



Arcade El 7ag Bor3y is a game-box consisting of 3 games: Chess, Pac-man & snake. This game-box is implemented using object oriented programming. We used various algorithms to build our AI engines creating an enjoyable gaming experience. So, either you just want to play a casual game or have a solid thinking contest, we have a game for you.

Tools used:

- **Object oriented programming (classes – objects – virtual functions – polymorphism).**
- **Containers (arrays – vector – stack).**
- **Algorithms (minimax – alpha-beta pruning – breadth first search).**
- **Built-in functions (rand()).**
- **Graphics library (SFML).**

Chess:

Chess game consists of 2 modes; you can play a 2-player game with your friend or compete against the computer.

Main features:

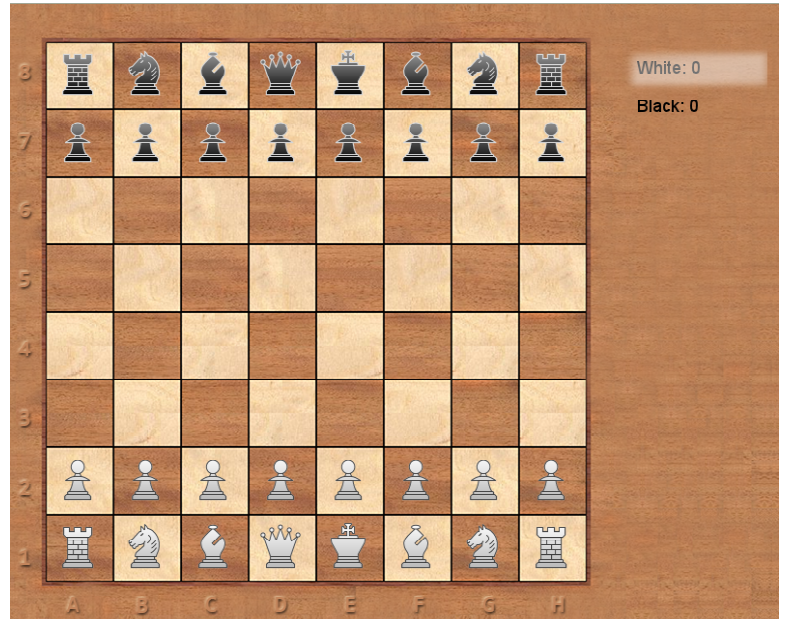
- Play against a friend or against the computer.
- Choose what color you want to play with.
- Enjoy the special moves of chess including: castling & promotion.
- A scoring system based on the pieces eaten by each player.
- When selecting a piece, you can see all the available destinations this piece can go to.
- Undo any done move.

AI:

The AI engine is based on the minimax algorithm. It's optimized using alpha-beta pruning algorithm and a quiescence function. We also use an evaluation function based on each piece's value and its heuristic value on the board.

Instructions & controls:

- Left-mouse click: select piece/select cell.
- Right-mouse click: deselect piece.
- Ctrl + z: undo.
- Esc: quit to main menu.



Pac-man:

Main features:

- Enjoy a multi-level experience.
- Eat food to get score.
- Eat a transformer to be able to eat the ghosts and get a higher score.
- Compete against your previous performances and try to beat your high score.

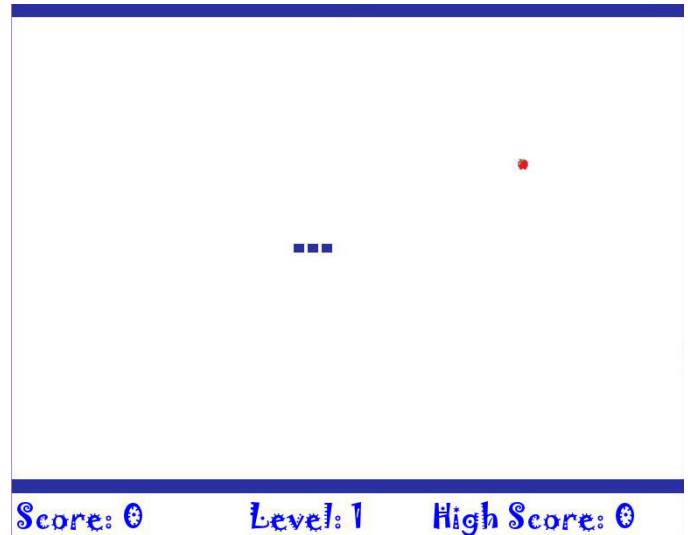
AI:

The AI engine is based on the breadth first search (bfs) algorithm. The ghosts search for you in a certain range to find the shortest path to you, if not found, they move randomly in the board, creating a challenging yet enjoyable gaming experience.

Instructions & controls:

- Keyboard arrows: move.
- P: pause.
- Esc: exit game.





Snake:

Snake game consists of 2 modes; classic mode & arcade mode.

Main features:

- **Classic mode:** enjoy the classic snake, eat as much as you can and avoid collisions with yourself or walls.
- **Arcade mode:** play a multi-level game with different mazes.
- **Try to beat your high score.**

Instructions & controls:

- **Keyboard arrows:** move.
- **Keyboard arrows (hold):** move faster.
- **P:** pause.
- **Esc:** exit game.