## HOMEWORK \#2

Problem 1. Consider the partition

$$
\mathcal{P}=\{\{1,3,7,8,9,10\},\{2,4\},\{5\},\{6\}\} .
$$

Let $\sim$ be the associated equivalence relation.
(a) What is $\overline{7}$ ?
(b) Is it true that $7 \sim 5$ ?
(c) List 4 elements of $A$ so that $a \nsim b$ for any distict $a$ and $b$ in your list.

Problem 2. The following table describes an equivalence relation. Find the associated set of ordered pairs that is this relation.

| $\sim$ | 1 | 2 | 3 | 4 | 5 | 6 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | $*$ | $*$ | $*$ |  |  |  |
| 2 | $*$ | $*$ | $*$ |  |  |  |
| 3 | $*$ | $*$ | $*$ |  |  |  |
| 4 |  |  |  | $*$ |  | $*$ |
| 5 |  |  |  |  | $*$ |  |
| 6 |  |  |  | $*$ |  | $*$ |

x
Problem 3. There are 5 partitions on the set $\{0,1,2\}$. Find them all.

Problem 4. Given this Hasse diagram, find the associated parital order, giving your answer as a table.


Problem 5. Given the partial order indicated by this table, find the associated Hasse diagram.

| $\preceq$ | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | $*$ |  |  |  |  |  |  |
| 2 | $*$ | $*$ |  |  |  |  |  |
| 3 | $*$ | $*$ | $*$ | $*$ |  |  |  |
| 4 | $*$ |  |  | $*$ |  |  |  |
| 5 | $*$ | $*$ | $*$ | $*$ | $*$ |  |  |
| 6 | $*$ | $*$ | $*$ | $*$ |  | $*$ |  |
| 7 | $*$ | $*$ | $*$ | $*$ | $*$ | $*$ | $*$ |

Problem 6. If $\preceq$ is the partial order indicated in this talble, what are all the maximal elements?

| $\preceq$ | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | $*$ | $*$ | $*$ | $*$ | $*$ | $*$ | $*$ | $*$ | $*$ |
| 2 |  | $*$ |  |  |  | $*$ |  |  |  |
| 3 |  |  | $*$ |  |  |  | $*$ |  |  |
| 4 |  |  | $*$ | $*$ |  |  | $*$ | $*$ | $*$ |
| 5 |  | $*$ | $*$ |  | $*$ | $*$ | $*$ |  |  |
| 6 |  |  |  |  |  | $*$ |  |  |  |
| 7 |  |  |  |  |  |  | $*$ |  |  |
| 8 |  |  |  |  |  |  |  | $*$ |  |
| 9 |  |  |  |  |  |  |  | $*$ | $*$ |

