

Objective of the session :

Write a simple program using two-dimensional arrays.

1 Tic-Tac-Toe Game

Design a program to play the tic-tac-toe game. The tic-tac-toe is played on a 3x3 grid. At each round, a player places his symbol in a cell with the objective of placing 3 aligned horizontally, vertically or diagonally. The symbol of the first player is **X**, the symbol of the second player is **O**.

The different subprograms are as follows :

Display the grid

The game grid will be displayed in the following procedure :

{displays the grid contained in g}
procedure display (**E** g : Grid)

Exercices

1. Write the detailed design of this procedure
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Placing a symbol

The symbol placement procedure asks a player to enter the number of a cell and modify the grid accordingly. The procedure checks that the cell number is valid and that there is not already a symbol in that location. The signature of the procedure is :

{modifies the grid g by placing the symbol s on the cell entered by the player}
procedure play (**I/O** g : Grid; **E** s : Symbol)

Exercices

1. Write the detailed design of this procedure
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Victory test

Check whether one of the two players is the winner, that is, if she has managed to align her symbol three times. The signature of the function is :

{Returns the symbol of the player who won or the symbol of an empty cell if there is no winner.}

function win (g : Grid) : Symbol

Exercices

1. Write the detailed design of this procedure
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Main program

Finally, the main program initializes the grid with empty symbols and then asks each player to play until one has won or all the cells from the grid are filled in.

Exercices

1. Download the file `morpion.pas`,
 2. Define a data type to represent the content of a cell (Symbol) and then a table to represent a grid of 9 cells (Grid).
 3. Complete the different parts to obtain a functional program.
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