marked.

Modified ISA	**5**
Datapath paper design	**10**

Verilog of datapath	**20**
Datapath test bench	**10**
Verilog of controller	**15**
Controller test bench	**10**
Overall test bench	**20**
Total Marks	***90***

Assignment submission

Use electronic submission via the [CSE WBCM student page link](#).

You should keep submitting your incomplete assignment from time to time after making some progress, as you can submit any number of times before the deadline expires.

Warning

Cases of copying will be dealt with seriously and severely, with recommendation to the Dean to de-register the student from the course.