Homework Part-IV
Theory of Computation
CS205@IITG Spring '25 R. Inkulu

1. [3rd April]

   (i)

2. [2nd April]

   (i) Give a polynomial reduction from the vertex cover problem to clique problem.

   (ii) With the two gadgets presented in class for $3SAT$ to $3COL$ polynomial time reduction, complete the proof of correctness of $< \phi > \in 3SAT \Leftrightarrow f(< \phi >) =< G > \in 3COL$.

   (iii) Construct graphs' corresponding to (iii)(a) of below problem output by each of the reductions, from $3SAT$ to $CLIQUE$, and from $3SAT$ to $3COL$.

3. [1st April]

   (i) Give a polynomial time reduction from $3SAT$ to SAT, and prove its correctness.

   (ii) While considering all the cases and subcases, as presented in the lecture, complete the proof given on pg 311 of [Sip] for a polynomial time reduction from SAT to $3SAT$.

   (iii) Determine whether the following two boolean formulas are satisfiable: (a) $(x_1 \vee x_2 \vee \overline{x}_3) \wedge (\overline{x}_1 \vee x_2 \vee x_4) \wedge (\overline{x}_2 \vee \overline{x}_3 \vee \overline{x_5})$, and (b) exer 7.5 on pg 311 of [Sip].