

# Manual for the Mathematica Chess Package

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## 1 Installing the package

Installing the Chess Package is quite easy, as it only includes one file. Under **File** you will find **Install**. Click on **Install** and a popup window as shown in Figure 1 will be displayed. Select the source and the file **Chess.wl** and install it by clicking **OK**.

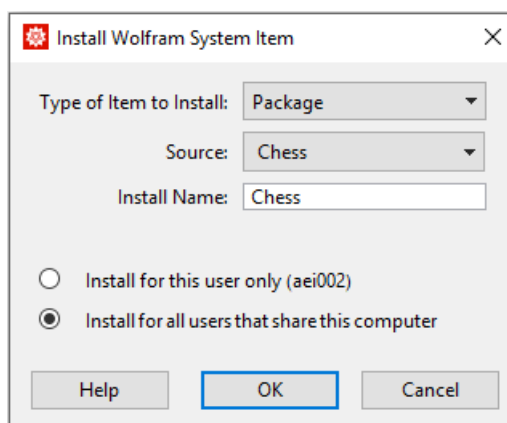


Figure 1: Installing the Chess Package in Mathematica.

After the package is installed it is loaded by

```
In[1]:= Needs["Chess"]
```

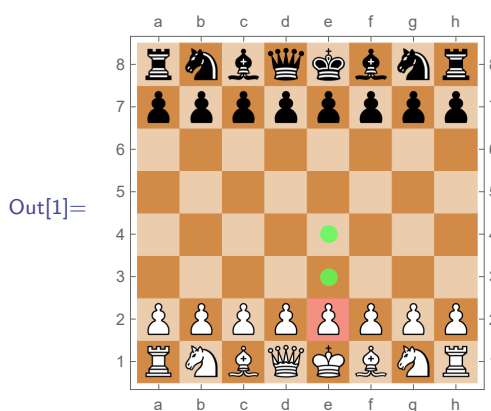
## 2 Options

Currently the Chess package has eight available options when presenting the chessboard.

### 2.1 ShowBoard

The default option value is **Static**, meaning that no interaction is possible. An interactive mode is available by using **Interactive**:

```
In[1]:= Chess[ShowBoard -> Interactive]
```



The square you click on is coloured red and possible cells of moving the piece to are indicated by green dots. Each move is binding and you cannot move back.

The third important option value of **ShowBoard** is a converted PGN-file, see subsection 3.1. In this mode a menu is displayed, making it possible to move forward and backward in the PGN-file.

**ShowBoard** may also have value **None**, not displaying any chessboard.

### 2.2 ImageSize

**ImageSize** works as for all other Mathematica graphics. Default value is 240.

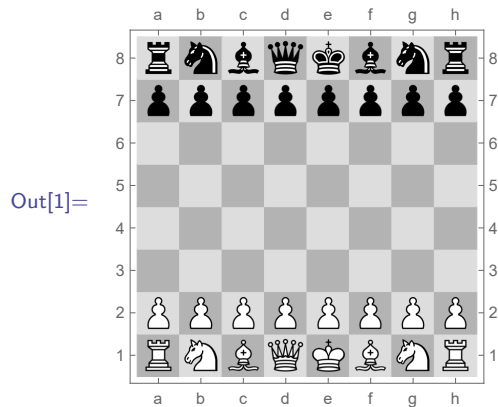
### 2.3 PieceSize

Default value of **PieceSize** is **Automatic**, which means one tenth of the **ImageSize**. You may however select specific values and by that unlinking the piece size to the board size.

## 2.4 BoardColour

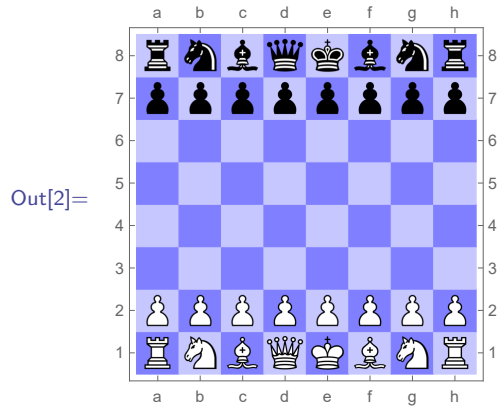
Default board colour is `RGBColor[0.8196, 0.5451, 0.2784]` (displayed in the figure above) but you may select any board colour, for example

```
In[1]:= Chess[BoardColour -> GrayLevel[.7]]
```



or

```
In[2]:= Chess[BoardColour -> Blend[{White, Blue}]]
```



## 2.5 ShowPieces

Default option is `All`, other options are `White`, `Black`, or `None`.

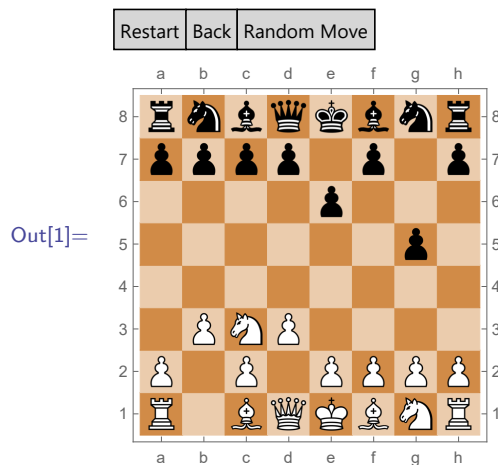
## 2.6 PawnConvert

Default option is `MakeQueen`, which promote pawns to queens. Currently there are no other options. A menu to chose between Queen, Knight, Bishop or Rook has been written into the code, but it does not work...

## 2.7 ShowPGN

Default option of `ShowPGN` is `True`. If setting this to `False` and `ShowBoard`  $\rightarrow$  `Normal`, random moves are available. Use `Interact`  $\rightarrow$  `False` to avoid highlighting the cell where your pointer is placed. This is how it may look like after a few random moves. Each move is initiated by clicking the `Random Move` button.

```
In[1]:= Chess[
  ShowBoard -> Normal,
  ShowPGN   -> False,
  Interact  -> False
]
```



## 2.8 Interact

Default value is `True` and if it is set to `False` this is override when `ShowBoard` is set to `Interactive`.

## 3 Running chess

### 3.1 Reading PGN-files

Start by loading the Chess package:

```
In[1]:= Get["Chess"]
```

We find PGN-files many places on the internet, here is an example of where you may download games by Kasparov:

```
In[2]:= kasparov =
  Import[
```

```

"http://chessproblem.my-free-games.com/PGN/Kasparov.zip",
"*.pgn"
][[1]];

```

The PGNS is presented in a *Mathematica* readable format by the use of `MakePGNfiles`:

```
In[3]:= MakePGNfiles[kasparov]
```

```
Out[3]= 549 PGN files are available (PGNfile[no])
```

The message tells us that we have 549 available games from the downloaded zip-file, numbered from 1 to 549. Game number 540, for example, looks like this:

```
In[4]:= PGNfile[540]
```

```

Out[4]= <|"Event" -> "KasparovChess GP g/60", "Site" -> "Internet INT",
Date" -> "2000.02.13", "Round" -> "2.2",
White" -> "Van Wely, Loek", "Black" -> "Kasparov, Gary",
Result" -> "0-1", "WhiteElo" -> "2646", "BlackElo" -> "2851",
ECO" -> "D46k", "EventDate" -> "2000.02.09",
PGN" -> {"1.d4", "Nf6", "2.Nf3", "d5", "3.c4", "e6", "4.Nc3", "c6",
"5.e3", "Nbd7", "6.Qc2", "Bd6", "7.Bd3", "0-0", "8.0-0", "dxc4",
"9.Bxc4", "a6", "10.a4", "c5", "11.Rd1", "Qc7", "12.Ne4", "Nxe4",
"13.Qxe4", "Nf6", "14.Qh4", "cxd4", "15.", "Bd3", "h6", "16.e4",
"Nd7", "17.Bxh6", "gxh6", "18.Rac1", "Qd8", "19.Qxh6", "Qf6",
"20.Qxf6", "Nxf6", "21.e5", "Be7", "22.exf6", "Bxf6", "23.Be4",
"Rd8", "24.g4", "Rb8", "25.g5", "Bh8", "26.Ne1", "Bd7", "27.a5",
"Ba4", "28.", "Rd2", "d3", "29.Rxd3", "Bb5", "30.Rxd8+", "Rxd8",
"31.Nf3", "Bxb2", "32.Rc7", "Ba3", "33.Rxb7", "Rd1+", "34.", "Kg2",
"Bd6", "35.Kh3", "Rc1", "36.Nd4", "Bf1+", "37.Bg2", "Rc3+",
"38.f3", "Bd3", "39.Rb3", "Rxb3", "40.Nxb3", "Bb4", "41.f4", "Bc4",
"42.Nd4", "Bxa5", "43.f5", "Bc3", "44.Nc6", "a5", "45.Nxa5",
"Bxa5", "46.Be4", "Bd5", "47.", "Bd3", "Bc7", "48.f6", "Bf4",
"49.Kg4", "Bxh2", "50.g6", "e5", "51.Kf5", "Be6+", "52.Kg5",
"Bf4+", "53.Kh5", "Bd5", "54.Kg4", "fxg6", "55.Bxg6", "Be6+",
"56.Kf3", "Bg5"}|>

```

Note that the PGN is presented as an *Mathematica* Association, including all the information available about the game. We need to convert it to a format the Chess package can understand. This is done by `PGNconvert`:

```
In[5]:= pgn = PGNconvert[PGNfile[540]["PGN"]]
```

```

Out[5]= {{4, 4}, {knight, 6, 6}, {knight, 6, 3}, {4, 5}, {3, 4}, {5,
6}, {knight, 3, 3}, {3, 6}, {5, 3}, {knight, b, 4, 7}, {queen, 3,
2}, {bishop, 4, 6}, {bishop, 4, 3}, {0, Chess'Private'short}, {0,
Chess'Private'short}, {d, x, 3, 4}, {bishop, x, 3, 4}, {1, 6}, {1,
4}, {3, 5}, {rook, 4, 1}, {queen, 3, 7}, {knight, 5, 4}, {knight, x,
5, 4}, {queen, x, 5, 4}, {knight, 6, 6}, {queen, 8, 4}, {c, x, 4,
4}, {bishop, 4, 3}, {8, 6}, {5, 4}, {knight, 4, 7}, {bishop, x, 8,
6}, {g, x, 8, 6}, {rook, a, 3, 1}, {queen, 4, 8}, {queen, x, 8,
6}, {queen, 6, 6}, {queen, x, 6, 6}, {knight, x, 6, 6}, {5,
5}, {bishop, 5, 7}, {e, x, 6, 6}, {bishop, x, 6, 6}, {bishop, 5,
4}, {rook, 4, 8}, {7, 4}, {rook, 2, 8}, {7, 5}, {bishop, 8,
8}, {knight, 5, 1}, {bishop, 4, 7}, {1, 5}, {bishop, 1, 4}, {rook,
4, 2}, {4, 3}, {rook, x, 4, 3}, {bishop, 2, 5}, {rook, x, 4,
8}, {rook, x, 4, 8}, {knight, 6, 3}, {bishop, x, 2, 2}, {rook, 3,
7}, {bishop, 1, 3}, {rook, x, 2, 7}, {rook, 4, 1}, {king, 7,
2}, {bishop, 4, 6}, {king, 8, 3}, {rook, 3, 1}, {knight, 4,
4}, {bishop, 6, 1}, {bishop, 7, 2}, {rook, 3, 3}, {6, 3}, {bishop,
4, 3}, {rook, 2, 3}, {rook, x, 2, 3}, {knight, x, 2, 3}, {bishop, 2,
4}, {6, 4}, {bishop, 3, 4}, {knight, 4, 4}, {bishop, x, 1, 5}, {6,
5}, {bishop, 3, 3}, {knight, 3, 6}, {1, 5}, {knight, x, 1,
5}, {bishop, x, 1, 5}, {bishop, 5, 4}, {bishop, 4, 5}, {bishop, 4,
3}, {bishop, 3, 7}, {6, 6}, {bishop, 6, 4}, {king, 7, 4}, {bishop,
x, 8, 2}, {7, 6}, {5, 5}, {king, 6, 5}, {bishop, 5, 6}, {king, 7,
5}, {bishop, 6, 4}, {king, 8, 5}, {bishop, 4, 5}, {king, 7, 4}, {f,
x, 7, 6}, {bishop, x, 7, 6}, {bishop, 5, 6}, {king, 6, 3}, {bishop,
7, 5}}

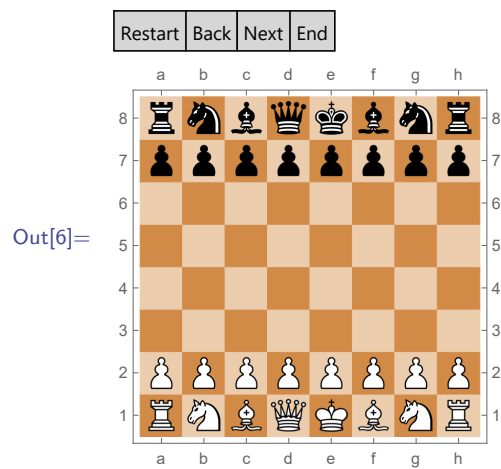
```

This are not outputs you will normally see, but this is how the package needs to have moves presented. Now it is time to bring the chessboard up to present the game. As always it will display the initial situation and you may go through the different moves (and back) by pressing the buttons of top of the chessboard. You may chose to interact (`Interact -> True`) but normally while presenting PGNs you will prefer the interactions option set to `False`.

```

In[6]:= Chess[ShowBoard -> pgn, Interact -> False]

```



We may now click the "Next" button until the end or simply press "End" and find the final position of the game:

