

# Northern Michigan University (Marquette Co, MI)

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

### Assignment 5

Due: Monday 17 April 2023 2:00 P.M. EST

Create a directory called “HW5” 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 HW5 folder along with an empty file or folder named DONE .

Show that the following Turing Machines cannot be constructed (i.e. that you can't write a program do to these things).

1. Given a Turing Machine, definitively determine YES or NO whether that Turing Machine halts on least two inputs.
2. Given a Turing Machine, definitively determine YES or NO whether that Turing Machine halts on at least two distinct inputs that have the same length as each other.
3. Given a Turing Machine, definitively determine YES or NO whether the set of inputs on which that Turing Machine halts can be expressed as a regular expression.