### Definition: Representative of an Equivalence Class

Let M be a non-empty set and let R R be an equivalence relation to x ∈ L M. Let L be an equiva-

lence class with respect to . Any element is called a representative of the equivalence class.

#### Example: Relationships and representatives of equivalence classes

Let us look at our example with the students enrolled in the subjects of medicine,

computer science and history. We have seen that the equivalence classes for this aregiven by SM, SI and SG. Obviously M = SM ∪ SI ∪ SG is a decomposition of the set M

and tative of the equivalence class SISM ∩ SI = ∅, , SM ∩ S[a] := {a + kn|k ∈ ℤG = ∅S and M, each computer science student is a representativeS}I ∩ S, [2] =G = ∅ {2+ kn|k ∈ ℤ} . Each medical student is a represen-SG } {0+ kn|k ∈ ℤ} [1] = {1+ kn|k ∈ ℤ

0so on.the equivalence class containing 1. Accordingly, ∈ ℤ. Accordingly, we choose 1 as the representative of equivalence class n ∈ [0], is ∈ [1] and and n ∈ [n] etc., i.e., generally . Thus [2] is then the equivalence class containing 2, and[0] and [n[0], i.e., ] are not disjunctive and are there- the equivalence class containing etc., i.e., generally [1] = [n + 1]. Furthermore, for [1]n ∈ [kn] and call . Thus for [1]nk

, . [3] = [kn + 3], by ℤ = [0] ∪ [1] ∪ ∈ [n + 1] etc. n +1 ∈ [kn + 1]. ∪ [n − 1]. Let us examinek ∈ ℤ x = 0 ≤ a b < n

follows, i.e., Because of b + n(k − k') .

and thus followsBecause n is a divisor of b − ab, it must be that−n a n∈ Z

b−n a

obtain a disjoint decomposition of Because of the equivalence relation n ∈ ℕ it follows that ∼n. n ≠ 0ℤ= 0 by and therefore ℤ = [0] ∪ [1] ∪ b − a = 0. ∪ [n − 1], so a = b with respect to. We thus

#### STUDY GOALS

On completion of this unit, you will have learned...

what is meant by a (logical) statement.

what “the logical equivalence of statements” means.

how to connect statements to expressions using logical operators.

how propositional logical formulas are defined.

what truth tables are and how to work with them.

which calculation rules apply in propositional logic. – how to simplify propositional logic.