# Requizzing Period 1- Standard 5

Due Date . . . . . . . . . . TODO
Name . . . . . . . . . . **Your Name**
Student ID . . . . . . . . . . **Your Student ID**

## Contents

## 1 Instructions

- The solutions **should be typed**, using proper mathematical notation. We cannot accept hand-written solutions. Here's a short intro to LaTeX.
- You should submit your work through the **class Canvas page** only. Please submit one PDF file, compiled using this LaTeX template.
- You may not need a full page for your solutions; pagebreaks are there to help Gradescope automatically find where each problem is. Even if you do not attempt every problem, please submit this document with no fewer pages than the blank template (or Gradescope has issues with it).
- You **may not collaborate with other students**. **Copying from any source is an Honor Code violation. Furthermore, all submissions must be in your own words and reflect your understanding of the material.** If there is any confusion about this policy, it is your responsibility to clarify before the due date.
- Posting to **any** service including, but not limited to Chegg, Discord, Reddit, StackExchange, etc., for help on an assignment is a violation of the Honor Code.
- You **must** virtually sign the Honor Code (see Section **??**). Failure to do so will result in your assignment not being graded.

## 2 Honor Code (Make Sure to Virtually Sign)

**Problem 1.**

- My submission is in my own words and reflects my understanding of the material.
- I have not collaborated with any other person.
- I have not posted to external services including, but not limited to Chegg, Discord, Reddit, StackExchange, etc.

- I have neither copied nor provided others solutions they can copy.

*Agreed (signature here).* □

# 3 Standard 5- Exchange Arguments

## 3.1 Problem ??

**Problem 2.** Consider the interval scheduling problem from class. You are given a set of intervals $\mathcal{I}$, where each interval has a start and finish time $[s_i, f_i]$. Your goal is to select a subset $S$ of the given intervals such that (i) no two intervals in $S$ overlap, and (ii) $S$ contains as many intervals as possible subject to condition (i).

Suppose we have two intervals with the same start time but different finish times. That is, let $I_1 = [s, f_1]$ and $I_2 = [s, f_2]$ with $f_2 > f_1$.

(a) Let overlap($[s, f]$) denote the number of intervals of $\mathcal{I}$ (excluding $[s, f]$) with which $[s, f]$ overlaps. Explain carefully why overlap($I_1$) $\leq$ overlap($I_2$).

*Answer.* □

(b) Suppose that overlap($I_1$) $<$ overlap($I_2$). Explain carefully why $I_2$ can safely be exchanged for $I_1$ (that is, in any non-overlapping set of intervals containing $I_2$, replacing $I_2$ by $I_1$ always results in another non-overlapping set of intervals, no smaller than the one we started with).

*Answer.* □