A relation is a way of describing how things are related to each other:

$5 < 7$ True

$3 < 1$ False

$a \in A$, $A \subseteq B$

$a + b = c$, $3 \mid 12$ True

$3 \mid 11$ False.

Example let $A = \{1, 2, 3, 4, 5\}$

Consider the less than "$<$" relation.

What are some true $<$ statement we can make about members of A?

$1<2$ $(1,2)$, $2<3$, $3<4$, $4<5$,

$1<5$, $1<4$, $1<3$

$2<4$, $2<5$, $3<5$

this list has all information about $<$ on the set A.

"$\leq$"

lets write this list:

$R=\{(1,2),(2,3),(3,4),(4,5),(1,5),(1,4),$
$(1,3),(2,4),(2,5),(3,5)\}$

IDEA: this set contains all info about "$<$" on the set $\{1,2,3,4,5\}$.

If all you ~~need~~ can do is ask

"$(a,b) \in R$"

task is $3<5$,

$(3,5) \in R$?

is $4<1$?

is $(4,1) \in R$? No,

so $4 \not< 1$

Defn a relation R on a set A is a set of ordered pairs of elements of A

$$R \subseteq A \times A$$