

- ▶ The nearest neighbor classifier relies on a *metric* or a *distance function* between points.
- ▶ For all points  $x$ ,  $y$  and  $z$ , a metric  $D(\cdot, \cdot)$  must satisfy the following properties:
  - ▶ Nonnegativity:  $D(\mathbf{x}, \mathbf{y}) \geq 0$ .
  - ▶ Reflexivity:  $D(\mathbf{x}, \mathbf{y}) = 0$  if and only if  $\mathbf{x} = \mathbf{y}$ .
  - ▶ Symmetry:  $D(\mathbf{x}, \mathbf{y}) = D(\mathbf{y}, \mathbf{x})$ .
  - ▶ Triangle inequality:  $D(\mathbf{x}, \mathbf{y}) + D(\mathbf{y}, \mathbf{z}) \geq D(\mathbf{x}, \mathbf{z})$ .
- ▶ If the second property is not satisfied,  $D(\cdot, \cdot)$  is called a pseudometric.