

Ex. 1

- i) Complete the Latin square S . How many ways are there of doing this?
- ii) One completion of S is in Canonical form, as are $L(1)$ and $M(1)$ (if relabelled) when $n = 4$. Find the fourth Latin square of order 4 which is in Canonical form.
- iii) Complete the Latin square T . Show that this cannot be done in such a way that the letters on the main diagonals are also distinct.
Hint: Consider the symbols available for the central 2, 2 - entry.
- iv) Show that the Latin square U can be completed so that the letters on the main diagonals are distinct.

$$S = \begin{array}{|c|c|c|c|} \hline 0 & 1 & 2 & 3 \\ \hline 1 & 3 & 0 & 2 \\ \hline & & & \\ \hline & & & \\ \hline \end{array}$$

$$T = \begin{array}{|c|c|c|c|c|} \hline A & B & C & D & E \\ \hline B & E & A & C & D \\ \hline & & & & \\ \hline & & & & \\ \hline & & & & \\ \hline \end{array}$$

$$U = \begin{array}{|c|c|c|c|c|} \hline A & B & C & D & E \\ \hline E & C & D & A & B \\ \hline & & & & \\ \hline & & & & \\ \hline & & & & \\ \hline \end{array}$$

Ex. 2

- i) Find the four mutually orthogonal Latin squares $L(a)$ of order 5.
- ii) Construct Magic squares of order 3, 5, and 7.
- iii) Construct a Magic square C_1 from the squares $L(2)$ and $L(3)$ of i) using the method described in Theorem 3.1.11 (iii).