

Foundation of Computer Science (CS60001)

Tutorial-01

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1. If $A \cup B = A \cup C$ and $A \cap B = A \cap C$ then prove that $B = C$.
2. List the ordered pairs in the relation R from $A = \{0,1, 2, 3\}$ to $B = \{0, 1, 2, 3, 4\}$ where $(a, b) \in R$ iff
 - a) a divides b
 - b) $\gcd(a, b) = 1$
3. Prove that there are 2^{n^2} binary relations on a set of cardinality n .
4. Determine whether the relation \mathbf{R} on the set of all integers is reflexive, symmetric, antisymmetric, and/or transitive, where $(x, y) \in \mathbf{R}$ iff
 - a) x is divisible by y
5. Consider the equivalence relation on the set of integers $R = \{ (x, y) \mid x - y \text{ is an integer} \}$
What is the equivalence class of 1 for this equivalence relation?
6. Which f is not a function from \mathbf{R} to \mathbf{R} in the following equations, where \mathbf{R} is the set of real numbers ? Explain why they are not a function.
 - a) $f(x) = 1/x$
 - b) $f(x) = y$ such that $y^2 = x$
7. Determine whether each of the following function is a bijection from \mathbf{Z} to \mathbf{Z} :
 $f(x) = 2x + 3$
8. Construct the membership function of 3-bit numbers of even parity.