3dchess

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Contents

Chapter 1

Namespace Index

1.1 Namespace List

Here is a list of all documented namespaces with brief descriptions:

Chapter 2

Hierarchical Index

2.1 Class Hierarchy

This inheritance list is sorted roughly, but not completely, alphabetically:

Chapter 3

Class Index

3.1 Class List

Here are the classes, structs, unions and interfaces with brief descriptions:

Chapter 4

Namespace Documentation

4.1 DebugTools Namespace Reference

Contains functions for helping with debugging tasks.

Functions

- string toInitializerList (const std::array< Piece, 64 > &board)

  Returns the code needed to initialize a board to the given state.
- template<typename Rng >
  GameState **generateRandomState** (size_t maxTurns, Rng &rng)
- template<typename Rng >
  ChessBoard **generateRandomBoard** (size_t maxTurns, Rng &rng)

4.1.1 Detailed Description

Contains functions for helping with debugging tasks.

4.2 freetype Namespace Reference

FreeType Headers.

Classes

- struct font_data

Functions

- int next_p2 (int a)
- void make_dlist (FT_Face face, char ch, GLuint list_base, GLuint *tex_base)

  Create a display list coresponding to the give character.
- void pushScreenCoordinateMatrix ()
- void pop_projection_matrix ()
- void print (const font_data &ft_font, float x, float y, const char *fmt,...)

4.2.1 Detailed Description

FreeType Headers. OpenGL Headers Some STL headers Using the STL exception library increases the chances that someone else using our code will corretly catch any exceptions that we throw. MSVC will spit out all sorts of useless warnings if you create vectors of strings, this pragma gets rid of them. Wrap everything in a namespace, that we can use common function names like "print" without worrying about overlapping with anyone else's code.

4.2.2 Function Documentation

4.2.2.1 int freetype::next_p2 (int *a*) [inline]

This function gets the first power of 2 >= the int that we pass it.

4.2.2.2 void freetype::pop_projection_matrix ( ) [inline]

Pops the projection matrix without changing the current MatrixMode.

4.2.2.3 void freetype::print (const font_data & *ft_font,* float *x,* float *y,* const char * *fmt,* ...)

Much like Nehe's glPrint function, but modified to work with freetype fonts.

The flagship function of the library - this thing will print out text at window coordinates x,y, using the font ft_font. The current modelview matrix will also be applied to the text.

4.2.2.4 void freetype::pushScreenCoordinateMatrix ( ) [inline]

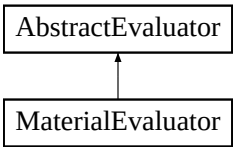
A fairly straight forward function that pushes a projection matrix that will make object world coordinates identical to window coordinates.

Chapter 5

Class Documentation

5.1 AbstractEvaluator Class Reference

Inheritance diagram for AbstractEvaluator:



Public Member Functions

- virtual Score **getScore** (const GameState &gameState) const =0

The documentation for this class was generated from the following file:

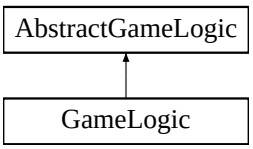
- S:/dev/3dchess/src/logic/interface/AbstractEvaluator.h

5.2 AbstractGameLogic Class Reference

Interface for chess game logic implementations.

`#include <AbstractGameLogic.h>`

Inheritance diagram for AbstractGameLogic:



Public Member Functions

- virtual AbstractPlayerPtr **getWhitePlayer** () const =0
- virtual AbstractPlayerPtr **getBlackPlayer** () const =0
- virtual void addObserver (AbstractGameObserverPtr observer)=0

Registers an observer for game events.

- virtual bool isGameOver () const =0
- virtual PlayerColor getWinner () const =0
- virtual GameConfigurationPtr getConfiguration () const =0
- virtual void start ()

  Starts the game logic thread.
- virtual void join ()

  Will block until the logic thread terminated. Be sure to call stop first to initiate logic thread shutdown.
- virtual void stop ()=0

  Initiates a shutdown of the game logic.

Protected Member Functions

- virtual void run ()=0

  Actual game logic function. Called by start function on the game logic thread to run the actual logic.

Protected Attributes

- std::thread m_thread

  Game logic thread.

5.2.1 Detailed Description

Interface for chess game logic implementations.

5.2.2 Member Function Documentation

5.2.2.1 virtual void AbstractGameLogic::addObserver (AbstractGameObserverPtr *observer*) [pure virtual]

Registers an observer for game events.

See Also

AbstractGameObserver for the available events.

Parameters

observer	Observer to register.

Implemented in GameLogic.

5.2.2.2 virtual GameConfigurationPtr AbstractGameLogic::getConfiguration ( ) const [pure virtual]

Returns

GameConfiguration currently used.

Implemented in GameLogic.

5.2.2.3 virtual PlayerColor AbstractGameLogic::getWinner ( ) const [pure virtual]

Returns

If isGameOver returns the winner of the game.

Implemented in GameLogic.

5.2.2.4 virtual bool AbstractGameLogic::isGameOver ( ) const [pure virtual]

Returns

true if game has ended.

Implemented in GameLogic.

5.2.2.5 virtual void AbstractGameLogic::start ( ) [inline], [virtual]

Starts the game logic thread.

See Also

run

The documentation for this class was generated from the following file:

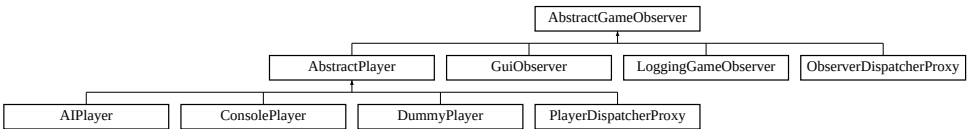
- S:/dev/3dchess/src/logic/interface/AbstractGameLogic.h

5.3 AbstractGameObserver Class Reference

Allows to observe relevant GameEvents inside the GameLogic. Classes of this type can be registered with the GameLogic to be notified of relevant game events.

`#include <AbstractGameObserver.h>`

Inheritance diagram for AbstractGameObserver:



Public Member Functions

- virtual void onGameStart (GameState state, GameConfiguration config)

  Called when the game starts.
- virtual void onTurnStart (PlayerColor who)

  Called if a player is asked to perform a turn.
- virtual void onTurnEnd (PlayerColor who, Turn turn, GameState newState)

  Called if a player ended its turn.
- virtual void onTurnTimeout (PlayerColor who, std::chrono::seconds timeout)

  Called if a players turn is aborted due to timeout.
- virtual void onGameOver (GameState state, PlayerColor winner)

  Called when a game started with onGameStart is over.

5.3.1 Detailed Description

Allows to observe relevant GameEvents inside the GameLogic. Classes of this type can be registered with the GameLogic to be notified of relevant game events.

Note

A Observer is only required to stay in a valid state for one game. It is free to halt its operations after the end of the game.

Warning

None of the functions in the class must block.

5.3.2 Member Function Documentation

5.3.2.1 virtual void AbstractGameObserver::onGameOver (GameState *state,* PlayerColor *winner*) [inline], [virtual]

Called when a game started with onGameStart is over.

Parameters

state	State on game over.
winner	Winner of the game.

Reimplemented in PlayerDispatcherProxy, GuiObserver, ObserverDispatcherProxy, AIPlayer, ConsolePlayer, and LoggingGameObserver.

5.3.2.2 virtual void AbstractGameObserver::onGameStart (GameState *state,* GameConfiguration *config*) [inline], [virtual]

Called when the game starts.

Parameters

state	GameState on game start.
config	Valid GameConfiguration for this game.

Reimplemented in PlayerDispatcherProxy, GuiObserver, AIPlayer, ObserverDispatcherProxy, ConsolePlayer, and LoggingGameObserver.

5.3.2.3 virtual void AbstractGameObserver::onTurnEnd (PlayerColor *who,* Turn *turn,* GameState *newState*) [inline], [virtual]

Called if a player ended its turn.

Parameters

who	Color of the player doing the turn.
turn	Turn the player decided on.
newState	State after the player performed the turn.

Reimplemented in PlayerDispatcherProxy, GuiObserver, ObserverDispatcherProxy, ConsolePlayer, and LoggingGameObserver.

5.3.2.4 virtual void AbstractGameObserver::onTurnStart (PlayerColor *who*) [inline], [virtual]

Called if a player is asked to perform a turn.

Parameters

who	Color of the player doing the turn.

Reimplemented in PlayerDispatcherProxy, GuiObserver, ObserverDispatcherProxy, and LoggingGameObserver.

5.3.2.5 virtual void AbstractGameObserver::onTurnTimeout (PlayerColor *who,* std::chrono::seconds *timeout*) [inline], [virtual]

Called if a players turn is aborted due to timeout.

Parameters

who	Color of the player who got interrupted.
timeout	Length of the time limit that got violated.

Reimplemented in PlayerDispatcherProxy, GuiObserver, ObserverDispatcherProxy, and LoggingGameObserver.

The documentation for this class was generated from the following file:

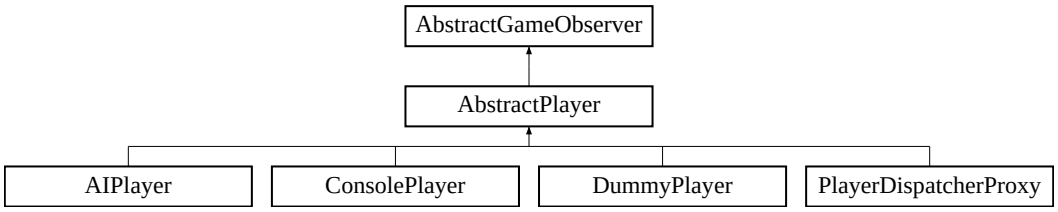
- S:/dev/3dchess/src/logic/interface/AbstractGameObserver.h

5.4 AbstractPlayer Class Reference

Class a player has to implement to interact with the GameLogic. Every player is also a AbstractGameObserver which is notified of relevant game events. You do not need to register the player as an observer for this to happen.

`#include <AbstractPlayer.h>`

Inheritance diagram for AbstractPlayer:



Public Member Functions

- virtual void onSetColor (PlayerColor color)=0

  Notifies that player what color he will be playing. Called before onGameStart.
- virtual std::future< Turn > doMakeTurn (GameState state)=0

  Asks the player to make his turn.
- virtual void doAbortTurn ()=0

  Asks the player to abort a turn asked for with doMakeTurn. When this is called the GameLogic will no longer react to the completion of the future for that turn. A use of this function is the abortion of a turn due to timeout.

5.4.1 Detailed Description

Class a player has to implement to interact with the GameLogic. Every player is also a AbstractGameObserver which is notified of relevant game events. You do not need to register the player as an observer for this to happen.

Note

A Observer is only required to stay in a valid state for one game. It is free to halt its operations after the end of the game.

Warning

None of the functions in the class must block.

5.4.2 Member Function Documentation

5.4.2.1 virtual std::future<Turn> AbstractPlayer::doMakeTurn (GameState *state*) [pure virtual]

Asks the player to make his turn.

Warning

This function must not block. It is to return immediatly. The players turn is to be set on the returned future.

Note

The game logic can abort its request for a player to make his turn using the doAbortTurn function at any time.

Parameters

state	Current state of the game.

Returns

A future to the turn to make.

Implemented in DummyPlayer, PlayerDispatcherProxy, AIPlayer, and ConsolePlayer.

5.4.2.2 virtual void AbstractPlayer::onSetColor (PlayerColor *color*) [pure virtual]

Notifies that player what color he will be playing. Called before onGameStart.

Parameters

color	Color the player has.

Implemented in DummyPlayer, AIPlayer, PlayerDispatcherProxy, and ConsolePlayer.

The documentation for this class was generated from the following file:

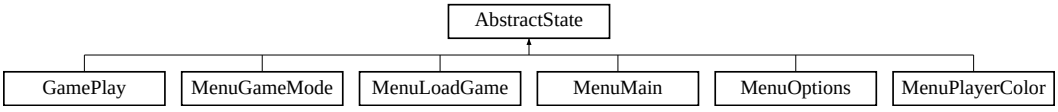
- S:/dev/3dchess/src/logic/interface/AbstractPlayer.h

5.5 AbstractState Class Reference

Interface for modelling a game state.

`#include <AbstractState.h>`

Inheritance diagram for AbstractState:



Public Member Functions

- virtual void enter ()=0

  Enters the state for the first time. This will setup all the state related stuff.
- virtual AbstractState * run ()=0

  Runs the current state and does all the work.
- virtual void exit ()=0

  Exits the current state and cleans up all allocated resources.
- virtual void draw ()=0

  Draws something state related stuff on the screen.

5.5.1 Detailed Description

Interface for modelling a game state.

Note

To run() a state, first enter() the state.

5.5.2 Member Function Documentation

5.5.2.1 virtual void AbstractState::enter ( ) [pure virtual]

Enters the state for the first time. This will setup all the state related stuff.

Note

To run() the current state, first enter() it.

Implemented in GamePlay, MenuGameMode, MenuLoadGame, MenuOptions, MenuMain, and MenuPlayerColor.

5.5.2.2 virtual void AbstractState::exit ( ) [pure virtual]

Exits the current state and cleans up all allocated resources.

Note

This is the last method to call, before the object is deleted.

Implemented in GamePlay, MenuGameMode, MenuLoadGame, MenuOptions, MenuMain, and MenuPlayerColor.

5.5.2.3 virtual AbstractState* AbstractState::run ( ) [pure virtual]

Runs the current state and does all the work.

Returns

AbstractState* the state which should be run after this state. A nullptr if the game should be exited.

Implemented in GamePlay, MenuGameMode, MenuLoadGame, MenuOptions, MenuMain, and MenuPlayerColor.

The documentation for this class was generated from the following file:

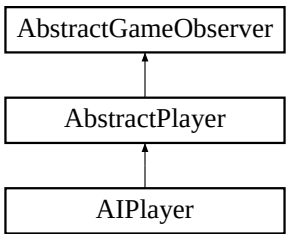
- S:/dev/3dchess/src/gui/interface/AbstractState.h

5.6 AIPlayer Class Reference

Artificial intelligence player implementation.

`#include <AIPlayer.h>`

Inheritance diagram for AIPlayer:



Public Types

- enum States { **PREPARATION**, **PONDERING**, **PLAYING**, **STOPPED** }

  States for AIPlayer.

Public Member Functions

- AIPlayer ()

  Creates a new AIPlayer.
- void start ()

  Starts the AIPlayer thread.
- virtual void onSetColor (PlayerColor color) override

  Notifies that player what color he will be playing. Called before onGameStart.
- virtual void onGameStart (GameState state, GameConfiguration config) override

  Called when the game starts.
- virtual std::future< Turn > doMakeTurn (GameState state) override

  Asks the player to make his turn.
- virtual void doAbortTurn () override

  Asks the player to abort a turn asked for with doMakeTurn. When this is called the GameLogic will no longer react to the completion of the future for that turn. A use of this function is the abortion of a turn due to timeout.
- virtual void onGameOver (GameState, PlayerColor) override

  Called when a game started with onGameStart is over.
- States getState () const

5.6.1 Detailed Description

Artificial intelligence player implementation.

5.6.2 Constructor & Destructor Documentation

5.6.2.1 AIPlayer::AIPlayer ( )

Creates a new AIPlayer.

Note

Don't forget to start() it.

5.6.3 Member Function Documentation

5.6.3.1 future< Turn > AIPlayer::doMakeTurn (GameState *state*) [override], [virtual]

Asks the player to make his turn.

Warning

This function must not block. It is to return immediatly. The players turn is to be set on the returned future.

Note

The game logic can abort its request for a player to make his turn using the doAbortTurn function at any time.

Parameters

state	Current state of the game.

Returns

A future to the turn to make.

Implements AbstractPlayer.

5.6.3.2 AIPlayer::States AIPlayer::getState ( ) const

Returns

Return current state.

5.6.3.3 void AIPlayer::onGameOver (GameState *state*, PlayerColor *winner*) [override], [virtual]

Called when a game started with onGameStart is over.

Parameters

state	State on game over.
winner	Winner of the game.

Reimplemented from AbstractGameObserver.

5.6.3.4 void AIPlayer::onGameStart (GameState *state*, GameConfiguration *config*) [override], [virtual]

Called when the game starts.

Parameters

state	GameState on game start.
config	Valid GameConfiguration for this game.

Reimplemented from AbstractGameObserver.

5.6.3.5 void AIPlayer::onSetColor (PlayerColor *color*) [override], [virtual]

Notifies that player what color he will be playing. Called before onGameStart.

Parameters

color	Color the player has.

Implements AbstractPlayer.

The documentation for this class was generated from the following files:

- S:/dev/3dchess/src/ai/AIPlayer.h
- S:/dev/3dchess/src/ai/AIPlayer.cpp

5.7 AnimationHelper Class Reference

`#include <AnimationHelper.h>`

Public Types

- enum FunctionType { EASE_LINEAR, EASE_OUTSINE }

  The possible time function types.

Public Member Functions

- AnimationHelper (const int duration)

  Creates a new AnimationHelper object.
- void setStartNowOrKeepIt ()

  Sets the current time as start point for the animation. If this method is called multiple times, only the first call will take effect.
- void reset ()

  Resets the start time stamp to the current time.
- float ease (FunctionType type, const float lowerBound, const float upperBound)

  The percentage of the range between the lowerBound and upperBound.
- bool hasStopped ()

  Gets the status of the animation.

5.7.1 Detailed Description

The class helps to create animations by providing time dependent methods.

5.7.2 Member Enumeration Documentation

5.7.2.1 enum AnimationHelper::FunctionType

The possible time function types.

Enumerator

EASE_LINEAR Linear.

EASE_OUTSINE Sinus like curve.

5.7.3 Constructor & Destructor Documentation

5.7.3.1 AnimationHelper::AnimationHelper (const int *duration*)

Creates a new AnimationHelper object.

Parameters

duration	The period how long the animation should took.

5.7.4 Member Function Documentation

5.7.4.1 float AnimationHelper::ease (FunctionType *type*, const float *lowerBound*, const float *upperBound*)

The percentage of the range between the lowerBound and upperBound.

Note

The lowerBound must be less than upperBound.

Parameters

type	One of the FunctionType as defined above.
lowerBound	The lower bound of the range.
upperBound	The upper bound of the range.

Returns

The numeric value in percent. This will show the completeness of the animation in percent between 0.0 and 1.0;

5.7.4.2 bool AnimationHelper::hasStopped ( )

Gets the status of the animation.

Returns

True if the animation was started and has already finished. False if not.

The documentation for this class was generated from the following files:

- S:/dev/3dchess/src/gui/AnimationHelper.h
- S:/dev/3dchess/src/gui/AnimationHelper.cpp

5.8 AssimpHelper Class Reference

`#include <AssimpHelper.h>`

Public Member Functions

- void importScene (std::string filename)

  Imports the scene by filename.
- void drawScene ()

  Draws the scene.

5.8.1 Detailed Description

Assimp wrapper class to handle scene modeling in an more comfortable way.

5.8.2 Member Function Documentation

5.8.2.1 void AssimpHelper::importScene (std::string *filename*)

Imports the scene by filename.

Parameters

filename	The filename of the scene to import.

The documentation for this class was generated from the following files:

- S:/dev/3dchess/src/gui/AssimpHelper.h
- S:/dev/3dchess/src/gui/AssimpHelper.cpp

5.9 ChessBoard Class Reference

Public Member Functions

- **ChessBoard** (std::array< Piece, 64 > board, PlayerColor nextPlayer=White)
- void **applyTurn** (const Turn &t)
- std::array< Piece, 64 > **getBoard** () const
- std::vector< Piece > **getCapturedPieces** () const
- bool hasBlackPieces () const

  Returns true if black pieces are on the board.
- bool hasWhitePieces () const

  Returns true if white pieces are on the board.
- PlayerColor getNextPlayer () const

  Return next player to make a turn.
- Score getScore (PlayerColor color) const

  Returns the current estimated score according to the internal estimator.
- bool **operator==** (const ChessBoard &other) const
- bool **operator!=** (const ChessBoard &other) const
- std::string **toString** () const
- File getEnPassantFile () const

  Returns the file where en-passant rights exist. NoFile if none.
- std::array< bool, NUM_PLAYERS > getShortCastleRights () const

  Returns short castle rights for players.
- std::array< bool, NUM_PLAYERS > getLongCastleRights () const

  Returns long castle rights for players.

Protected Attributes

- std::array< std::array
  < BitBoard, NUM_PIECETYPES+1 >
  , NUM_PLAYERS > **bb**
- std::array< bool, NUM_PLAYERS > shortCastleRight

  Short castle rights for players.
- std::array< bool, NUM_PLAYERS > longCastleRight

  Long castle rights for players.
- uint8_t enPassantRightForFiles

  Bitmask for enemy en passant rights for a file next turn.
- PlayerColor nextPlayer

  Player doing the next turn.

Friends

- class **TurnGenerator**

The documentation for this class was generated from the following files:

- S:/dev/3dchess/src/logic/ChessBoard.h
- S:/dev/3dchess/src/logic/ChessBoard.cpp

5.10 ChessSet Class Reference

The ChessSet holds all the figures together with the board needed for the chess game.

`#include <ChessSet.h>`

Public Member Functions

- void setState (std::array< Piece, 64 > state, PlayerColor lastPlayer, Turn lastTurn)
  Sets the new chess state.
- int getResourcesCount ()
  Returns the number of big resources which must be loaded for initializing the ChessSet.
- void registerLoadCallback (const boost::function< void(std::string)> &callback)
  Registers a function as callback.
- void loadResources ()
  Loads all resources, builds the models and the chess board.
- void draw ()
  Draws the whole ChessSet. This includes all models and the chess board. Depending in the current state.

5.10.1 Detailed Description

The ChessSet holds all the figures together with the board needed for the chess game.

5.10.2 Member Function Documentation

5.10.2.1 int ChessSet::getResourcesCount ( )

Returns the number of big resources which must be loaded for initializing the ChessSet.

Note

This can be used for a progress bar.

Returns

The number of big resources.

5.10.2.2 void ChessSet::loadResources ( )

Loads all resources, builds the models and the chess board.

Note

If you've registered a function as callback, you will be informed on each resource which is loaded.

5.10.2.3 void ChessSet::registerLoadCallback (const boost::function< void(std::string)> & *callback*)

Registers a function as callback.

Parameters

callback	The function which will be called when a resource was successfully loaded.

5.10.2.4 void ChessSet::setState (std::array< Piece, 64 > *state*, PlayerColor *lastPlayer*, Turn *lastTurn*)

Sets the new chess state.

Note

You need to call this only, when there's a visible change like moving a figure from field A to field B.

Parameters

state	The state of the current board. Only the given pieces on the fields will be drawn.

The documentation for this class was generated from the following files:

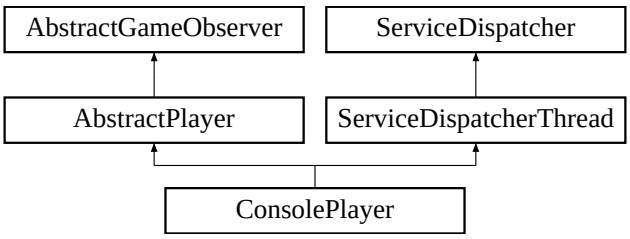
- S:/dev/3dchess/src/gui/ChessSet.h
- S:/dev/3dchess/src/gui/ChessSet.cpp

5.11 ConsolePlayer Class Reference

Class which takes human player interaction from a console.

`#include <ConsolePlayer.h>`

Inheritance diagram for ConsolePlayer:



Public Member Functions

- virtual void onSetColor (PlayerColor color) override

  Notifies that player what color he will be playing. Called before onGameStart.
- virtual void onGameStart (GameState state, GameConfiguration config) override

  Called when the game starts.
- virtual std::future< Turn > doMakeTurn (GameState state) override

  Asks the player to make his turn.
- virtual void onTurnEnd (PlayerColor color, Turn turn, GameState newState) override

  Called if a player ended its turn.
- virtual void doAbortTurn () override

  Asks the player to abort a turn asked for with doMakeTurn. When this is called the GameLogic will no longer react to the completion of the future for that turn. A use of this function is the abortion of a turn due to timeout.
- virtual void onGameOver (GameState state, PlayerColor winner) override

  Called when a game started with onGameStart is over.

Additional Inherited Members

5.11.1 Detailed Description

Class which takes human player interaction from a console.

Warning

Has serious issues on turn timeout due to blocking console reads.

5.11.2 Member Function Documentation

5.11.2.1 future< Turn > ConsolePlayer::doMakeTurn (GameState *state*) [override], [virtual]

Asks the player to make his turn.

Warning

This function must not block. It is to return immediatly. The players turn is to be set on the returned future.

Note

The game logic can abort its request for a player to make his turn using the doAbortTurn function at any time.

Parameters

state	Current state of the game.

Returns

A future to the turn to make.

Implements AbstractPlayer.

5.11.2.2 void ConsolePlayer::onGameOver (GameState *state*, PlayerColor *winner*) [override], [virtual]

Called when a game started with onGameStart is over.

Parameters

state	State on game over.
winner	Winner of the game.

Reimplemented from AbstractGameObserver.

5.11.2.3 void ConsolePlayer::onGameStart (GameState *state*, GameConfiguration *config*) [override], [virtual]

Called when the game starts.

Parameters

state	GameState on game start.

config	Valid GameConfiguration for this game.

Reimplemented from AbstractGameObserver.

5.11.2.4 void ConsolePlayer::onSetColor (PlayerColor *color*) [override], [virtual]

Notifies that player what color he will be playing. Called before onGameStart.

Parameters

color	Color the player has.

Implements AbstractPlayer.

5.11.2.5 void ConsolePlayer::onTurnEnd (PlayerColor *who*, Turn *turn*, GameState *newState*) [override], [virtual]

Called if a player ended its turn.

Parameters

who	Color of the player doing the turn.
turn	Turn the player decided on.
newState	State after the player performed the turn.

Reimplemented from AbstractGameObserver.

The documentation for this class was generated from the following files:

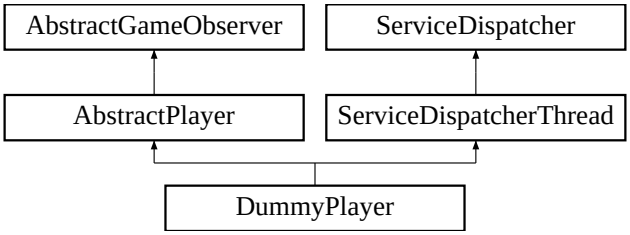
- S:/dev/3dchess/src/misc/ConsolePlayer.h
- S:/dev/3dchess/src/misc/ConsolePlayer.cpp

5.12 DummyPlayer Class Reference

Player implementation which takes random turns after random amounts of time.

`#include <DummyPlayer.h>`

Inheritance diagram for DummyPlayer:



Public Member Functions

- virtual void onSetColor (PlayerColor color) override

  Notifies that player what color he will be playing. Called before onGameStart.
- virtual void doAbortTurn () override

  Asks the player to abort a turn asked for with doMakeTurn. When this is called the GameLogic will no longer react to the completion of the future for that turn. A use of this function is the abortion of a turn due to timeout.
- virtual std::future< Turn > doMakeTurn (GameState state) override

  Asks the player to make his turn.

Additional Inherited Members

5.12.1 Detailed Description

Player implementation which takes random turns after random amounts of time.

Warning

Does not react to doAbortTurn events.

5.12.2 Member Function Documentation

5.12.2.1 virtual std::future<Turn> DummyPlayer::doMakeTurn (GameState *state*) [inline], [override], [virtual]

Asks the player to make his turn.

Warning

This function must not block. It is to return immediatly. The players turn is to be set on the returned future.

Note

The game logic can abort its request for a player to make his turn using the doAbortTurn function at any time.

Parameters

state	Current state of the game.

Returns

A future to the turn to make.

Implements AbstractPlayer.

5.12.2.2 virtual void DummyPlayer::onSetColor (PlayerColor *color*) [inline], [override], [virtual]

Notifies that player what color he will be playing. Called before onGameStart.

Parameters

color	Color the player has.

Implements AbstractPlayer.

The documentation for this class was generated from the following file:

- S:/dev/3dchess/src/misc/DummyPlayer.h

5.13 StateMachine::EventMap Struct Reference

Structure for holding user events.

`#include <StateMachine.h>`

Public Attributes

- bool **mouseMoved** = false
- int **mouseX** = 0
- int **mouseY** = 0
- bool **mouseDown** = false
- bool **mouseUp** = false
- bool **keyLeft** = false
- bool **keyRight** = false
- bool **keyDown** = false
- bool **keyUp** = false
- bool **keyEscape** = false
- bool **key0** = false
- bool **key1** = false
- bool **keyA** = false
- bool **keyY** = false

5.13.1 Detailed Description

Structure for holding user events.

The documentation for this struct was generated from the following file:

- S:/dev/3dchess/src/gui/StateMachine.h

5.14 freetype::font_data Struct Reference

`#include <FreeType.h>`

Public Member Functions

- void **init** (const char *fname, unsigned int h)
- void **clean** ()

Public Attributes

- float h

  Holds the height of the font.
- GLuint * textures

  Holds the texture id's.
- GLuint list_base

  Holds the first display list id.

5.14.1 Detailed Description

This holds all of the information related to any freetype font that we want to create.

The documentation for this struct was generated from the following files:

- S:/dev/3dchess/src/gui/FreeType.h
- S:/dev/3dchess/src/gui/FreeType.cpp

5.15 GameConfiguration Struct Reference

Class for holding game configuration parameters.

`#include <GameConfiguration.h>`

Public Member Functions

- bool save (const std::string &path) const

  Saves this configuration to the given path.
- bool **operator==** (const GameConfiguration &other) const
- std::string **toString** () const

Static Public Member Functions

- static boost::optional < GameConfiguration > load (const std::string &path)

  Loads a game configuration from disk.
- static bool save (const GameConfiguration &config, const std::string &path)

  Saves a given game configuration to a file.

Public Attributes

- int timeBetweenTurnsInSeconds

  Minimum time between turns for display purposes.
- int maximumTurnTimeInSeconds

  Maximum time between turns after which to time out a move.

Friends

- class **boost::serialization::access**

5.15.1 Detailed Description

Class for holding game configuration parameters.

Note

Can be stored and read from disc using save/load.

5.15.2 Member Function Documentation

5.15.2.1 boost::optional< GameConfiguration > GameConfiguration::load (const std::string & *path*) [static]

Loads a game configuration from disk.

Parameters

path	Path to file.

Returns

GameConfiguration on success. boost::none on failure.

5.15.2.2 bool GameConfiguration::save (const GameConfiguration & *config,* const std::string & *path*) [static]

Saves a given game configuration to a file.

Parameters

config	Configuration to save.
path	Path to save configuration to.

Returns

True on success.

5.15.2.3 bool GameConfiguration::save (const std::string & *path*) const

Saves this configuration to the given path.

Parameters

path	Path to file to save to.

Returns

True on success.

The documentation for this struct was generated from the following files:

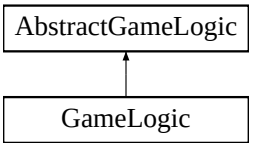
- S:/dev/3dchess/src/core/GameConfiguration.h
- S:/dev/3dchess/src/core/GameConfiguration.cpp

5.16 GameLogic Class Reference

GameLogic implementation for a game of chess with observers.

`#include <GameLogic.h>`

Inheritance diagram for GameLogic:



Public Member Functions

- GameLogic (AbstractPlayerPtr white, AbstractPlayerPtr black, GameConfigurationPtr config)

  Sets up a GameLogic object for one chess game.
- virtual AbstractPlayerPtr **getWhitePlayer** () const override
- virtual AbstractPlayerPtr **getBlackPlayer** () const override
- virtual void addObserver (AbstractGameObserverPtr observer) override

  Registers an observer for game events.
- virtual bool isGameOver () const override
- virtual PlayerColor getWinner () const override
- virtual GameConfigurationPtr getConfiguration () const override
- virtual void stop () override

  Initiates a shutdown of the game logic.

Additional Inherited Members

5.16.1 Detailed Description

GameLogic implementation for a game of chess with observers.

5.16.2 Constructor & Destructor Documentation

5.16.2.1 GameLogic::GameLogic (AbstractPlayerPtr *white*, AbstractPlayerPtr *black*, GameConfigurationPtr *config*)

Sets up a GameLogic object for one chess game.

Note

Don't forget to start operation by calling start.

Parameters

white	White player reference
black	Black player reference
config	Configuration for this game

5.16.3 Member Function Documentation

5.16.3.1 void GameLogic::addObserver (AbstractGameObserverPtr *observer*) [override], [virtual]

Registers an observer for game events.

See Also

AbstractGameObserver for the available events.

Parameters

observer	Observer to register.

Implements AbstractGameLogic.

5.16.3.2 GameConfigurationPtr GameLogic::getConfiguration ( ) const [override], [virtual]

Returns

GameConfiguration currently used.

Implements AbstractGameLogic.

5.16.3.3 PlayerColor GameLogic::getWinner ( ) const [override], [virtual]

Returns

If isGameOver returns the winner of the game.

Implements AbstractGameLogic.

5.16.3.4 bool GameLogic::isGameOver ( ) const [override], [virtual]

Returns

true if game has ended.

Implements AbstractGameLogic.

The documentation for this class was generated from the following files:

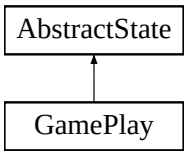
- S:/dev/3dchess/src/logic/GameLogic.h
- S:/dev/3dchess/src/logic/GameLogic.cpp

5.17 GamePlay Class Reference

Class which holds the state GamePlay. This state is the essential part of all states. The whole game play is hold in this state.

`#include <GamePlay.h>`

Inheritance diagram for GamePlay:



Public Types

- enum GameMode { **AI_VS_AI**, **PLAYER_VS_AI** }

  The possible game modes.

Public Member Functions

- GamePlay (GameMode mode, PlayerColor firstPlayerColor)

  Creates a new game.
- void enter () override

  Enters the state for the first time. This will setup all the state related stuff.
- AbstractState * run () override

  Runs the current state and does all the work.
- void exit () override

  Exits the current state and cleans up all allocated resources.
- void draw ()

  Draws something state related stuff on the screen.
- void **startShowText** (std::string text)
- void **switchToPlayerColor** (PlayerColor color)
- void setState (std::array< Piece, 64 > state, PlayerColor lastPlayer, Turn lastTurn)

  Method for setting the new chess state. This method is non-blocking.
- void **setState** (std::array< Piece, 64 > state)
- void setCapturedPiecesList (std::vector< Piece > piecesList)

  Method for setting the new turn, which changed the chess state.
- void **onBeforeLoadNextResource** (std::string resourceName)

- void **onResumeGame** ()
- void **onSaveGame** ()
- void **onLeaveGame** ()
- void **onBackToMenu** ()

5.17.1 Detailed Description

Class which holds the state GamePlay. This state is the essential part of all states. The whole game play is hold in this state.

Note

To run() a state, first enter() the state.

5.17.2 Constructor & Destructor Documentation

5.17.2.1 GamePlay::GamePlay (GameMode *mode*, PlayerColor *firstPlayerColor*)

Creates a new game.

Parameters

mode	The GameMode (*AI vs. AI* or *Player vs. AI*).
firstPlayerColor	The color of the player which takes the first turn.

5.17.3 Member Function Documentation

5.17.3.1 void GamePlay::enter ( ) [override], [virtual]

Enters the state for the first time. This will setup all the state related stuff.

Note

To run() the current state, first enter() it.

Implements AbstractState.

5.17.3.2 void GamePlay::exit ( ) [override], [virtual]

Exits the current state and cleans up all allocated resources.

Note

This is the last method to call, before the object is deleted.

Implements AbstractState.

5.17.3.3 AbstractState * GamePlay::run ( ) [override], [virtual]

Runs the current state and does all the work.

Returns

AbstractState* the state which should be run after this state. A nullptr if the game should be exited.

Implements AbstractState.

5.17.3.4 void GamePlay::setCapturedPiecesList (std::vector< Piece > *piecesList*)

Method for setting the new turn, which changed the chess state.

Note

Be sure to first call this and *after* call setState. This method is non-blocking.

The documentation for this class was generated from the following files:

- S:/dev/3dchess/src/gui/states/GamePlay.h
- S:/dev/3dchess/src/gui/states/GamePlay.cpp

5.18 GameState Class Reference

Public Member Functions

- **GameState** (const ChessBoard &chessBoard)
- virtual void **init** ()
- virtual std::vector< Turn > **getTurnList** () const
- virtual void **applyTurn** (const Turn &turn)
- virtual PlayerColor **getNextPlayer** () const
- virtual const ChessBoard & **getChessBoard** () const
- bool **isGameOver** () const
- PlayerColor **getWinner** () const
- Score getScore () const

  Returns current score estimate from next players POV.
- bool **operator==** (const GameState &other) const
- bool **operator!=** (const GameState &other) const
- std::string **toString** () const

The documentation for this class was generated from the following files:

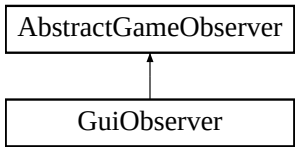
- S:/dev/3dchess/src/logic/GameState.h
- S:/dev/3dchess/src/logic/GameState.cpp

5.19 GuiObserver Class Reference

Allows to observe relevant GameEvents inside the GameLogic. Classes of this type can be registered with the GameLogic to be notified of relevant game events.

`#include <GuiObserver.h>`

Inheritance diagram for GuiObserver:



Public Member Functions

- GuiObserver (ChessSetPtr chessSetPtr, GamePlay &gamePlayState)
  Creates a new observer object.
- void onGameStart (GameState state, GameConfiguration config) override
  Called when the game starts.
- void onTurnStart (PlayerColor who) override
  Called if a player is asked to perform a turn.
- void onTurnEnd (PlayerColor who, Turn turn, GameState newState) override
  Called if a player ended its turn.
- void onTurnTimeout (PlayerColor who, std::chrono::seconds timeout) override
  Called if a players turn is aborted due to timeout.
- void onGameOver (GameState state, PlayerColor winner) override
  Called when a game started with onGameStart is over.

5.19.1 Detailed Description

Allows to observe relevant GameEvents inside the GameLogic. Classes of this type can be registered with the GameLogic to be notified of relevant game events.

Note

A Observer is only required to stay in a valid state for one game. It is free to halt its operations after the end of the game.

Warning

None of the functions in the class must block.

5.19.2 Constructor & Destructor Documentation

5.19.2.1 GuiObserver::GuiObserver (ChessSetPtr *chessSetPtr,* GamePlay & *gamePlayState*)

Creates a new observer object.

Parameters

chessSetPtr	A shared pointer to the ChessSet object.
gamePlayState	A reference to the GamePlay state.

5.19.3 Member Function Documentation

5.19.3.1 void GuiObserver::onGameOver (GameState *state,* PlayerColor *winner*) [override], [virtual]

Called when a game started with onGameStart is over.

Parameters

state	State on game over.
winner	Winner of the game.

Reimplemented from AbstractGameObserver.

5.19.3.2 void GuiObserver::onGameStart (GameState *state,* GameConfiguration *config*) [override], [virtual]

Called when the game starts.

Parameters

state	GameState on game start.
config	Valid GameConfiguration for this game.

Reimplemented from AbstractGameObserver.

5.19.3.3 void GuiObserver::onTurnEnd (PlayerColor *who*, Turn *turn*, GameState *newState*) [override], [virtual]

Called if a player ended its turn.

Parameters

who	Color of the player doing the turn.
turn	Turn the player decided on.
newState	State after the player performed the turn.

Reimplemented from AbstractGameObserver.

5.19.3.4 void GuiObserver::onTurnStart (PlayerColor *who*) [override], [virtual]

Called if a player is asked to perform a turn.

Parameters

who	Color of the player doing the turn.

Reimplemented from AbstractGameObserver.

5.19.3.5 void GuiObserver::onTurnTimeout (PlayerColor *who*, std::chrono::seconds *timeout*) [override], [virtual]

Called if a players turn is aborted due to timeout.

Parameters

who	Color of the player who got interrupted.
timeout	Length of the time limit that got violated.

Reimplemented from AbstractGameObserver.

The documentation for this class was generated from the following files:

- S:/dev/3dchess/src/gui/GuiObserver.h
- S:/dev/3dchess/src/gui/GuiObserver.cpp

5.20 GuiWindow Class Reference

`#include <GuiWindow.h>`

Public Types

- enum WindowMode { **FULLSCREEN**, **WINDOW** }

  Available window modes.
- enum fontSize { **HEADLINE** = 42, **SUB_HEADLINE** = 28, **TEXT** = 20, **TEXT_SMALL** = 15 }

  The available font sizes.

Public Member Functions

- GuiWindow (std::string title, bool fullscreen, int width, int height)

  Creates a new GUI window.
- void exec ()

  Inits the window and starts the execution loop.
- int getWidth ()

  Gets the width of the window.
- int getHeight ()

  Gets the height of the window.
- int getCameraDistanceToOrigin ()

  Gets the distance between the camera and the world coordinate origin.
- bool isFullscreen ()

  Checks if the window is currently in fullscreen mode.
- void set2DMode ()

  Set the model view matrix to draw 2D.
- void set3DMode ()

  Set the model view matrix to draw 3D.
- void swapFrameBufferNow ()

  The frame buffer will normally swapped at the end of the execution loop. If you want to swap it earlier, use this method to force a frame buffer swap immediately.
- void switchWindowMode (WindowMode mode)

  Switches the window mode to one of the available modes.
- void printHeadline (std::string text)

  Prints the headline text at the top left location.
- void printSubHeadline (std::string text)

  Prints the subheadline text at the top left location directly under the headline.
- void printTextCenter (float red, float green, float blue, std::string text)

  Prints text at the center of the window's viewport.
- void printText (int x, int y, float red, float green, float blue, std::string text)

  Prints text at the given position of the window's viewport with normal text size.
- void printTextSmall (int x, int y, float red, float green, float blue, std::string text)

  Prints text at the given position of the window's viewport with small text size.

Public Attributes

- float m_cX

  Camera position in world coordinates.
- float **m_cY**
- float **m_cZ**
- float m_cameraAngleX

  Camera angle in degree.
- float **m_cameraAngleY**
- float **m_cameraAngleZ**
- float m_fov

  field of view (is the extent of the observable world that is seen at any given moment)

5.20.1 Detailed Description

This class is a wrapper which holds the window with the OpenGL context. The GuiWindow will handle keyboard and mouse events and provides methods to switch OpenGL matrix modes and camera position. The window can also toggle between fullscreen and window mode.

5.20.2 Constructor & Destructor Documentation

5.20.2.1 GuiWindow::GuiWindow (std::string *title,* bool *fullscreen,* int *width,* int *height*)

Creates a new GUI window.

Parameters

title	The title/name of the window which is shown in the top window location.
fullscreen	True to start in fullscreen, false to start in window mode.
width	The width of the window.
height	The height of the window.

5.20.3 Member Function Documentation

5.20.3.1 int GuiWindow::getCameraDistanceToOrigin ( )

Gets the distance between the camera and the world coordinate origin.

Returns

The distance between camera and world origin.

5.20.3.2 int GuiWindow::getHeight ( )

Gets the height of the window.

Returns

The height of the window.

5.20.3.3 int GuiWindow::getWidth ( )

Gets the width of the window.

Returns

The width of the window.

5.20.3.4 bool GuiWindow::isFullscreen ( )

Checks if the window is currently in fullscreen mode.

Returns

True if the window is in fullscreen mode, false if not.

5.20.3.5 void GuiWindow::printHeadline (std::string *text*)

Prints the headline text at the top left location.

Parameters

text	The text to draw.

5.20.3.6 void GuiWindow::printSubHeadline (std::string *text*)

Prints the subheadline text at the top left location directly under the headline.

Parameters

text	The text to draw.

5.20.3.7 void GuiWindow::printText (int *x,* int *y,* float *red,* float *green,* float *blue,* std::string *text*)

Prints text at the given position of the window's viewport with normal text size.

Parameters

x	The x location in the viewport.
y	The y location in the viewport.
red	The red amount of color between 0.0 and 1.0
green	The green amount of color between 0.0 and 1.0
blue	The blue amount of color between 0.0 and 1.0
text	The text to draw.

Note

The origin of the viewport is the upper left corner.

5.20.3.8 void GuiWindow::printTextCenter (float *red,* float *green,* float *blue,* std::string *text*)

Prints text at the center of the window's viewport.

Parameters

red	The red amount of color between 0.0 and 1.0
green	The green amount of color between 0.0 and 1.0
blue	The blue amount of color between 0.0 and 1.0
text	The text to draw.

5.20.3.9 void GuiWindow::printTextSmall (int *x,* int *y,* float *red,* float *green,* float *blue,* std::string *text*)

Prints text at the given position of the window's viewport with small text size.

Parameters

x	The x location in the viewport.
y	The y location in the viewport.
red	The red amount of color between 0.0 and 1.0
green	The green amount of color between 0.0 and 1.0
blue	The blue amount of color between 0.0 and 1.0

text	The text to draw.

Note

The origin of the viewport is the upper left corner.

5.20.3.10 void GuiWindow::switchWindowMode (WindowMode *mode*)

Switches the window mode to one of the available modes.

Parameters

mode	A window mode, see above.

The documentation for this class was generated from the following files:

- S:/dev/3dchess/src/gui/GuiWindow.h
- S:/dev/3dchess/src/gui/GuiWindow.cpp

5.21 has_toString< T > Struct Template Reference

Public Types

- enum { **value** = std::is_same<decltype(test<T>(0)), yes>::value }

The documentation for this struct was generated from the following file:

- S:/dev/3dchess/src/misc/helper.h

5.22 IncrementalBoardEvaluator Class Reference

Class for incrementally estimating game state.

`#include <Evaluators.h>`

Public Member Functions

- IncrementalBoardEvaluator ()
  Initializes the evaluator for a prestine board.
- IncrementalBoardEvaluator (const std::array< Piece, 64 > &board)
  Initializes the evaluator for an already played board.
- void moveIncrement (const Turn &turn)
  Updates estimate for the moving of the piece in give turn.
- void captureIncrement (Field field, const Piece &piece)
  Updates estimate for a capture of the given piece on the given field.
- Score getScore (PlayerColor color) const
  Returns the score from the perspective of the given player color.
- bool **operator==** (const IncrementalBoardEvaluator &other) const

Static Public Member Functions

- static Score estimateFullBoard (const std::array< Piece, 64 > &board)
  Gives a full estimate for the given board.

5.22.1 Detailed Description

Class for incrementally estimating game state.

The documentation for this class was generated from the following files:

- S:/dev/3dchess/src/logic/Evaluators.h
- S:/dev/3dchess/src/logic/Evaluators.cpp

5.23 IncrementalZobristHasher< THASH, SEED > Class Template Reference

Zobrist-Hash implementation. Uses mt19937 to initialize from a fixed seed 452134.

`#include <IncrementalZobristHasher.h>`

5.23.1 Detailed Description

template<typename THASH, uint64_t SEED = 46170>class IncrementalZobristHasher< THASH, SEED >

Zobrist-Hash implementation. Uses mt19937 to initialize from a fixed seed 452134.

The documentation for this class was generated from the following files:

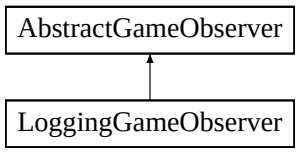
- S:/dev/3dchess/src/logic/IncrementalZobristHasher.h
- S:/dev/3dchess/src/logic/IncrementalZobristHasher.cpp

5.24 LoggingGameObserver Class Reference

AbstractGameObserver which simply logs occuring events.

`#include <LoggingGameObserver.h>`

Inheritance diagram for LoggingGameObserver:



Public Member Functions

- void onGameStart (GameState state, GameConfiguration config) override

  Called when the game starts.
- void onTurnStart (PlayerColor who) override

  Called if a player is asked to perform a turn.
- void onTurnEnd (PlayerColor who, Turn turn, GameState newState) override

  Called if a player ended its turn.
- void onTurnTimeout (PlayerColor who, std::chrono::seconds timeout) override

  Called if a players turn is aborted due to timeout.
- void onGameOver (GameState state, PlayerColor winner) override

  Called when a game started with onGameStart is over.

5.24.1 Detailed Description

AbstractGameObserver which simply logs occuring events.

5.24.2 Member Function Documentation

5.24.2.1 void LoggingGameObserver::onGameOver (GameState *state*, PlayerColor *winner*) [override], [virtual]

Called when a game started with onGameStart is over.

Parameters

state	State on game over.
winner	Winner of the game.

Reimplemented from AbstractGameObserver.

5.24.2.2 void LoggingGameObserver::onGameStart (GameState *state*, GameConfiguration *config*) [override], [virtual]

Called when the game starts.

Parameters

state	GameState on game start.
config	Valid GameConfiguration for this game.

Reimplemented from AbstractGameObserver.

5.24.2.3 void LoggingGameObserver::onTurnEnd (PlayerColor *who*, Turn *turn*, GameState *newState*) [override], [virtual]

Called if a player ended its turn.

Parameters

who	Color of the player doing the turn.
turn	Turn the player decided on.
newState	State after the player performed the turn.

Reimplemented from AbstractGameObserver.

5.24.2.4 void LoggingGameObserver::onTurnStart (PlayerColor *who*) [override], [virtual]

Called if a player is asked to perform a turn.

Parameters

who	Color of the player doing the turn.

Reimplemented from AbstractGameObserver.

5.24.2.5 void LoggingGameObserver::onTurnTimeout (PlayerColor *who*, std::chrono::seconds *timeout*) [override], [virtual]

Called if a players turn is aborted due to timeout.

Parameters

who	Color of the player who got interrupted.
timeout	Length of the time limit that got violated.

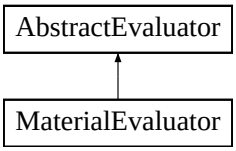
Reimplemented from AbstractGameObserver.

The documentation for this class was generated from the following files:

- S:/dev/3dchess/src/misc/LoggingGameObserver.h
- S:/dev/3dchess/src/misc/LoggingGameObserver.cpp

5.25 MaterialEvaluator Class Reference

Inheritance diagram for MaterialEvaluator:



Public Member Functions

- virtual Score **getScore** (const GameState &gameState) const override
- virtual Score **getMaterialWorth** (PlayerColor player, const ChessBoard &board) const

The documentation for this class was generated from the following files:

- S:/dev/3dchess/src/logic/Evaluators.h
- S:/dev/3dchess/src/logic/Evaluators.cpp

5.26 Menu2D Class Reference

Public Member Functions

- **Menu2D** (int windowWidth, int windowHeight)
- Menu2DItemPtr **addButton** (std::string filename)
- void **draw** ()
- void **mouseMoved** (const int x, const int y)
- void **mousePressed** ()
- void **mouseReleased** ()
- void **windowResized** (int newWidth, int newHeight)
- void **resetAnimation** ()

The documentation for this class was generated from the following files:

- S:/dev/3dchess/src/gui/Menu2D.h
- S:/dev/3dchess/src/gui/Menu2D.cpp

5.27 Menu2DItem Class Reference

This class describes a button of a menu. The button is a rectangle with textures depending on one of three states (normal, hover, active). The buttons can be used with the mouse cursor.

`#include <Menu2DItem.h>`

Public Member Functions

- Menu2DItem (std::string filename, int width, int height)

  Creates a new menu button item.
- void setPosition (int x, int y)

  Sets the buttons position in viewport coordinates.
- void draw ()

  Draws the button on the previously set position. This method will also consider the button state.
- void mouseMoved (int x, int y)

  Updates the mouse's pointer/cursor position.
- void mousePressed (int x, int y)

  Sets the coordinates, where the mouse clicked in the viewport.
- void mouseReleased (int x, int y)

  Sets the coordinates, where the mouse click was released in the viewport.
- void onClick (const boost::function< void()> &slot)

  Add a function or method which should be called via boost signals when the button is clicked. So the given method can do something.
- void unClick ()

  Remove all click signals.

5.27.1 Detailed Description

This class describes a button of a menu. The button is a rectangle with textures depending on one of three states (normal, hover, active). The buttons can be used with the mouse cursor.

5.27.2 Constructor & Destructor Documentation

5.27.2.1 Menu2DItem::Menu2DItem (std::string *filename,* int *width,* int *height*)

Creates a new menu button item.

Parameters

filename	The filename relative to the executable located in resources/bt_n<filename>.
width	The width of the button.
height	The height of the button.

Note

You must provide a texture for each state in the /resources folder relative to the executable.

For example:

- bt_nBack.png for the normal (no action, simple button) state.
- bt_aBack.png for the active (pressed) state.
- bt_hBack.png for the hover (mouse above the button) state.

Provide the filename without the prefix *bt_n*, *bt_a* and *bt_h*, this is automatically added.

5.27.3 Member Function Documentation

5.27.3.1 void Menu2DItem::draw ( )

Draws the button on the previously set position. This method will also consider the button state.

Note

To provide the correct button state, you must update the mouse position. See the methods below.

5.27.3.2 void Menu2DItem::mouseMoved (int *x*, int *y*)

Updates the mouse's pointer/cursor position.

Parameters

x	The mouse's x position.
x	The mouse's y position.

Note

You must use this method only if the mouse is moved but the mouse button is neither pressed nor released.

5.27.3.3 void Menu2DItem::mousePressed (int *x*, int *y*)

Sets the coordinates, where the mouse clicked in the viewport.

Parameters

x	The mouse's x position.
x	The mouse's y position.

Note

You must use this method only if the mouse was clicked but the mouse button is neither moved nor released.

5.27.3.4 void Menu2DItem::mouseReleased (int *x*, int *y*)

Sets the coordinates, where the mouse click was released in the viewport.

Parameters

x	The mouse's x position.
x	The mouse's y position.

Note

You must use this method only if the mouse was released but the mouse button is neither pressed nor the mouse is moved.

5.27.3.5 void Menu2DItem::onClick (const boost::function< void() > & *slot*)

Add a function or method which should be called via boost signals when the button is clicked. So the given method can do something.

Parameters

slot	The function/method to call when the button is clicked.

5.27.3.6 void Menu2DItem::setPosition (int *x*, int *y*)

Sets the buttons position in viewport coordinates.

Parameters

x	The x coordinate.
y	The y coordinate.

Note

The origin of the viewport is the upper left corner.

The documentation for this class was generated from the following files:

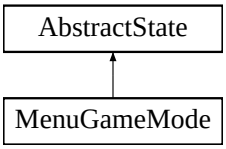
- S:/dev/3dchess/src/gui/Menu2DItem.h
- S:/dev/3dchess/src/gui/Menu2DItem.cpp

5.28 MenuGameMode Class Reference

Class which holds the state GameMode. This state let the user choose one of two modes. The *AI vs. AI* mode which shows a chess match between two artificial computer players where the user can only watch the game. In the *Player vs. AI* mode, the user can play against an artificial computer player.

`#include <MenuGameMode.h>`

Inheritance diagram for MenuGameMode:



Public Member Functions

- MenuGameMode ()
  Creates a new menu GameMode State object.
- void enter () override
  Enters the state for the first time. This will setup all the state related stuff.
- AbstractState * run () override
  Runs the current state and does all the work.
- void exit () override
  Exits the current state and cleans up all allocated resources.
- void draw ()
  Draws something state related stuff on the screen.
- void onModeAIVsAI ()
  This method is called if the user chose the AI vs. AI mode.
- void onModePlayerVsAI ()
  This method is called if the user chose the Player vs. AI mode.
- void onMenuBack ()
  This method is called if the user chose the back button.

5.28.1 Detailed Description

Class which holds the state GameMode. This state let the user choose one of two modes. The *AI vs. AI* mode which shows a chess match between two artificial computer players where the user can only watch the game. In the *Player vs. AI* mode, the user can play against an artificial computer player.

Note

To run() a state, first enter() the state.

5.28.2 Member Function Documentation

5.28.2.1 void MenuGameMode::enter ( ) [override], [virtual]

Enters the state for the first time. This will setup all the state related stuff.

Note

To run() the current state, first enter() it.

Implements AbstractState.

5.28.2.2 void MenuGameMode::exit ( ) [override], [virtual]

Exits the current state and cleans up all allocated resources.

Note

This is the last method to call, before the object is deleted.

Implements AbstractState.

5.28.2.3 AbstractState * MenuGameMode::run ( ) [override], [virtual]

Runs the current state and does all the work.

Returns

AbstractState* the state which should be run after this state. A nullptr if the game should be exited.

Implements AbstractState.

The documentation for this class was generated from the following files:

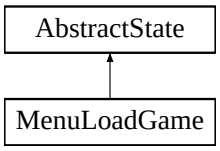
- S:/dev/3dchess/src/gui/states/MenuGameMode.h
- S:/dev/3dchess/src/gui/states/MenuGameMode.cpp

5.29 MenuLoadGame Class Reference

Class which holds the state LoadGame. The user can load a previously saved game from one of three game slots.

`#include <MenuLoadGame.h>`

Inheritance diagram for MenuLoadGame:



Public Member Functions

- MenuLoadGame ()

  Creates a new menu LoadGame State object.
- void enter () override

  Enters the state for the first time. This will setup all the state related stuff.
- AbstractState ∗ run () override

  Runs the current state and does all the work.
- void exit () override

  Exits the current state and cleans up all allocated resources.
- void draw ()

  Draws something state related stuff on the screen.
- void onMenuBack ()

  This method is called if the user chose the back button.

5.29.1 Detailed Description

Class which holds the state LoadGame. The user can load a previously saved game from one of three game slots.

Note

To run() a state, first enter() the state.

5.29.2 Member Function Documentation

5.29.2.1 void MenuLoadGame::enter ( ) [override], [virtual]

Enters the state for the first time. This will setup all the state related stuff.

Note

To run() the current state, first enter() it.

Implements AbstractState.

5.29.2.2 void MenuLoadGame::exit ( ) [override], [virtual]

Exits the current state and cleans up all allocated resources.

Note

This is the last method to call, before the object is deleted.

Implements AbstractState.

5.29.2.3 AbstractState * MenuLoadGame::run ( ) [override], [virtual]

Runs the current state and does all the work.

Returns

AbstractState* the state which should be run after this state. A nullptr if the game should be exited.

Implements AbstractState.

The documentation for this class was generated from the following files:

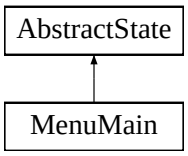
- S:/dev/3dchess/src/gui/states/MenuLoadGame.h
- S:/dev/3dchess/src/gui/states/MenuLoadGame.cpp

5.30 MenuMain Class Reference

Class which holds the state MenuMain. in this menu, the user can start a new game, load a previously saved game, go to the options menu or quit the game.

`#include <MenuMain.h>`

Inheritance diagram for MenuMain:



Public Member Functions

- MenuMain ()

  Creates a new menu MainMenu State object.
- void enter () override

  Enters the state for the first time. This will setup all the state related stuff.
- AbstractState * run () override

  Runs the current state and does all the work.
- void exit () override

  Exits the current state and cleans up all allocated resources.
- void draw ()

  Draws something state related stuff on the screen.
- void onNewGame ()

  This method is called if the user chose to play a new game.
- void onLoadGame ()

  This method is called if the user chose to load a game.
- void onOptions ()

  This method is called if the user chose to go to the options menu.
- void onExitGame ()

  This method is called if the user chose to exit the game.

5.30.1 Detailed Description

Class which holds the state MenuMain. in this menu, the user can start a new game, load a previously saved game, go to the options menu or quit the game.

Note

To run() a state, first enter() the state.

5.30.2 Member Function Documentation

5.30.2.1 void MenuMain::enter ( ) [override], [virtual]

Enters the state for the first time. This will setup all the state related stuff.

Note

To run() the current state, first enter() it.

Implements AbstractState.

5.30.2.2 void MenuMain::exit ( ) [override], [virtual]

Exits the current state and cleans up all allocated resources.

Note

This is the last method to call, before the object is deleted.

Implements AbstractState.

5.30.2.3 AbstractState * MenuMain::run ( ) [override], [virtual]

Runs the current state and does all the work.

Returns

AbstractState* the state which should be run after this state. A nullptr if the game should be exited.

Implements AbstractState.

The documentation for this class was generated from the following files:

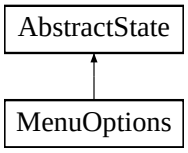
- S:/dev/3dchess/src/gui/states/MenuMain.h
- S:/dev/3dchess/src/gui/states/MenuMain.cpp

5.31 MenuOptions Class Reference

Class which holds the state MenuOption. This state let the user toggle between the fullscreen view or the windowed mode of the game.

`#include <MenuOptions.h>`

Inheritance diagram for MenuOptions:



Public Member Functions

- MenuOptions ()

  Creates a new menu Options State object.
- void enter () override

  Enters the state for the first time. This will setup all the state related stuff.
- AbstractState * run () override

  Runs the current state and does all the work.
- void exit () override

  Exits the current state and cleans up all allocated resources.
- void draw ()

  Draws something state related stuff on the screen.
- void onResolutionChange ()

  This method is called if the user chose to change the resolution.
- void onMenuBack ()

  This method is called if the user chose to go back to the menu he was, before he get here.

5.31.1 Detailed Description

Class which holds the state MenuOption. This state let the user toggle between the fullscreen view or the windowed mode of the game.

Note

To run() a state, first enter() the state.

5.31.2 Member Function Documentation

5.31.2.1 void MenuOptions::enter ( ) [override], [virtual]

Enters the state for the first time. This will setup all the state related stuff.

Note

To run() the current state, first enter() it.

Implements AbstractState.

5.31.2.2 void MenuOptions::exit ( ) [override], [virtual]

Exits the current state and cleans up all allocated resources.

Note

This is the last method to call, before the object is deleted.

Implements AbstractState.

5.31.2.3 AbstractState * MenuOptions::run ( ) [override], [virtual]

Runs the current state and does all the work.

Returns

AbstractState* the state which should be run after this state. A nullptr if the game should be exited.

Implements AbstractState.

The documentation for this class was generated from the following files:

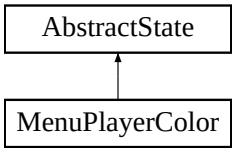
- S:/dev/3dchess/src/gui/states/MenuOptions.h
- S:/dev/3dchess/src/gui/states/MenuOptions.cpp

5.32 MenuPlayerColor Class Reference

Class which holds the state PlayerColor. This state let the user choose between black or white for the chess model figures.

`#include <MenuPlayerColor.h>`

Inheritance diagram for MenuPlayerColor:



Public Member Functions

- MenuPlayerColor ()

  Creates a new menu PlayerColor State object.
- void enter () override

  Enters the state for the first time. This will setup all the state related stuff.
- AbstractState * run () override

  Runs the current state and does all the work.
- void exit () override

  Exits the current state and cleans up all allocated resources.
- void draw ()

  Draws something state related stuff on the screen.
- void onColorWhite ()

  This method is called if the user chose the white color as player color.
- void onColorBlack ()

  This method is called if the user chose the black color as player color.
- void onMenuBack ()

  This method is called if the user chose to go back to the menu he was, before he get here.

5.32.1 Detailed Description

Class which holds the state PlayerColor. This state let the user choose between black or white for the chess model figures.

Note

To run() a state, first enter() the state.

5.32.2 Member Function Documentation

5.32.2.1 void MenuPlayerColor::enter ( ) [override], [virtual]

Enters the state for the first time. This will setup all the state related stuff.

Note

To run() the current state, first enter() it.

Implements AbstractState.

5.32.2.2 void MenuPlayerColor::exit ( ) [override], [virtual]

Exits the current state and cleans up all allocated resources.

Note

This is the last method to call, before the object is deleted.

Implements AbstractState.

5.32.2.3 AbstractState * MenuPlayerColor::run ( ) [override], [virtual]

Runs the current state and does all the work.

Returns

AbstractState* the state which should be run after this state. A nullptr if the game should be exited.

Implements AbstractState.

The documentation for this class was generated from the following files:

- S:/dev/3dchess/src/gui/states/MenuPlayerColor.h
- S:/dev/3dchess/src/gui/states/MenuPlayerColor.cpp

5.33 Mesh Class Reference

Wrapper class for the Assimp library.

`#include <Mesh.h>`

Public Member Functions

- Mesh (unsigned int numVertices, aiVector3D *vertices, aiVector3D *normals, unsigned int numFaces, aiFace *faces)

  Creates a new Mesh object.

Public Attributes

- aiVector3D * vertices

  The model's vertices.
- aiVector3D * normals

  The model's normals.
- aiVector3D * textureCoords

  The model's texture coordinates.
- GLuint * indices

  The model's indices.
- GLuint numVertices

  The number of vertices.
- GLuint numIndices

  The number of indices.

5.33.1 Detailed Description

Wrapper class for the Assimp library.

5.33.2 Constructor & Destructor Documentation

5.33.2.1 Mesh::Mesh (unsigned int *numVertices*, aiVector3D * *vertices*, aiVector3D * *normals*, unsigned int *numFaces*, aiFace * *faces*)

Creates a new Mesh object.

Parameters

numVertices	The number of model vertices.
vertices	The model's vertices itself.
normals	The model's normals itself.
numFaces	The number of model faces.
faces	The model's faces itself.

The documentation for this class was generated from the following files:

- S:/dev/3dchess/src/gui/Mesh.h
- S:/dev/3dchess/src/gui/Mesh.cpp

5.34 Model Class Reference

Representing a chess figure (e.g. King, Queen, ...).

`#include <Model.h>`

Public Types

- enum Color { **BLACK**, **WHITE** }

  Possible model colors.

Public Member Functions

- Model (std::string file)

  Loads the model from the filesystem.
- void loadScene ()

  Imports the model from filesystem.
- void setCorrectionValues (int localX, int localY, int localZ, float scaleFactor, int rotateX, int rotateY, int rotateZ)

  Corrects the model positioning if the model (in the given file) is not proper located at 0/0/0 local space coordinates, the rotation or the scaling factor is wrong.
- void setColor (Color color)

  Sets the models color.
- void setPosition (int globalX, int globalY, int globalZ)

  Sets a new global position (world coordinates) for the model.
- void draw ()

  Draws the model at configured world coordinates.

5.34.1 Detailed Description

Representing a chess figure (e.g. King, Queen, ...).

5.34.2 Constructor & Destructor Documentation

5.34.2.1 Model::Model (std::string *file*)

Loads the model from the filesystem.

Parameters

file	The filename with directory relative to the game's executable file.

5.34.3 Member Function Documentation

5.34.3.1 void Model::setColor (Color *color*)

Sets the models color.

Parameters

color	The color of the model.

5.34.3.2 void Model::setCorrectionValues (int *localX,* int *localY,* int *localZ,* float *scaleFactor,* int *rotateX,* int *rotateY,* int *rotateZ*)

Corrects the model positioning if the model (in the given file) is not proper located at 0/0/0 local space coordinates, the rotation or the scaling factor is wrong.

Note

This should only be used if there's no proper model file available.

Parameters

localX	Sets the local x coordinate.
localY	Sets the local y coordinate.
localZ	Sets the local z coordinate.
scaleFactor	The scaling factor to shrink or enlarge.
rotateX	The rotation in degree along the x axis.
rotateY	The rotation in degree along the y axis.
rotateZ	The rotation in degree along the z axis.

5.34.3.3 void Model::setPosition (int *globalX*, int *globalY*, int *globalZ*)

Sets a new global position (world coordinates) for the model.

Parameters

globalX	The global x coordinate.
globalY	The global y coordinate.
globalZ	The global z coordinate.

The documentation for this class was generated from the following files:

- S:/dev/3dchess/src/gui/Model.h
- S:/dev/3dchess/src/gui/Model.cpp

5.35 Negamax Class Reference

Implementation of a Negamax algorithm.

`#include <Negamax.h>`

Classes

- struct PerfCounters

  Structure with performance counters used for debugging and evaluation.
- struct Result

  Structure for holding search results.

Public Member Functions

- Negamax ()

  Creates a new algorithm instance.
- template<typename TGameState = GameState, bool AB_CUTOFF_ENABLED = true, bool MOVE_ORDERING_ENABLED = true> Result search (const TGameState &state, size_t maxDepth)

  Search given state up to maxDepth full turns.

Public Attributes

- struct Negamax::PerfCounters **m_counters**

5.35.1 Detailed Description

Implementation of a Negamax algorithm.

5.35.2 Member Function Documentation

5.35.2.1 template<typename TGameState = GameState, bool AB_CUTOFF_ENABLED = true, bool MOVE_ORDERING_ENABLED = true> Result Negamax::search (const TGameState & *state*, size_t *maxDepth*) [inline]

Search given state up to maxDepth full turns.

Template Parameters

TGameState	Type of game state so GameState is mockable.
AB_CUTOFF_ENABLE	If false Alpha-Beta cutoff feature is disabled.
MOVE_ORDERING_ENABLED	If false move ordering is disabled.

Parameters

state	Game state to search.
maxDepthInTurns	Number of full turns (ply and return ply) to search.

Returns

Result of the search.

The documentation for this class was generated from the following file:

- S:/dev/3dchess/src/ai/Negamax.h

5.36 ObjectHelper Class Reference

Helper class for creating static OpenGL display lists to boost the drawing of OpenGL objects.

`#include <ObjectHelper.h>`

Static Public Member Functions

- static GLuint createCubeList (float size, float x, float y, float z)

  Creates a new OpenGL display list for a cube.
- static GLuint create2DRectList (float width, float height, float viewportX, float viewportY, float colorR, float colorG, float colorB)

  Creates a new OpenGL display list for a 2D rectangle box.
- static GLuint create2DGradientRectList (float width, float height, float viewportX, float viewportY, float fromColorR, float fromColorG, float fromColorB, float toColorR, float toColorG, float toColorB)

  Creates a new OpenGL display list for a 2D rectangle box with gradient color from top to bottom.

5.36.1 Detailed Description

Helper class for creating static OpenGL display lists to boost the drawing of OpenGL objects.

Note

See http://www.opengl.org/documentation/specs/version1.1/glspec1.1/node123.html for more details about display lists.

5.36.2 Member Function Documentation

5.36.2.1 GLuint ObjectHelper::create2DGradientRectList (float *width*, float *height*, float *viewportX*, float *viewportY*, float *fromColorR*, float *fromColorG*, float *fromColorB*, float *toColorR*, float *toColorG*, float *toColorB*) [static]

Creates a new OpenGL display list for a 2D rectangle box with gradient color from top to bottom.

Parameters

width	The width of the rectangle.
height	The height of the rectangle.
viewportX	The viewport x coordinate from the left top corner.
viewportY	The viewport y coordinate from the left top corner.
fromColorR	The red color value between 0.0 and 1.0 at the top edge of the rectangle.
fromColorG	The green color value between 0.0 and 1.0 at the top edge of the rectangle.
fromColorB	The blue color value between 0.0 and 1.0 at the top edge of the rectangle.
toColorR	The red color value between 0.0 and 1.0 at the bottom edge of the rectangle.
toColorG	The green color value between 0.0 and 1.0 at the bottom edge of the rectangle.
toColorB	The blue color value between 0.0 and 1.0 at the bottom edge of the rectangle.

Returns

GLuint A display list index which holds the compiled rectangle.

5.36.2.2 GLuint ObjectHelper::create2DRectList (float *width,* float *height,* float *viewportX,* float *viewportY,* float *colorR,* float *colorG,* float *colorB*) [static]

Creates a new OpenGL display list for a 2D rectangle box.

Parameters

width	The width of the rectangle.
height	The height of the rectangle.
viewportX	The viewport x coordinate from the left top corner.
viewportY	The viewport y coordinate from the left top corner.
colorR	The red color value between 0.0 and 1.0.
colorG	The green color value between 0.0 and 1.0.
colorB	The blue color value between 0.0 and 1.0.

Returns

GLuint A display list index which holds the compiled rectangle.

5.36.2.3 GLuint ObjectHelper::createCubeList (float *size,* float *x,* float *y,* float *z*) [static]

Creates a new OpenGL display list for a cube.

Parameters

size	The size of an edge of the cube.
x	The position of the cube in x world coordinate.
y	The position of the cube in y world coordinate.
z	The position of the cube in z world coordinate.

Returns

GLuint A display list index which holds the compiled cube.

The documentation for this class was generated from the following files:

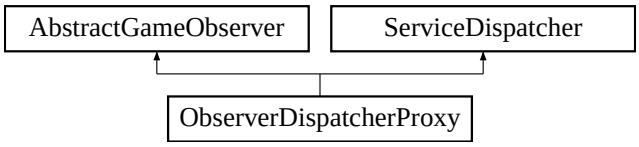
- S:/dev/3dchess/src/gui/ObjectHelper.h
- S:/dev/3dchess/src/gui/ObjectHelper.cpp

5.37 ObserverDispatcherProxy Class Reference

Proxy for transporting AbstractGameObserver events between threads.

`#include <ObserverDispatcherProxy.h>`

Inheritance diagram for ObserverDispatcherProxy:



Public Member Functions

- **ObserverDispatcherProxy** (AbstractGameObserverPtr observer)
- virtual void onGameStart (GameState state, GameConfiguration config) override

  Called when the game starts.
- virtual void onTurnStart (PlayerColor who) override

  Called if a player is asked to perform a turn.
- virtual void onTurnEnd (PlayerColor who, Turn turn, GameState newState) override

  Called if a player ended its turn.
- virtual void onTurnTimeout (PlayerColor who, std::chrono::seconds timeout) override

  Called if a players turn is aborted due to timeout.
- virtual void onGameOver (GameState state, PlayerColor winner) override

  Called when a game started with onGameStart is over.

Additional Inherited Members

5.37.1 Detailed Description

Proxy for transporting AbstractGameObserver events between threads.

As the GameLogic and other game components run on different threads it is essential to safely transport game events between them. Without any additional precautions AbstractGameObserver implementations will have their handlers called on the GameLogic thread they are registered on with all implied thread safety concerns.

This proxy will serialize calls coming in from the game logic in a thread-safe way and replay them once its poll method is called in the customers thread.

5.37.2 Member Function Documentation

5.37.2.1 virtual void ObserverDispatcherProxy::onGameOver (GameState *state*, PlayerColor *winner*) [inline], [override], [virtual]

Called when a game started with onGameStart is over.

Parameters

state	State on game over.

winner	Winner of the game.

Reimplemented from AbstractGameObserver.

5.37.2.2 virtual void ObserverDispatcherProxy::onGameStart (GameState *state*, GameConfiguration *config*) [inline], [override], [virtual]

Called when the game starts.

Parameters

state	GameState on game start.
config	Valid GameConfiguration for this game.

Reimplemented from AbstractGameObserver.

5.37.2.3 virtual void ObserverDispatcherProxy::onTurnEnd (PlayerColor *who*, Turn *turn*, GameState *newState*) [inline], [override], [virtual]

Called if a player ended its turn.

Parameters

who	Color of the player doing the turn.
turn	Turn the player decided on.
newState	State after the player performed the turn.

Reimplemented from AbstractGameObserver.

5.37.2.4 virtual void ObserverDispatcherProxy::onTurnStart (PlayerColor *who*) [inline], [override], [virtual]

Called if a player is asked to perform a turn.

Parameters

who	Color of the player doing the turn.

Reimplemented from AbstractGameObserver.

5.37.2.5 virtual void ObserverDispatcherProxy::onTurnTimeout (PlayerColor *who*, std::chrono::seconds *timeout*) [inline], [override], [virtual]

Called if a players turn is aborted due to timeout.

Parameters

who	Color of the player who got interrupted.
timeout	Length of the time limit that got violated.

Reimplemented from AbstractGameObserver.

The documentation for this class was generated from the following file:

- S:/dev/3dchess/src/logic/threading/ObserverDispatcherProxy.h

5.38 Negamax::PerfCounters Struct Reference

Structure with performance counters used for debugging and evaluation.

`#include <Negamax.h>`

Public Member Functions

- std::string **toString** () const

Public Attributes

- uint64_t nodes

  Number of nodes searched.
- uint64_t cutoffs

  Number of branches cut-off using Alpha-Beta.
- uint64_t updates

  Number of best result updates during search.
- std::chrono::milliseconds duration

  Time taken for last search.

5.38.1 Detailed Description

Structure with performance counters used for debugging and evaluation.

The documentation for this struct was generated from the following file:

- S:/dev/3dchess/src/ai/Negamax.h

5.39 Piece Struct Reference

Public Member Functions

- **Piece** (PlayerColor player, PieceType pieceType)
- bool **operator==** (const Piece &other) const

Public Attributes

- PlayerColor **player**
- PieceType **type**

The documentation for this struct was generated from the following files:

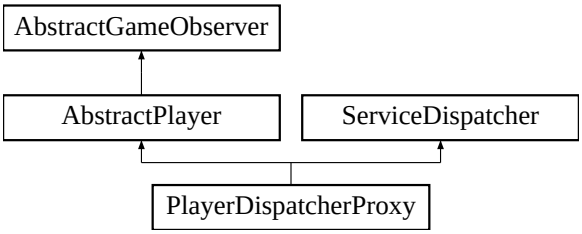
- S:/dev/3dchess/src/logic/ChessTypes.h
- S:/dev/3dchess/src/logic/ChessTypes.cpp

5.40 PlayerDispatcherProxy Class Reference

Proxy for transporting AbstractGamePlayer events between threads.

`#include <PlayerDispatcherProxy.h>`

Inheritance diagram for PlayerDispatcherProxy:



Public Member Functions

- **PlayerDispatcherProxy** (AbstractPlayerPtr player)
- virtual void onSetColor (PlayerColor color) override

  Notifies that player what color he will be playing. Called before onGameStart.
- virtual std::future< Turn > doMakeTurn (GameState state) override

  Asks the player to make his turn.
- virtual void doAbortTurn () override

  Asks the player to abort a turn asked for with doMakeTurn. When this is called the GameLogic will no longer react to the completion of the future for that turn. A use of this function is the abortion of a turn due to timeout.
- virtual void onGameStart (GameState state, GameConfiguration config) override

  Called when the game starts.
- virtual void onTurnStart (PlayerColor who) override

  Called if a player is asked to perform a turn.
- virtual void onTurnEnd (PlayerColor who, Turn turn, GameState newState) override

  Called if a player ended its turn.
- virtual void onTurnTimeout (PlayerColor who, std::chrono::seconds timeout) override

  Called if a players turn is aborted due to timeout.
- virtual void onGameOver (GameState state, PlayerColor winner) override

  Called when a game started with onGameStart is over.

Additional Inherited Members

5.40.1 Detailed Description

Proxy for transporting AbstractGamePlayer events between threads.

As the GameLogic and other game components run on different threads it is essential to safely transport game events between them. Without any additional precautions AbstractGamePlayer implementations will have their handlers called on the GameLogic thread they are registered on with all implied thread safety concerns.

This proxy will serialize calls coming in from the game logic in a thread-safe way and replay them once its poll method is called in the customers thread.

5.40.2 Member Function Documentation

5.40.2.1 virtual std::future<Turn> PlayerDispatcherProxy::doMakeTurn (GameState *state*) [inline], [override], [virtual]

Asks the player to make his turn.

Warning

This function must not block. It is to return immediatly. The players turn is to be set on the returned future.

Note

The game logic can abort its request for a player to make his turn using the doAbortTurn function at any time.

Parameters

state	Current state of the game.

Returns

A future to the turn to make.

Implements AbstractPlayer.

5.40.2.2 virtual void PlayerDispatcherProxy::onGameOver (GameState *state*, PlayerColor *winner*) [inline], [override], [virtual]

Called when a game started with onGameStart is over.

Parameters

state	State on game over.
winner	Winner of the game.

Reimplemented from AbstractGameObserver.

5.40.2.3 virtual void PlayerDispatcherProxy::onGameStart (GameState *state*, GameConfiguration *config*) [inline], [override], [virtual]

Called when the game starts.

Parameters

state	GameState on game start.
config	Valid GameConfiguration for this game.

Reimplemented from AbstractGameObserver.

5.40.2.4 virtual void PlayerDispatcherProxy::onSetColor (PlayerColor *color*) [inline], [override], [virtual]

Notifies that player what color he will be playing. Called before onGameStart.

Parameters

color	Color the player has.

Implements AbstractPlayer.

5.40.2.5 virtual void PlayerDispatcherProxy::onTurnEnd (PlayerColor *who*, Turn *turn*, GameState *newState*) [inline], [override], [virtual]

Called if a player ended its turn.

Parameters

who	Color of the player doing the turn.

turn	Turn the player decided on.
newState	State after the player performed the turn.

Reimplemented from AbstractGameObserver.

5.40.2.6 virtual void PlayerDispatcherProxy::onTurnStart (PlayerColor *who*) [inline], [override], [virtual]

Called if a player is asked to perform a turn.

Parameters

who	Color of the player doing the turn.

Reimplemented from AbstractGameObserver.

5.40.2.7 virtual void PlayerDispatcherProxy::onTurnTimeout (PlayerColor *who,* std::chrono::seconds *timeout*) [inline], [override], [virtual]

Called if a players turn is aborted due to timeout.

Parameters

who	Color of the player who got interrupted.
timeout	Length of the time limit that got violated.

Reimplemented from AbstractGameObserver.

The documentation for this class was generated from the following file:

- S:/dev/3dchess/src/logic/threading/PlayerDispatcherProxy.h

5.41 PoF Struct Reference

Public Member Functions

- **PoF** (Piece piece, Field field)

Public Attributes

- Piece **piece**
- Field **field**

The documentation for this struct was generated from the following file:

- S:/dev/3dchess/src/logic/ChessBoard.h

5.42 Negamax::Result Struct Reference

Structure for holding search results.

`#include <Negamax.h>`

Public Member Functions

- Result operator- () const

  Negates score. Syntax sugar to get closer to algorithm notation.
- bool **operator**< (const Result &other)
- bool **operator**<**=** (const Result &other)
- bool **operator**>**=** (const Result &other)
- bool **operator**> (const Result &other)
- bool **operator==** (const Result &other) const
- std::string **toString** () const

Public Attributes

- Score score

  Evaluator score estimation for this turn.
- boost::optional< Turn > turn

  Turn to make to advance towards score.

5.42.1 Detailed Description

Structure for holding search results.

The documentation for this struct was generated from the following file:

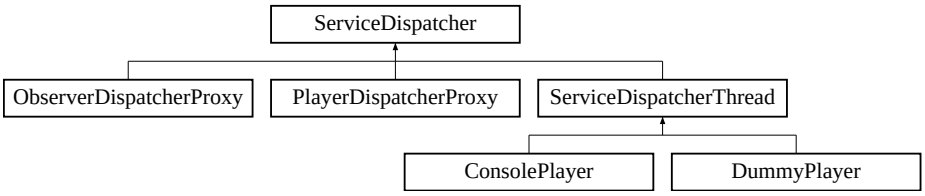
- S:/dev/3dchess/src/ai/Negamax.h

5.43 ServiceDispatcher Class Reference

Provides functionality for safely running operations in a thread.

`#include <ServiceDispatcher.h>`

Inheritance diagram for ServiceDispatcher:



Public Member Functions

- void poll ()

  Replays all posted functions in the calling thread.

Protected Member Functions

- template<typename Function >
  void post (Function &&function)

  Store a given function.

- template<typename Function >
  auto postPromise (Function &&function) -> decltype(std::promise< typename std::result_of< Function()>-
  ::type >().get_future())

  Stores a given function and returns a future on its return value.
- void run ()

  Runs underlying boost asio io_service.
- void resetWork ()

  Drops queued functions.
- void stopService ()

  Stops underlying service.

5.43.1 Detailed Description

Provides functionality for safely running operations in a thread.

For components running on different threads it is essential to safely transport events between them. Without any additional precautions functions will execute on the thread they are called.

This dispatcher can store functions in a thread-safe way and replay them once its poll method is called in the customers thread.

5.43.2 Member Function Documentation

5.43.2.1 void ServiceDispatcher::poll ( ) [inline]

Replays all posted functions in the calling thread.

See Also

post
postPromise

5.43.2.2 template<typename Function > void ServiceDispatcher::post (Function && *function*) [inline], [protected]

Store a given function.

Parameters

function	Function to store and later replay.

5.43.2.3 template<typename Function > auto ServiceDispatcher::postPromise (Function && *function*) -> decltype(std::promise<typename std::result_of<Function()>::type>().get_future()) [inline], [protected]

Stores a given function and returns a future on its return value.

Parameters

function	Function to store and later replay.

Returns

Future on result of given function.

5.43.2.4 void ServiceDispatcher::run ( ) [inline],[protected]

Runs underlying boost asio io_service.

Note

Will block until work is completed.

The documentation for this class was generated from the following file:

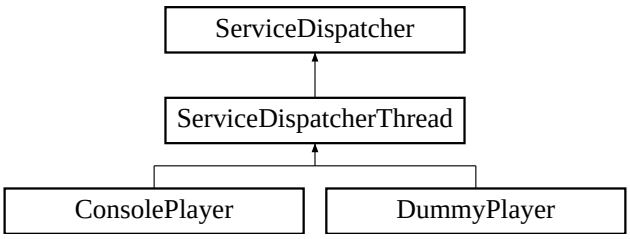
- S:/dev/3dchess/src/logic/threading/ServiceDispatcher.h

5.44 ServiceDispatcherThread Class Reference

Provides functionality for safely running operations in a thread.

`#include <ServiceDispatcherThread.h>`

Inheritance diagram for ServiceDispatcherThread:



Public Member Functions

- ServiceDispatcherThread ()

  Creates a ServiceDispatcherThread.
- virtual ~ServiceDispatcherThread ()

  Destroy dispatcher. Stops internal thread and discards all remaining calls.
- virtual void start ()

  Start the dispatcher thread.
- virtual void stop (bool force=false)

  Stops the execution of this tread.

Public Attributes

- std::thread m_thread

  Thread this object is running its event loop on after start.

Additional Inherited Members

5.44.1 Detailed Description

Provides functionality for safely running operations in a thread.

Uses ServiceDispatcher to move function calls into its own thread and execute them.

5.44.2 Constructor & Destructor Documentation

5.44.2.1 ServiceDispatcherThread::ServiceDispatcherThread ( ) [inline]

Creates a ServiceDispatcherThread.

Note

Don't forget to start() it.

5.44.3 Member Function Documentation

5.44.3.1 virtual void ServiceDispatcherThread::stop (bool *force* = false) [inline], [virtual]

Stops the execution of this tread.

Parameters

force	If true remaining calls are dropped. Otherwise shutdown is deferred until all calls currently in the queue are processed.

The documentation for this class was generated from the following file:

- S:/dev/3dchess/src/logic/threading/ServiceDispatcherThread.h

5.45 StateMachine Class Reference

Class which manages the states.

`#include <StateMachine.h>`

Classes

- struct EventMap

  Structure for holding user events.

Public Member Functions

- void setStartState (AbstractState *startState)

  Sets the start state and setup the state.
- AbstractState * run ()

  Runs the current state.
- void setNextState (AbstractState *state)

  Sets the next state which should be run.

Static Public Member Functions

- static StateMachine & getInstance ()

  Gets an instance of the StateMachine.

Public Attributes

- struct StateMachine::EventMap **eventmap**
- GuiWindow * window

  Holds the pointer to the GuiWindow object, to access gui related methods.

5.45.1 Detailed Description

Class which manages the states.

Note

This is a singleton, you can get only one instance of the StateMachine. Don't forget to update the events if they occur.

5.45.2 Member Function Documentation

5.45.2.1 static StateMachine& StateMachine::getInstance ( ) [inline], [static]

Gets an instance of the StateMachine.

Note

This is a singleton. So you can only get one instance.

Returns

StateMachine& A reference to the StateMachine.

5.45.2.2 AbstractState * StateMachine::run ( )

Runs the current state.

Returns

The AbstractState pointer to the state which must be run() the next time.

5.45.2.3 void StateMachine::setNextState (AbstractState * *state*)

Sets the next state which should be run.

Parameters

state	The next state.

5.45.2.4 void StateMachine::setStartState (AbstractState * *startState*)

Sets the start state and setup the state.

Parameters

startState	The start state.

The documentation for this class was generated from the following files:

- S:/dev/3dchess/src/gui/StateMachine.h
- S:/dev/3dchess/src/gui/StateMachine.cpp

5.46 Turn Class Reference

Public Types

- enum **Action** { **Move**, **Castle**, **Forfeit**, **Pass** }

Public Member Functions

- **Turn** (Piece piece, Field from, Field to, Action action)
- bool **operator==** (const Turn &other) const
- bool **operator!=** (const Turn &other) const
- std::string **toString** () const

Static Public Member Functions

- static Turn **move** (Piece piece, Field from, Field to)

Public Attributes

- Piece **piece**
- Field **from**
- Field **to**
- enum Turn::Action **action**

The documentation for this class was generated from the following files:

- S:/dev/3dchess/src/logic/Turn.h
- S:/dev/3dchess/src/logic/Turn.cpp

5.47 TurnGenerator Class Reference

Public Member Functions

- virtual std::vector< Turn > **generateTurns** (PlayerColor player, const ChessBoard &cb) const
- virtual BitBoard **calcTurns** (Piece piece, BitBoard bbPiece, const ChessBoard &cb) const
- virtual std::vector< Turn > **bitBoardToTurns** (Piece piece, BitBoard bbPiece, BitBoard bbTurns) const
- virtual BitBoard **calcKingTurns** (BitBoard king, BitBoard allOwnPieces) const
- virtual BitBoard **calcKnightTurns** (BitBoard knights, BitBoard allOwnPieces) const
- virtual BitBoard **calcPawnTurns** (BitBoard pawns, BitBoard allOppPieces, BitBoard allPieces, PlayerColor player) const
- virtual BitBoard **calcQueenTurns** (BitBoard queens, BitBoard allOppPieces, BitBoard allPieces) const
- virtual BitBoard **calcBishopTurns** (BitBoard bishops, BitBoard allOppPieces, BitBoard allPieces) const
- virtual BitBoard **calcRookTurns** (BitBoard rooks, BitBoard allOppPieces, BitBoard allPieces) const
- virtual BitBoard **maskRank** (Rank rank) const

- virtual BitBoard **clearRank** (Rank rank) const
- virtual BitBoard **maskFile** (File file) const
- virtual BitBoard **clearFile** (File file) const
- virtual BitBoard **getBitsE** (BitBoard bbPiece) const
- virtual BitBoard **getBitsW** (BitBoard bbPiece) const
- virtual BitBoard **getBitsN** (BitBoard bbPiece) const
- virtual BitBoard **getBitsS** (BitBoard bbPiece) const
- virtual BitBoard **getBitsNE** (BitBoard bbPiece) const
- virtual BitBoard **getBitsNW** (BitBoard bbPiece) const
- virtual BitBoard **getBitsSE** (BitBoard bbPiece) const
- virtual BitBoard **getBitsSW** (BitBoard bbPiece) const

The documentation for this class was generated from the following files:

- S:/dev/3dchess/src/logic/TurnGenerator.h
- S:/dev/3dchess/src/logic/TurnGenerator.cpp

Index