Name:
Let $X=\{0,1,2\}, Y=\{a, b\}$, and $Z=\{d, e, f, g\}$ Let $R_{1}$ be a relation from $X$ to $Y$ defined as $R_{1}=\{(0, a),(0, b),(1, a),(2, b)\}$ and $R_{2}=\{(a, d),(b, d),(b, f)\}$.

1. Write the matrix of each relation above using the ordering of sets $X, Y$, and $Z$ as they are listed above.
2. Take a moment to determine whether each relation is a function, one to one, onto.
3. Why weren't you asked to determine if the relations were symmetric, reflexive, or antisymmetric?
4. Using the definitions, determine the ordered pairs in $R_{2} \circ R_{1}$.
5. Now multiply the two matrices from part (1) to show it is (essentially) the matrix of the composition of the two relations.
6. Why is the word essentially needed here?
7. Can you explain why you multiplied the matrices in the order you did?
