

## **HW3: Common Proof Techniques**

**Q1: Summarize different categories of direct and indirect proof techniques.**

**A1:** (In addition to the names, you also need to know what each proof technique is and be able to apply them in real cases.)

Direct Proof

- Constructive proof

  - Proof by example

  - Proof by exhaustion

  - Proof by generalization of a generic particular

- Non-constructive proof

Indirect Proof

- Proof by contradiction

- Proof by contraposition

**Q2: Show that: for a directed graph with no cycle, there must exist at least one vertex without any incoming edge.**

**You need to prove it closed-notes. After the proof, compare yours with the notes.**

**If you have missed some statements, do you think those statements are necessary? If yes, what exceptions would occur if you omit these statements.**

**A2:** Please refer to your notes.