

Lab Report #1
Section 22 (T3), Group 2

Throughout the labs we have had our group had a strong method of communication. We all actively used discord to discuss homework help, quiz preparations, lecture clarifications and exam preparation. For homework help we primary asked for help on particular question and we would all help each other come to an agreed solution. For quiz preparation we would help each other with previous archived quiz solutions. What we mean by this is that we would help each other understand how to solve them. As for lecture clarifications if anyone missed lecture we would help them catch up to date. Lastly, for exams, one group member developed a study guide aside from content given in class and lab. The following paragraphs note the particular dates and activities we completed to help each other.

Our first meeting was online on September 19, from 4:00 PM to 6:00 PM Firstly, we reviewed over direct proofs using the definitions of divisibility of an even or odd integer. For example, if a number n is an odd integer, prove that $8 \mid (n^2 - 1)$, or in other words, $(n^2 - 1)$ is divisible by 8. Another type of problem we went over was base conversion. If given a number in base b , we were tasked with converting it to base 10, and vice versa. We discussed two different approaches for determining a base b given a value: either by plugging in powers of b in a proof, or by brute-forcing values of b (e.g. $b=9$, $b=10$, etc.). Both of these methods produce a correct answer, but we found the former to look better on paper, while the other can be rather lengthy. Next, we briefly covered cartesian product of sets, and how to create them, along with power sets. For this, we went back over the notes from class. Finally, we practiced with set proofs, namely using the rules of sets given on the exam reference sheet. This also included using the definitions of union, intersection, and so on.

Our second meeting was online on October 5, from 1:00 PM to 3:00 PM. First, we discussed problems about mod equivalence. Given some value, such as n^4 , we must prove that it is equivalent to 1 mod 16. Our method of solving these is similar to that of divisibility proofs, while bearing in mind the mod. We also reaffirmed that sometimes a side-proof is required to complete these. Next, We reviewed basic distance formulas, notably the one included in a past homework assignment. In that case, were the rate of travel R and time T are constant, then the distance D is simply found by $D = R \cdot T$. Lastly, we reviewed more advanced divisibility proofs of the form “if $C \mid (Ax + By)$, prove that $C \mid (ax + by)$ ”. Using techniques from lecture and recitation, we had to factor quantities such that one side of the equation has $(ax + by) + c(Ax + By)$, where A and B were given divisible values . From there, we had to set up a system of equations to determine the constant c , which in turn gave us the a and b to finish the proof.