

Northern Michigan University (Marquette Co, MI)

CS 522-01-23W: Principles Of Programming Languages

Assignment 6

Due: Monday 1 May 2023 2:00 P.M. EST

Create a directory called “HW6” at the top level of your CS522-01-23W folder on PHILOS. You should solve this problem in either a text file (.txt) or an MS Word file (.docx). Place this file inside your HW6 folder along with an empty file or folder named DONE .

1. Prove that NP and co-NP are both contained in Δ_2^P .
2. Prove that Σ_k^P and Π_k^P are both contained in Δ_{k+1}^P .
3. Prove that if NP = co-NP, then P = NP.
4. Prove that NP is contained within PSPACE. In other words, suppose a problem is in NP. This means there is one thread through the NTM that can solve the problem in polynomial time. Show that a regular TM can emulate that NTM using polynomial space EVEN THOUGH you probably can't do it in polynomial time?