THE GEORGE WASHINGTON UNIVERSITY
WASHINGTON, DC

# CS 2312: Lab 02

SCHOOL OF ENGINEERING & APPLIED SCIENCE

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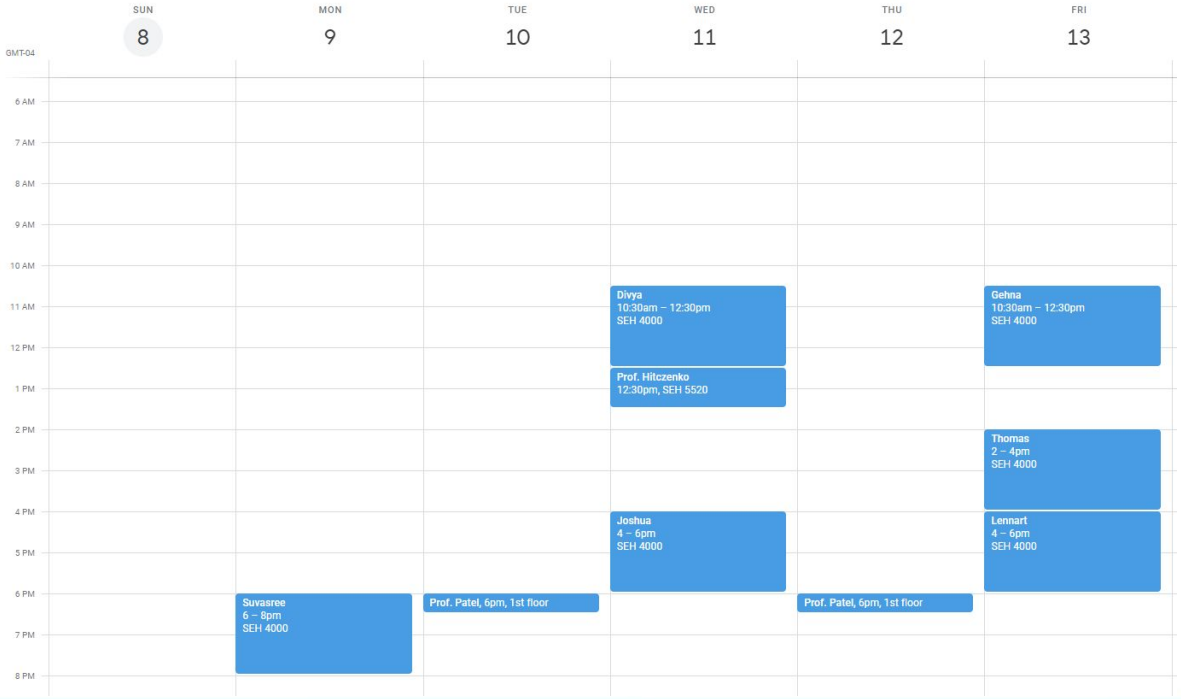
# Office hours set!




Also on [syllabus]

# Congruence Modulo $\equiv_m$

A very useful definition to keep in mind!

$$\text{Given } m \in \mathbb{Z}^+,\ a \equiv b \bmod m \Leftrightarrow m|(b-a)$$

# Equivalence Relations

What are the three properties needed to prove an equivalence relation?

I. Reflexive property
II. Symmetric property
III. Transitive property

# Exercise 1

Prove that congruence modulo is an equivalence relation.

*Solution*

# Induction (weak)

Induction proofs have three steps:

- Base case
- Induction hypothesis
- Induction step

Bonus: can someone explain why induction is a sufficient proof?

# Exercise 2

Prove using induction that for any positive integer *n* and any $a_0, a_1, ..., a_n \in [0..9]$ we have:

$$\sum_{i=0}^{n-1} a_i * 10^i < 10^n$$

*Solution*

# Questions about modulo proof?

$$a \; rem \; m = b \; rem \; m \Leftrightarrow a \equiv b \bmod m$$