

TicTacToe on a LAN

You have to design and implement a two-player tic-tac-toe game using the traditional client-server architecture. In tic-tac-toe, there are totally two players and a 3×3 empty board so that if player 1 chooses a symbol 'X' and then player 2 chooses 'O'. if any column or any row or any cross gets filled with the same symbol then the player corresponding to that symbol will win. The players will act as clients and the server should handle those two clients as mentioned below.

(You can refer to this [link](#) for more info about tic tac toe game)

1. The game server should be first started and wait for players (choose a port of your choice) to join in.

```
$SERVER$ ./gameserver
$SERVER$ Game server started. Waiting for players.
```

2. The client joins, he is assigned an ID and he needs to wait for a game partner...

```
$CLIENT1$ ./gameclient
$CLIENT1$ Connected to the game server. Your player ID is
1. Waiting for a partner to join . . .
```

3. The second client joins.

```
$CLIENT2$ ./gameclient
$CLIENT2$ Connected to the game server. Your player ID is
2. Your partner's ID is 1. Your symbol is 'X'
$CLIENT2$ Starting the game ...
$CLIENT2$  __ | __ | __
$CLIENT2$  __ | __ | __
$CLIENT2$  __ | __ | __
```

4. Meanwhile at client 1,

```
$CLIENT1$ Connected to the game server. Your player ID is
1. Waiting for a partner to join . . .
$CLIENT1$ Your partner's ID is 2. Your symbol is 'O'.
$CLIENT1$ Starting the game ...
$CLIENT1$  __ | __ | __
$CLIENT1$  __ | __ | __
$CLIENT1$  __ | __ | __
$CLIENT1$ Enter (ROW, COL) for placing your mark: 1 3
$CLIENT1$  __ | __ | O
$CLIENT1$  __ | __ | __
$CLIENT1$  __ | __ | __
```

Handle illegal entries, for example a player cannot make two successive entries or cannot put a position that is already occupied etc. When a player makes an entry the updated state of the game should be visible to all players simultaneously and the relevant player should be prompted to enter his intended move.

If any of the partners quits/disconnects, the gameserver should display a message to the other player (e.g., "Sorry, your partner disconnected") and disconnect him.

When a particular player wins or the game is a draw, this message will be displayed in both the player terminals and they need to be asked whether to replay. The game will **only** be replayed if both players enter YES, otherwise both the players will be disconnected from the server. Once you have this basic functionality implemented you can consider the following add-ons. **[30 marks]**

Extra features:

- a. Extend the basic code you have developed to support multiple games simultaneously. When there are an odd number of players, the one who joined last will wait for some player to join in and a new game starts with a new game ID. **[10 marks]**
- b. Time outs: If a certain player takes more than 15 seconds to make a move, the game will be automatically quitted, the player and his partner will be asked whether they want to replay. If yes, a new game starts with a new game ID, else they will be disconnected from the server. **[10 marks]**
- c. Server maintains and updates all game related statistics in a log file. For example, time of the game, how long the game lasted, which player won and the sequence of moves given by the players. **[10 marks]**