**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ID: \_\_\_\_\_\_\_\_\_\_\_\_**

**Department of Computer Science and Engineering**

**MIDTERM EXAMINATION**

**Fall 2014**

**CSE340: Computer Architecture**

**Total Marks:** 3**0**  **Time Allowed: 1 hour**

Return the question with your answer script

**Section 1**

Question 1

1. Design a shift register using D-FF which can perform the below functionality: **5**
   * 1. Shift Left
     2. Shift Right
     3. Store Data
     4. Clear All

1. Design and explain the operation of a counter that can count from decimal 0 to 12 using T flip-flop. Also show the timing diagram **5**

**Section 2**

Question 2

1. Define assembler and compiler. 2
2. Explain various instruction types with necessary figures. 5
3. Why do you need a J type instruction? Give example. 3 **8** **3**

Question 3

1. Encode the following MIPS instructions. For each instruction, you should identify the format type (R, I, or J format): 3
   1. **addi $14,$15,-73**
   2. **slt $7,$8,$9**
   3. **J 1010**
2. Write the equivalent MIPS code for the given C function: 4

*if (i!=j) f=g+h; else f=g-h;*

1. What is data overflow? When can we encounter overflow situation? 3