

CS 241 Homework 4

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Instructions

- The learning objective for this assignment is to ensure that you understand the underlying material, and to provide you with practice in solving problems of this kind.
- Only a few of these problems will be graded. You do not know beforehand which ones these are; hence, you should provide solutions to all the problems.
- Make your solutions concise and formal.
- Please type the assignment if your handwriting is difficult to read. Otherwise scan to pdf
- You are encouraged to work on problems in groups. List the people you worked in groups with please. If you used an online resource i.e. Math-Stack Exchange, link the question asked or resource such that I can check you understand rather than brain-off copying
- Note that you must write your solutions by yourself, in your own words. Individual submissions
- **Remember that proving a statement is false counts as proving the statement. To prove a statement you do not need to prove it true**

Problems

Extra Credit: All assignments must be uploaded to Canvas as a pdf. Should you type up your homework in Latex, I will give you +2 extra credit points (equivalent to 10%). Template file will be provided if you want

Prove the following theorems.

Theorem 4.1. *Let n be an integer such that $n \geq 2$. Either n is prime, or n can be expressed as a **unique** product of primes.*

Note: In order to prove uniqueness, consider what would happen for some n if it had two distinct prime decomposition

Theorem 4.2. *Let $A \subseteq \mathbb{N}$ and $A \neq \emptyset$. $\exists a_{\min} \in A | \forall a \in A, a_{\min} < a$*