

## Project 2 (0.2 points)

- *Input:* non-zero natural number  $n$
- *Output:*
  1. the number of associative operations on a set  $A = \{a_1, \dots, a_n\}$
  2. the operation table of each associative operation (for  $n \leq 4$ )

*Example:*

- *Input:*  $n = 2$
- *Output:*
  1. the number of associative operations on a set  $A = \{a_1, a_2\}$  is 8
  2. identifying an operation table  $\begin{array}{c|cc} & a_1 & a_2 \\ \hline a_1 & x & y \\ a_2 & z & t \end{array}$  by the matrix  $\begin{pmatrix} x & y \\ z & t \end{pmatrix} \in M_2(A)$ , the operation tables of the associative operations on  $A = \{a_1, a_2\}$  are given by the matrices:
$$\begin{pmatrix} a_1 & a_1 \\ a_1 & a_1 \end{pmatrix}, \begin{pmatrix} a_1 & a_1 \\ a_1 & a_2 \end{pmatrix}, \begin{pmatrix} a_1 & a_1 \\ a_2 & a_2 \end{pmatrix}, \begin{pmatrix} a_1 & a_2 \\ a_1 & a_2 \end{pmatrix}, \begin{pmatrix} a_1 & a_2 \\ a_2 & a_1 \end{pmatrix}, \begin{pmatrix} a_1 & a_2 \\ a_2 & a_2 \end{pmatrix}, \begin{pmatrix} a_2 & a_1 \\ a_1 & a_2 \end{pmatrix}, \begin{pmatrix} a_2 & a_2 \\ a_2 & a_2 \end{pmatrix}.$$