**Dr. AMBEDKAR INSTITUTE OF TECHNOLOGY**

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**(An Autonomous Institution, Aided by Government of Karnataka)**



**JAVA LAB**

**SUB CODE: ISL59**

**V Semester**

**OPEN ENDED QUESTION ON**

**TIC TAC TOE GAME**

**BACHELOR OF ENGINEEERING**

**DEPARTMENT OF**

**INFORMATION SCIENCE AND ENGINEERING**

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**Introduction**

**Tic-tac-toe** is a game for two players, *X* and *O*, who take turns marking the spaces in a 3×3 grid. The player who succeeds in placing three of their marks in a horizontal, vertical, or diagonal row wins the game.

The following example game is won by the first player, X:

Players soon discover that [best play](https://en.wikipedia.org/wiki/Best_response) from both parties leads to a [draw](https://en.wikipedia.org/wiki/Draw_(tie)). Hence, tic-tac-toe is most often played by young children.

Because of the simplicity of tic-tac-toe, it is often used as a [pedagogical](https://en.wikipedia.org/wiki/Pedagogical) tool for teaching the concepts of good [sportsmanship](https://en.wikipedia.org/wiki/Sportsmanship) and the branch of [artificial intelligence](https://en.wikipedia.org/wiki/Artificial_intelligence) that deals with the searching of [game trees](https://en.wikipedia.org/wiki/Game_tree). It is straightforward to write a [computer program](https://en.wikipedia.org/wiki/Computer_program) to play tic-tac-toe perfectly, to enumerate the 765 essentially different positions (the [state space complexity](https://en.wikipedia.org/wiki/State_space_complexity)), or the 26,830 possible games [up to](https://en.wikipedia.org/wiki/Up_to)rotations and reflections (the [game tree complexity](https://en.wikipedia.org/wiki/Game_tree_complexity)) on this space.

The game can be generalized to an [m,n,k-game](https://en.wikipedia.org/wiki/M,n,k-game) in which two players alternate placing stones of their own color on an *m*×*n* board, with the goal of getting *k* of their own color in a row. Tic-tac-toe is the (3,3,3)-game. [Harary's generalized tic-tac-toe](https://en.wikipedia.org/wiki/Harary%27s_generalized_tic-tac-toe" \o "Harary's generalized tic-tac-toe) is an even broader generalization of tic tac toe. It can also be generalized as a [nd game](https://en.wikipedia.org/wiki/Nd_game). Tic-tac-toe is the game where n equals 3 and d equals 2.[[3]](https://en.wikipedia.org/wiki/Tic-tac-toe#cite_note-3) If played properly, the game will end in a draw making tic-tac-toe a [futile game](https://en.wikipedia.org/wiki/Futile_game).

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**GamePlay:**

A player can play a perfect game of tic-tac-toe (to win or, at least, draw) if they choose the first available move from the following list, each turn, as used in Newell and Simon's 1972 tic-tac-toe program.[[14]](https://en.wikipedia.org/wiki/Tic-tac-toe#cite_note-14)

1. **Win**: If the player has two in a row, they can place a third to get three in a row.
2. **Block**: If the opponent has two in a row, the player must play the third themselves to block the opponent.
3. **Fork**: Create an opportunity where the player has two threats to win (two non-blocked lines of 2).
4. **Blocking an opponent's fork**:
   * **Option 1**: The player should create two in a row to force the opponent into defending, as long as it doesn't result in them creating a fork. For example, if "X" has two opposite corners and "O" has the center, "O" must not play a corner in order to win. (Playing a corner in this scenario creates a fork for "X" to win.)
   * **Option 2**: If there is a configuration where the opponent can fork, the player should block that fork.
5. **Center**: A player marks the center. (If it is the first move of the game, playing on a corner gives the second player more opportunities to make a mistake and may therefore be the better choice; however, it makes no difference between perfect players.)
6. **Opposite corner**: If the opponent is in the corner, the player plays the opposite corner.
7. **Empty corner**: The player plays in a corner square.
8. **Empty side**: The player plays in a middle square on any of the 4 sides.

Screenshots







