Gaia DB

0.9

Generated by Doxygen 1.8.14

Contents

Chapter 1

Class Index

1.1 Class List

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

Chapter 2

File Index

2.1 File List

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

Chapter 3

Class Documentation

3.1 _db_ctx Struct Reference

A small struct which holds pointers to databases and the directory they are in.

```
#include <gaia_db.h>
```

Public Attributes

- DB ∗ dbp

  Handle to the primary database.
- DB ∗ sdbp

  Handle to the secondary database that holds indices for the morton codes.
- const char ∗ db_dir

  Home directory the databases are located in.

3.1.1 Detailed Description

A small struct which holds pointers to databases and the directory they are in.

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

- src/gaia_db.h

3.2 _star Struct Reference

Star struct which holds basic data of a star.

```
#include <gaia_db.h>
```

Public Attributes

- u_int64_t morton_index

    Morton-code of the star in a 3d-grid.
- u_int64_t id

    ID extracted from dataset.
- double x

    X position star.
- double y

    Y position star.
- double z

    Z position star.
- u_int32_t colour

    Colour of the star in hex converted to int.
- float brightness

    Absolute magnitude of the star.

3.2.1 Detailed Description

Star struct which holds basic data of a star.

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

- src/gaia_db.h

Chapter 4

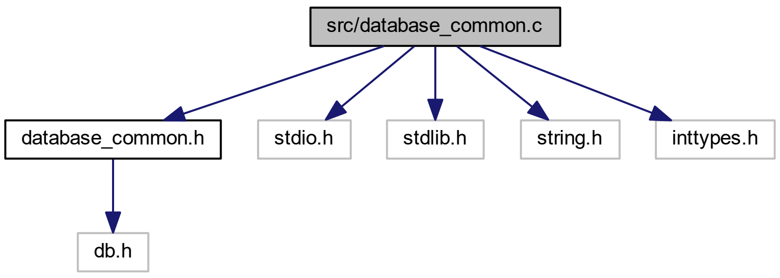
File Documentation

4.1 src/database_common.c File Reference

Helper functions for database interaction.

```
#include "database_common.h"
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include <inttypes.h>
```

Include dependency graph for database_common.c:



Functions

- char ∗ make_path (const char ∗str1, const char ∗str2)

  Form a path from the string to the directory and the name of the db. This needs to be freed. Done automatically by berkeley if used to create db.
- void log_error (DB ∗dbp, int ret)

  Small helper function for logging errors in the logfile.
- int db_init (DB ∗∗dbpp, const char ∗db_directory, const char ∗db_name, FILE ∗log_file, u_int32_t db_flags, DBTYPE db_type)

  Initialize a database.
- int db_close (DB ∗dbp)

Close the database.
- int db_insert (DB ∗dbp, void ∗d_key, size_t s_key, void ∗d_data, size_t s_data)
  Insert a value in the database.
- void ∗ db_get (DB ∗dbp, void ∗d_key, int s_key)
  Get an item from the database.

4.1.1 Detailed Description

Helper functions for database interaction.

Author

Danny Dorstijn

Version

0.9

Date

2019-01-23

Copyright

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4.1.2 Function Documentation

4.1.2.1 db_close()

```
int db_close (
             DB ∗ dbp )
```

Close the database.

Parameters

dbp	- Handle to the db to be closed

Returns

int - Error code or 0 if all is fine

4.1.2.2 db_get()

```
void* db_get (
            DB * dbp,
            void * d_key,
            int s_key )
```

Get an item from the database.

Parameters

dbp	- Handle to the database
d_key	- Pointer to the key
s_key	- Size of the key

Returns

void∗ - Data of the record

4.1.2.3 db_init()

```
int db_init (
            DB ** dbpp,
            const char * db_directory,
            const char * db_name,
            FILE * log_file,
            u_int32_t db_flags,
            DBTYPE db_type )
```

Initialize a database.

Parameters

dbpp	- A pointer to a handle for the new db
db_directory	- The directory where to place the db
db_name	- Name of the database
log_file	- Log file to print all errors in
db_flags	- Flags for creating a db
db_type	- Type of the db (BTree, Heap, Queue, etc.)

Returns

int - Error code or 0 if all is fine

4.1.2.4 db_insert()

```
int db_insert (
            DB * dbp,
            void * d_key,
            size_t s_key,
            void * d_data,
            size_t s_data )
```

Insert a value in the database.

Parameters

dbp	- Handle to the db
d_key	- Pointer to the data of the key
s_key	- Size of the key (using sizeof)
d_data	- Pointer to the data
s_data	- Sizeof the corresponding data (using sizeof)

Returns

int - Error code or 0 if all is fine

4.1.2.5 log_error()

```
void log_error (
            DB * dbp,
            int ret )
```

Small helper function for logging errors in the logfile.

Parameters

dbp	- Handle to the database
ret	- The error code to be printed

4.1.2.6 make_path()

```
char* make_path (
            const char * str1,
            const char * str2 )
```

Form a path from the string to the directory and the name of the db. This needs to be freed. Done automatically by berkeley if used to create db.

Parameters

str1	- First string
str2	- Second string

Returns

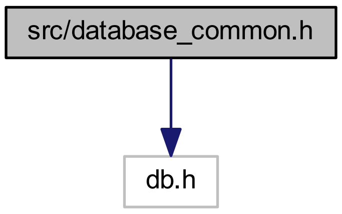
char∗ - Both strings combined

4.2 src/database_common.h File Reference

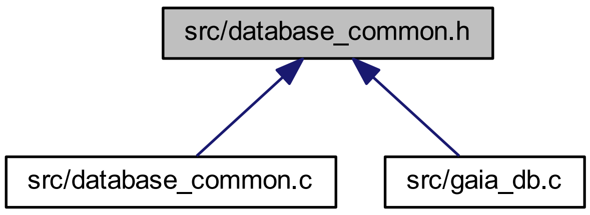
Helper functions for database interaction.

```
#include "db.h"
```

Include dependency graph for database_common.h:



This graph shows which files directly or indirectly include this file:



Functions

- void log_error (DB ∗dbp, int ret)

    Small helper function for logging errors in the logfile.
- int db_init (DB ∗∗dbpp, const char ∗db_directory, const char ∗db_name, FILE ∗log_file, u_int32_t db_flags, DBTYPE db_type)

    Initialize a database.
- int db_close (DB ∗dbp)

    Close the database.
- int db_insert (DB ∗dbp, void ∗d_key, size_t s_key, void ∗d_data, size_t s_data)

    Insert a value in the database.
- void ∗ db_get (DB ∗dbp, void ∗d_key, int s_key)

    Get an item from the database.

4.2.1 Detailed Description

Helper functions for database interaction.

Author

Danny Dorstijn

Version

0.9

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2019-01-23

Copyright

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4.2.2 Function Documentation

4.2.2.1 db_close()

```
int db_close (
            DB * dbp )
```

Close the database.

Parameters

dbp	- Handle to the db to be closed

Returns

int - Error code or 0 if all is fine

4.2.2.2 db_get()

```
void* db_get (
             DB * dbp,
             void * d_key,
             int s_key )
```

Get an item from the database.

Parameters

dbp	- Handle to the database
d_key	- Pointer to the key
s_key	- Size of the key

Returns

void∗ - Data of the record

4.2.2.3 db_init()

```
int db_init (
             DB ** dbpp,
             const char * db_directory,
             const char * db_name,
             FILE * log_file,
             u_int32_t db_flags,
             DBTYPE db_type )
```

Initialize a database.

Parameters

dbpp	- A pointer to a handle for the new db
db_directory	- The directory where to place the db
db_name	- Name of the database
log_file	- Log file to print all errors in
db_flags	- Flags for creating a db
db_type	- Type of the db (BTree, Heap, Queue, etc.)

Returns

int - Error code or 0 if all is fine

4.2.2.4 db_insert()

```
int db_insert (
            DB * dbp,
            void * d_key,
            size_t s_key,
            void * d_data,
            size_t s_data )
```

Insert a value in the database.

Parameters

dbp	- Handle to the db
d_key	- Pointer to the data of the key
s_key	- Size of the key (using sizeof)
d_data	- Pointer to the data
s_data	- Sizeof the corresponding data (using sizeof)

Returns

int - Error code or 0 if all is fine

4.2.2.5 log_error()

```
void log_error (
            DB * dbp,
            int ret )
```

Small helper function for logging errors in the logfile.

Parameters

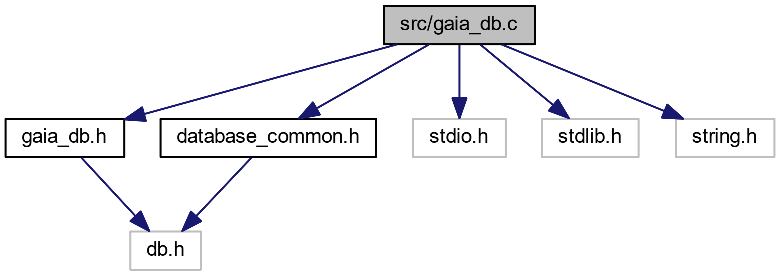
dbp	- Handle to the database
ret	- The error code to be printed

4.3 src/gaia_db.c File Reference

Implementation of the BerkeleyDB wrapper.

```
#include "gaia_db.h"
#include "database_common.h"
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
```

Include dependency graph for gaia_db.c:



Functions

- int get_id_callback (DB ∗dbp, const DBT ∗pkey, const DBT ∗pdata, DBT ∗skey)

  Callback used by the db for creating indices for the morton codes.
- DB_CTX ∗ gaia_setup_database (const char ∗directory)

  Setup the databases for GAIA.
- int gaia_close_database (DB_CTX ∗ctx)

  Close the databases. Writes the db's to a file.
- int gaia_new_star (DB ∗dbp, u_int64_t id, double x, double y, double z, u_int32_t colour, float brightness, u_int64_t morton_index)
- SStar ∗ gaia_get_star (DB ∗dbp, u_int64_t id)

  Get a star from the db based on the ID of the star.
- SStar ∗ gaia_get_star_by_morton (DB ∗sdbp, u_int64_t index)

  Get the star based on it's morton code.
- DBC ∗ gaia_open_cursor (DB ∗dbp)

  Get a new cursor to iterate over the database.
- int gaia_close_cursor (DBC ∗dbcp)

  Close the cursor after you are done using it.
- SStar ∗ gaia_cursor_get_star (DBC ∗dbcp)

  Get the star the cursor is pointing to.
- char gaia_cursor_has_next (DBC ∗dbcp)

  Check if the cursor is on the last record and jump to that record.
- int gaia_cursor_goto_star (DBC ∗dbcp, u_int64_t id)

  Set the cursor to a star with the id given.
- int gaia_delete_star (DB ∗dbp, u_int64_t id)

  Search and remove a star from the db.
- int gaia_update_star_morton (DB ∗dbp, u_int64_t id, u_int64_t morton_index)

  Update the morton code of the star.

4.3.1 Detailed Description

Implementation of the BerkeleyDB wrapper.

Author

Danny Dorstijn

Version

0.8

Date

2019-01-23

Copyright

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4.3.2 Function Documentation

4.3.2.1 gaia_close_cursor()

```
int gaia_close_cursor (
             DBC * dbcp )
```

Close the cursor after you are done using it.

Parameters

dbcp	- Handle to the database

Returns

int - Error code or 0 if all is fine

4.3.2.2 gaia_close_database()

```
int gaia_close_database (
             DB_CTX * ctx )
```

Close the databases. Writes the db's to a file.

Parameters

ctx	- The context with both the database handles

Returns

int - Returns err code or 0 if all was fine

4.3.2.3 gaia_cursor_get_star()

```
SStar* gaia_cursor_get_star (
             DBC * dbcp )
```

Get the star the cursor is pointing to.

Parameters

dbcp	- Handle to the database

Returns

SStar∗ - The star the cursor is pointing to

4.3.2.4 gaia_cursor_goto_star()

```
int gaia_cursor_goto_star (
             DBC * dbcp,
             u_int64_t id )
```

Set the cursor to a star with the id given.

Parameters

dbcp	- Handle to the database
id	- ID to jump to

Returns

int - Error code or 0 if all is fine

4.3.2.5 gaia_cursor_has_next()

```
char gaia_cursor_has_next (
            DBC * dbcp )
```

Check if the cursor is on the last record and jump to that record.

Parameters

dbcp	- Handle to the database

Returns

char - 1 if jump is succesful. Else 0

4.3.2.6 gaia_delete_star()

```
int gaia_delete_star (
            DB * dbp,
            u_int64_t id )
```

Search and remove a star from the db.

Parameters

dbp	- Handle for the primary database
id	- The id of the star

Returns

int - Error code or 0 if all is fine

4.3.2.7 gaia_get_star()

```
SStar* gaia_get_star (
            DB * dbp,
            u_int64_t id )
```

Get a star from the db based on the ID of the star.

Parameters

dbp	- Handle for the primary database
id	- ID of the star you are looking for

Returns

SStar∗ - Star object with all the data corresponding to the id given

4.3.2.8 gaia_get_star_by_morton()

```
SStar* gaia_get_star_by_morton (
            DB * sdbp,
            u_int64_t index )
```

Get the star based on it's morton code.

Parameters

sdbp	- Handle for the secondary database with morton code indices
index	- The morton code index

Returns

SStar∗ - The star data corresponding to the index given

4.3.2.9 gaia_new_star()

```
int gaia_new_star (
            DB * dbp,
            u_int64_t id,
            double x,
            double y,
            double z,
            u_int32_t colour,
            float brightness,
            u_int64_t morton_index )
```

Parameters

dbp	- Handle for the primary db
id	- ID of the star extracted from the uuid in the gaia dataset
x	- X position of the star
y	- Y position of the star
z	- Z position of the star
colour	- The colour of the star
brightness	- The brightness of the star (apparent magnitude)
morton_index	- The morton index of the star. Leave 0 if unsure

Returns

int - Error code or 0 if fine

4.3.2.10 gaia_open_cursor()

```
DBC* gaia_open_cursor (
             DB * dbp )
```

Get a new cursor to iterate over the database.

Parameters

dbp	- Handle to the database

Returns

DBC∗ - The cursor

4.3.2.11 gaia_setup_database()

```
DB_CTX* gaia_setup_database (
             const char * directory )
```

Setup the databases for GAIA.

Parameters

directory	- The base directory to put the databases in

Returns

DB_CTX∗ - A helper to manage the databases

4.3.2.12 gaia_update_star_morton()

```
int gaia_update_star_morton (
             DB * dbp,
             u_int64_t id,
             u_int64_t morton_index )
```

Update the morton code of the star.

Parameters

dbp	- Handle of the primary database
id	- The id of the star
morton_index	- The new morton index

Returns

int - Error code or 0 if all is fine

4.3.2.13 get_id_callback()

```
int get_id_callback (
            DB * dbp,
            const DBT * pkey,
            const DBT * pdata,
            DBT * skey )
```

Callback used by the db for creating indices for the morton codes.

Parameters

dbp	- Handle for dbp (unused)
pkey	- Handle for the key of the main db (unused)
pdata	- Handle for the data of the main db. Used to extract morton idx
skey	- Handle for the secondary key. This is what we put in the db

Returns

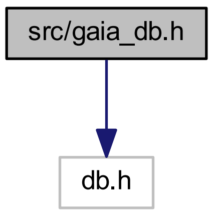
int - Returns 0 to signal all is fine

4.4 src/gaia_db.h File Reference

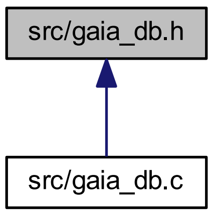
Gaia DB wrapper.

```
#include "db.h"
```

Include dependency graph for gaia_db.h:



This graph shows which files directly or indirectly include this file:



Classes

- struct _star

  Star struct which holds basic data of a star.
- struct _db_ctx

  A small struct which holds pointers to databases and the directory they are in.

Typedefs

- typedef struct _star SStar

  Star struct which holds basic data of a star.
- typedef struct _db_ctx DB_CTX

  A small struct which holds pointers to databases and the directory they are in.

Functions

- DB_CTX ∗GAIADB_DLL gaia_setup_database (const char ∗directory)

  Setup the databases for GAIA.
- int GAIADB_DLL gaia_close_database (DB_CTX ∗context)

  Close the databases. Writes the db's to a file.
- int GAIADB_DLL gaia_new_star (DB ∗dbp, u_int64_t id, double x, double y, double z, u_int32_t colour, float brightness, u_int64_t morton_index)
- SStar ∗GAIADB_DLL gaia_get_star (DB ∗dbp, u_int64_t id)

  Get a star from the db based on the ID of the star.
- SStar ∗GAIADB_DLL gaia_get_star_by_morton (DB ∗sdbp, u_int64_t index)

  Get the star based on it's morton code.
- int GAIADB_DLL gaia_delete_star (DB ∗dbp, u_int64_t id)

  Search and remove a star from the db.
- int GAIADB_DLL gaia_update_star_morton (DB ∗dbp, u_int64_t id, u_int64_t morton_index)

  Update the morton code of the star.
- DBC ∗GAIADB_DLL gaia_open_cursor (DB ∗dbp)

  Get a new cursor to iterate over the database.
- char GAIADB_DLL gaia_cursor_has_next (DBC ∗dbcp)

  Check if the cursor is on the last record and jump to that record.
- SStar ∗GAIADB_DLL gaia_cursor_get_star (DBC ∗dbcp)

  Get the star the cursor is pointing to.
- int GAIADB_DLL gaia_cursor_goto_star (DBC ∗dbcp, u_int64_t id)

  Set the cursor to a star with the id given.
- int GAIADB_DLL gaia_close_cursor (DBC ∗dbcp)

  Close the cursor after you are done using it.

4.4.1 Detailed Description

Gaia DB wrapper.

Author

Danny Dorstijn

Version

0.8

Date

2019-01-23

Copyright

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4.4.2 Function Documentation

4.4.2.1 gaia_close_cursor()

```
int GAIADB_DLL gaia_close_cursor (
            DBC * dbcp )
```

Close the cursor after you are done using it.

Parameters

dbcp	- Handle to the database

Returns

int - Error code or 0 if all is fine

4.4.2.2 gaia_close_database()

```
int GAIADB_DLL gaia_close_database (
            DB_CTX * ctx )
```

Close the databases. Writes the db's to a file.

Parameters

ctx	- The context with both the database handles

Returns

int - Returns err code or 0 if all was fine

4.4.2.3 gaia_cursor_get_star()

```
SStar* GAIADB_DLL gaia_cursor_get_star (
            DBC * dbcp )
```

Get the star the cursor is pointing to.

Parameters

dbcp	- Handle to the database

Returns

SStar* - The star the cursor is pointing to

4.4.2.4 gaia_cursor_goto_star()

```
int GAIADB_DLL gaia_cursor_goto_star (
            DBC * dbcp,
            u_int64_t id )
```

Set the cursor to a star with the id given.

Parameters

dbcp	- Handle to the database
id	- ID to jump to

Returns

int - Error code or 0 if all is fine

4.4.2.5 gaia_cursor_has_next()

```
char GAIADB_DLL gaia_cursor_has_next (
             DBC * dbcp )
```

Check if the cursor is on the last record and jump to that record.

Parameters

dbcp	- Handle to the database

Returns

char - 1 if jump is succesful. Else 0

4.4.2.6 gaia_delete_star()

```
int GAIADB_DLL gaia_delete_star (
             DB * dbp,
             u_int64_t id )
```

Search and remove a star from the db.

Parameters

dbp	- Handle for the primary database
id	- The id of the star

Returns

int - Error code or 0 if all is fine

4.4.2.7 gaia_get_star()

```
SStar* GAIADB_DLL gaia_get_star (
            DB * dbp,
            u_int64_t id )
```

Get a star from the db based on the ID of the star.

Parameters

dbp	- Handle for the primary database
id	- ID of the star you are looking for

Returns

SStar* - Star object with all the data corresponding to the id given

4.4.2.8 gaia_get_star_by_morton()

```
SStar* GAIADB_DLL gaia_get_star_by_morton (
            DB * sdbp,
            u_int64_t index )
```

Get the star based on it's morton code.

Parameters

sdbp	- Handle for the secondary database with morton code indices
index	- The morton code index

Returns

SStar* - The star data corresponding to the index given

4.4.2.9 gaia_new_star()

```
int GAIADB_DLL gaia_new_star (
            DB * dbp,
            u_int64_t id,
            double x,
            double y,
            double z,
            u_int32_t colour,
            float brightness,
            u_int64_t morton_index )
```

Parameters

dbp	- Handle for the primary db
id	- ID of the star extracted from the uuid in the gaia dataset
x	- X position of the star
y	- Y position of the star
z	- Z position of the star
colour	- The colour of the star
brightness	- The brightness of the star (apparent magnitude)
morton_index	- The morton index of the star. Leave 0 if unsure

Returns

int - Error code or 0 if fine

4.4.2.10 gaia_open_cursor()

```
DBC* GAIADB_DLL gaia_open_cursor (
             DB * dbp )
```

Get a new cursor to iterate over the database.

Parameters

dbp	- Handle to the database

Returns

DBC∗ - The cursor

4.4.2.11 gaia_setup_database()

```
DB_CTX* GAIADB_DLL gaia_setup_database (
             const char * directory )
```

Setup the databases for GAIA.

Parameters

directory	- The base directory to put the databases in

Returns

DB_CTX* - A helper to manage the databases

4.4.2.12 gaia_update_star_morton()

```
int GAIADB_DLL gaia_update_star_morton (
            DB * dbp,
            u_int64_t id,
            u_int64_t morton_index )
```

Update the morton code of the star.

Parameters

dbp	- Handle of the primary database
id	- The id of the star
morton_index	- The new morton index

Returns

int - Error code or 0 if all is fine

Index