

Discrete Mathematics, CSE 121 : Assignment 1

General Instructions:

- (a) Maximum marks = 10.
- (b) In every proof/derivation clearly state your assumptions and give details of each step.
- (c) This is an individual assignment. Therefore,
 - (a) Copying from any source without acknowledging it is a case of plagiarism. Please refer to the Academic Dishonesty Policy of the institute.
 - (b) You can discuss a problem with a classmate, however, similarities in your answers is considered plagiarism. Please refer to the Academic Dishonesty Policy of the institute.
 - (c) You will be evaluated for your attempt and approach. Therefore, you are encouraged to attempt the questions even if you can not complete an answer. The Academic Dishonesty Policy of the institute is equally applicable even for partial answers.

Questions:

1. Given twelve coins, eleven or twelve of which are identical. If one is different, we don't know whether it is heavier or lighter than the others. Can you devise a method to use a balance at most three times to determine if there is a unique coin, and if there is, to isolate it and determine whether it is heavier or lighter relative to the others? If yes, describe it. If no, prove the impossibility. [4 marks]
2. Solve question (1) with thirteen coins with twelve or all thirteen being identical while using the balance at most three times only. [6 marks]