Quiz #1 Grading Summary

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- **Problem 2:**
  A visual inspection was made comparing your DFA to the DFA given in the solution. The inspection consisted of trying to find parts that matched. For an example: a part that ensured that “aa” could not be accepted should be there.

  5 Test strings (1pt each) - accept: ababab, abbabbab, babbbab and reject: aab, babaab

  Many students did not have a transition for each letter in the alphabet for each state. 1pt was deducted each time this happened.

  A common mistake was thinking that the string must end in “ab” (which is understandable). No point deductions were made for this mistake.

- **Problem 3:**
  The string could begin with 00 or 11 OR end with 00 or 11. 1 point was deducted for each missing case.

  If the regular expression required that it both begin AND end with 00 or 11, a score of 3 was given. A score of 2 was given if a legitimate effort was given but the answer was incorrect.

  Some people had the correct answer with something extra "union." 1 point was deducted for each extra union.

- **Problem 4:**
  A visual inspection was made comparing your NFA to the NFA given in the solution. The inspection consisted of trying to find parts that matched up.

  2 points were awarded if an attempt was made using the process defined in class.

  3 Test Strings (1 pt each) - accept: ababaabba, baba and reject: abaab.

- **Problem 5:**
  Grading: I subtracted 1 point for each missing state and 1/2 point for each instance of the following (not related to a missing state): no start state, accept state not marked, wrong/missing transition, mislabeled state. The exception is the null state -- I took off a point if it wasn't there, but not any points for mislabeling it (either not labeling it or labeling it epsilon), not elaborating the transitions from it, or making more than one. If the score came out to a half point, I rounded up unless the score was 5.5, in which case I rounded down (those who got the diagram exact deserve all the points, and those who missed something don't).

  Common Errors:
1. Not writing a DFA:
   a. No start state
   b. Zero or 2+ transitions from a state for an input symbol
   c. Epsilon transitions
2. Since state 2 in the NFA had an epsilon transition to state 3, whenever there's a state in which 2 is included in the DFA, it must also have 3. Many people had a state 1,2 which should have been state 1,2,3.
3. All states in the result DFA, which contain an accepting NFA state, are accepting states. In this case, the accepting states are 1,2,3 and 2,3.
4. The Null state:
   a. Not labeled as a 0 with a strike through it
   b. Doesn't have a transition to itself for 0 and 1

• Problem 6:
  Grading: -1 point for each wrong part (missing/wrong term or some one problem such as a term out of order).

Common Errors:
1. When eliminating state B, many people forgot that the transition from C to E (which was 1 U 10) gets the transition from C through B to E union on (to become 1 U 10 U 11) -- some people forgot to do this or only counted a single 1 when there must be two (a 1 to transition from C to B and a 1 to transition from B to E).
2. When eliminating state B, state C should get a transition back to itself on a 10 (a 1 to get from C to B, and a 0 to get back to C from B). Many people either tried to incorporate this into the 11 they union with the C-E transition or somehow switched it to 01. Note this is what contributes (10)* to the final expression.
3. Since concatenation comes before union in the regular expression order of operations, 0(10)*(1 U 10) U 11 is NOT the same as 0(10)*(1 U 10 U 11). The difference is that the first way says that "11" is a string in the language and that any string starting with 0 cannot end in 11. Both are not true.

• Problem 7
  Grading break downs:
  0.5 pt – logic frame in the proof
  1.5 pt – knowing pumping lemma
  2 pt – for picking correct string
  2 pt – for decomposition and pumping

Common errors:
1. After picking a string, decompose it into one special case only (i.e. for string $a^p b^{p^2}$, pick $x=\bar{a}^p y=a^p$).
2. Some have problem in decomposition.
3. Logical mistake: “exists a decomposition such that the PL holds” rather than “PL holds, therefore for any decomposition there might be, one can get a contradiction.”