Tutorial Sheet – Odd Semester 2022

15B11CI212 Theoretical Foundations of Computer Science

Tutorial 2
Introduction to Discrete Mathematics and Set Theory

Ques 1: How many numbers below 100 are divisible by 2,3, or 5?

Ques 2. Suppose, there are 1000 students who are taking admission in the university in the academic year 2022-2023. All these students are enrolled in a Math or an English course. 400 students are taking Maths and English, 600 students are taking English.
a) How many are taking maths course?
b) How many are taking a math course but not and an English course?

Ques 3. Out of 30 students in class,15 take an TFCS course, 8 take a AI course and 6 take DBMS course. It is known that 3 students take all the three courses. Show that 7 or more students take none of the courses.

Ques 4: Let A = {1, 2, 3, 4, 5} and B = {0, 3, 6}. Find

a) A ∪ B.
b) A ∩ B.
c) A − B.
d) B − A.

Ques 5: Let A = {0, 2, 4, 6, 8, 10}, B = {0, 1, 2, 3, 4, 5, 6}, and C = {4, 5, 6, 7, 8, 9, 10}. Find

a) A ∩ B ∩ C.
b) A ∪ B ∪ C.
c) (A ∪ B) ∩ C.
d) (A ∩ B) ∪ C.

Ques 6: Prove that A∩(B - C) ⊂ A − (B ∩ C)

Ques 7: Show that if A, B, and C are sets, then

$$(A \cap B \cap C)^c = A^c \cup B^c \cup C^c$$

Ques 8: Show that if A and B are sets, then

a) $A - B = A \cap B^c$.
b) $(A \cap B) \cup (A \cap B^c) = A$.

Ques 9: List all partitions of the following sets:

(a) {a}
(b) {a, b}
(c) {a, b, c}

Ques 10: The bit strings for the sets {1,2,3,4,5} and {1,3,5,7,9} are 11 1110 0000 and 10 1010 1010, respectively. Use bit strings to find the union and intersection of these sets.