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CS350

HW 4

1. Given $A \leq_m B$ and $B \leq_m C$, we can translate them as
For any x :
X element A iff $\text{Tab}(x)$ element B
For any y :
Y element B iff $\text{Tbc}(y)$ element C
And then we can translate the question as $\text{Tac}(x)$
 $\text{Tac}(x) = \text{Tbc}(\text{Tab}(x))$ and since both Tab and Tbc run in poly time, so Tac too, then we can show:
X element A iff $\text{Tbc}(\text{Tab}(x))$ element C
Hence $A \leq_m C$
2. Check each node in order to see if they are connected. If all nodes are connected, then guess path P not longer than the number of nodes in G . If this path exist, then check if P covers every node exactly once.
3. See if every node is covered. We could essentially use the same algorithm as in problem two, but with added layer of abstraction. The abstraction is as follows; we would guess a linear ordering of SCC's in G . We would then need to check if these SCC's are all connected in that linear order.
4. We can prove that $C1 = C2$ and can be solved in poly time. Assume we have alg M to decide whether C is satisfied for a given Boolean formula C . Now, notice that $C1=C2$ iff $C1 \text{ OR } C2$. The result will follow by ruling M on the formula.