

cpts350 hw7

1. Let  $G$  be a color graph where each node has a color and multiple nodes can share the same color. In particular, there is a designated initial node. An  $\omega$ -path is an infinite walk on  $G$  that starts from the initial.

(1). Design an algorithm that decides where there is an  $\omega$ -path on which  $\Box(\text{yellow} \vee \Diamond \text{blue})$  holds.

(2). Design an algorithm that decides where there is an  $\omega$ -path on which  $\Box \Diamond(\text{yellow} \vee \Diamond \text{blue})$  holds.

2. Let  $G$  be a color graph where each node has a color and multiple nodes can share the same color. In particular, there is a designated initial node. An  $\omega$ -path is an infinite walk on  $G$  that starts from the initial. Design an algorithm to decide whether there is an  $\omega$ -path on which it passes red nodes for infinitely many times and passes blue nodes for only finitely many times.

3. Let  $G$  be a color graph where each node has a color and multiple nodes can share the same color. In particular, there is a designated initial node. An  $\omega$ -path is an infinite walk on  $G$  that starts from the initial. A good  $\omega$ -path is one where there are infinitely many prefixes, each of which satisfies the following condition: the number of red nodes equals the number of blue nodes. Design an algorithm to decide whether there is a good  $\omega$ -path.

4. Let  $G$  be a color graph where each node has a color and multiple nodes can share the same color. In particular, there is a designated initial node. An  $\omega$ -path is an infinite walk on  $G$  that starts from the initial. A bad  $\omega$ -path is one where there are infinitely many prefixes, each of which satisfies the following condition: the number of red nodes is a multiple of 5. Design an algorithm to decide whether there is a bad  $\omega$ -path.