CISC 462 Assignment 3 Postmortem

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1. **Part (a): 5 marks. Part (b)(i): 2 marks. Part (b)(ii): 3 marks.**

   Some students mistakenly assumed in part (b)(i) that you needed to use all dominoes in a valid solution. In fact, you are free to use any subset of the dominoes; all that matters is that the concatenated strings on the top and bottom match.

   Some students said that no match existed in part (b)(ii) because of a difference in lengths between the top and bottom strings of each domino, but the key point to identify is that we had no matching of suffixes between top and bottom strings in pairs of dominoes.

2. **Whole question: 10 marks.**

   Students who didn't convert the non-constrained PCP instance to a pair of languages (as suggested in the solutions) had a tougher time trying to figure out a decision procedure. This was often because such solutions involved comparing dominoes directly or trying to construct strings from subsets of dominoes, and since there is an infinite number of domino combinations, we encounter some issues.

3. **Parts (a) and (b): 2 marks each. Parts (c) and (d): 3 marks each.**

   Parts (a) and (b) were quite straightforward if you thought to use the identity function in your mapping.

   Almost every student gave a correct answer for part (c).

   Part (d) had a few options to use for the reduction. The solutions used A_{TM}, but it is also possible to reduce to $HALT_{TM}$ or other undecidable decision problems.

   Many students didn't provide justification for their choice of language and mapping reduction.

4. **Each part: 1 mark.**

   These questions were straightforward; either you got it right or you didn't!

   If you didn't get a particular question right, then I recommend reviewing asymptotic analysis.

5. **Whole question: 10 marks.**

   This question was done very well.

   There were a number of approaches to solving this question. Although the solutions used the graph reachability problem, you could alternatively apply the DFA emptiness problem to the complement of the given DFA to arrive at the same result. A very concise solution simply minimized the DFA and checked if the minimal DFA consisted of a single accepting state with a looping transition on all symbols.

6. **Part (a): 5 marks. Part (b): 5 marks.**

   The most common problem with part (a) was forgetting to account for the time required to find each of the three edges in the set E. (It's not constant time!) No marks were deducted for this error, since the question only asked to show that the problem ran in polynomial time.

   There were no major problems with part (b).

Questions/comments? Feel free to stop by my office hours or send me an email at `tsmith [at] cs [dot] queensu [dot] ca`.