F09 Ordered pairs exercise

Course in Semantics · Ling 531 / 731
University of Kansas

Key

1. Write the following function, which is in list notation, as a set of ordered pairs.

$$\begin{bmatrix} \text{Douglas} & \rightarrow & \text{Lawrence} \\ \text{Shawnee} & \rightarrow & \text{Topeka} \\ \text{Wyandotte} & \rightarrow & \text{Kansas City} \\ \text{Sedgwick} & \rightarrow & \text{Wichita} \\ \text{Johnson} & \rightarrow & \text{Olathe} \\ \text{Gove} & \rightarrow & \text{Gove City} \end{bmatrix}$$

{ ⟨Douglas, Lawrence⟩, ⟨Shawnee, Topeka⟩, ⟨Wyandotte, Kansas City⟩, ⟨Sedgwick, Wichita⟩, ⟨Johnson, Olathe⟩, ⟨Gove, Gove City⟩ }

2. (a) What is the most probable domain of the first member of each pair?
{ x | x is a county in Kansas }

   (b) What is the most probable domain of the second member of each pair? { x | x is a city in Kansas }

   (c) What is the Cartesian product of the two sets?
{ x | x is a county in Kansas } × { x | x is a city in Kansas }

Write the following (part of a) characteristic function as a set of ordered pairs.

$$\begin{bmatrix} \text{Joey} & \rightarrow & 1 \\ \text{Monica} & \rightarrow & 1 \\ \text{Leonard} & \rightarrow & 0 \\ \text{Penny} & \rightarrow & 0 \\ \text{Phoebe} & \rightarrow & 1 \\ \text{Jerry} & \rightarrow & 0 \end{bmatrix}$$

{ ⟨Joey, 1⟩ , ⟨Monica, 1⟩ , ⟨Leonard, 0⟩, ⟨Penny, 0⟩, ⟨Phoebe, 1⟩, ⟨Jerry, 0⟩ }

3. Write the following set of ordered pairs as a function in λ-notation. (Hint: It isn't quite a characteristic function. Hint 2: Think about formulating the abstracted set of ordered pairs first)

{ ⟨1924, Chamonix⟩, ⟨1928, St Moritz⟩, ⟨1932, Lake Placid⟩,
⟨1936, Garmisch-Partenkirchen⟩,
⟨1948, St Moritz⟩, ⟨1952, Oslo⟩, ⟨1956, Cortina d'Ampezzo⟩, ⟨1960, Squaw Valley⟩,
⟨1964, Innsbruck⟩, ⟨1968, Grenoble⟩, ⟨1972, Sapport⟩, ⟨1976, Innsbruck⟩,
⟨1980, Lake Placid⟩, ⟨1984, Sarajevo⟩, ⟨1988, Calgary⟩,
⟨1992, Albertville⟩, ⟨1994, Lillehammer⟩, ⟨1998, Nagano⟩, ⟨2002, Salt Lake City⟩,
⟨2006, Torino⟩, ⟨2010, Vancouver⟩, ⟨2014, Sochi⟩, ⟨2018, PyeongChang⟩ }

$\lambda x \in \{ y \mid y \text{ is a year} \}$. the site of the Winter Olympics in x
$\{\langle x, y\rangle \in \{ z \mid z \text{ is a year} \} \times \{ z \mid z \text{ is a city} \} \mid y \text{ is the site of the Winter Olympics in x} \}$