

① Find two (distinct) quotient maps from  $X = \{1, 2, 3, 4\}$  to  $Y = \{5, 6, 7\}$  where  $X$  has <sup>the</sup> topology generated by subbase  $\{\{1\}, \{1, 2, 4\}, \{2, 3\}\}$  &  $Y$  has <sup>the</sup> topology generated by ~~sub~~base  $\{\{5\}, \{6\}, Y\}$

② Prove that the coordinate projection  $\pi_1: X \times Y \rightarrow X$  is a quotient map, for all spaces  $X, Y$ .

③ Define  $f: [0, 1) \cup \{2\} \rightarrow [0, 1]$  by  $f(x) = x$  if  $x < 1$  else  $1$ . Is  $f$  continuous? Is  $f$  a quotient map?