A function $f : X \rightarrow Y$ takes elements from $X$ as the input and provides elements from $Y$ as the output. It is important to note that

- $f$ produces only one element from $Y$ as the output for any $x \in X$.
- It must produce an output for every $x \in X$ otherwise it does not qualify as a function.
- $f(x) \in Y$ is called the image of $x \in X$.
- $x \in X$ is called the pre-image of $f(x) \in Y$.
- We may thus say that for each $x \in X$ the function produces a unique image $f(x) \in Y$.

A self-map $f : (X, d_X) \rightarrow (X, d_X)$ is a contraction if

- $\exists K \in (0, 1)$ such that
  - $d(f(x), f(y)) \leq Kd(x, y)$
- $\forall x, y \in X$.

Given a non-empty set $X$, let $\overline{P(X)}$ denote the collection of all non-empty subsets of $X$.

A correspondence $f^c : X \rightarrow \overline{P(Y)}$ takes elements from $X$ as the input and provides elements from $\overline{P(Y)}$ as the output. It is important to note that

- $f^c$ produces only one element from $\overline{P(Y)}$ as the output for any $x \in X$; but one element of $\overline{P(Y)}$ may contain one or more elements of $Y$.
- It must produce an output for every $x \in X$ otherwise it does not qualify as a correspondence.
- $f^c(x) \in \overline{P(Y)}$ is called the image of $x \in X$.
- $x \in X$ is called the pre-image of $f^c(x) \in \overline{P(Y)}$.
- We will denote $f^c : X \rightarrow \overline{P(Y)}$ as $f^c : X \Rightarrow Y$ throughout this section.