The entries of any matrix M can be rearranged into a list $r(M)$ by forming the list row-by-row starting from the first row, and also into a list $c(M)$ by forming the list column-by-column starting from the first column. If m and n are positive integers and A is an $m \times n$ matrix give a careful specification of the lists $r(M)$ and $c(M)$. (Your specification should include a rule that for each index i in the list gives the value of the ith item of the list.

- Specification for $c(M)$
  $c(M) := \bigoplus_{j=1}^{n}(M_{1j}, \cdots, M_{mj}) = (a_1, ..., a_{mn}).\ a_i \in c(M), a_i = M_{pq}, p = ((i-1 \mod m)+1), q = (\lceil \frac{i}{m} \rceil)$
- Specification for $r(M)$
  $r(M) := \bigoplus_{j=1}^{m}(M_{j1}, \cdots, M_{jn})\ a_i \in r(M), a_i = M_{qp}, p = ((i-1 \mod n)+1), q = (\lceil \frac{i}{n} \rceil)$