Quiz 3

CSE 112 Computer Organization

INSTRUCTIONS:

Total Marks = 25

Time Duration = 30mins(solving) + 10mins(uploading)

1. **Duration of the quiz is 30 mins, and 10 mins for scanning and uploading the solutions. No further extension of time will be given regarding this.**
2. **Question paper will be uploaded in the google classroom. Do not forget to turn in. Solutions submitted by any other means (email etc.) won't be considered for evaluation.**
3. **Students are required to switch on their cameras and mute themselves. Make sure you are sitting in a well lit room so that we are able to see your faces clearly. Please keep in mind that we'll be keeping a note of this and any violation can lead to some strict action against you.**
4. **The answers should be in your own handwriting and submission should be in PDF format only.**
5. **Write any assumption clearly, if any. Needless to say, only reasonable assumptions will be considered if any ambiguity is found in the question.**
6. **During the exam if you have any query, write it in the meet chat box. It will be taken into notice by us. Don't unnecessarily unmute your mic for it as it creates disturbance to others.**
7. **Calculators are NOT allowed during the exam time. ONLY use pen and paper for writing the exam.**

GOOD LUCK !!

ISA conventions for Q1

All instructions follow the following conventions:

mnemonic destination source1 source2

mnemonic destination source1

for branch instruction breq means branch if source1 == source2

Q1: Pipeline Diagram (5 stages: Fetch, Decode, eXecute, Memory, Writeback)

Draw the pipeline diagram for the following assembly programs. If there are *any* potential data hazards, point them out. Assume that you have different instructions and data memories.
Also point out the number of cycles required to execute the code.
Note that branches are resolved at the execution stage.

[25 marks]

```
mov r1 r2
mov r3 r2
mov r4 r3
breq r3 r4 label
mov r10 r1
add r14 r15 r6
sub r11 r5 r1
label: add r1 r4 r5
add r2 r1 r1
```
