# API Documentation

API Documentation

January 21, 2018

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Benzlim

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## 1.2 Functions

**main**()

## 1.3 Variables

| Name | Description |
|---|---|
| __package__ | **Value:** `'src'` |
| lvl | **Value:** `0` |

# 2 Module src.__main__

## 2.1 Variables

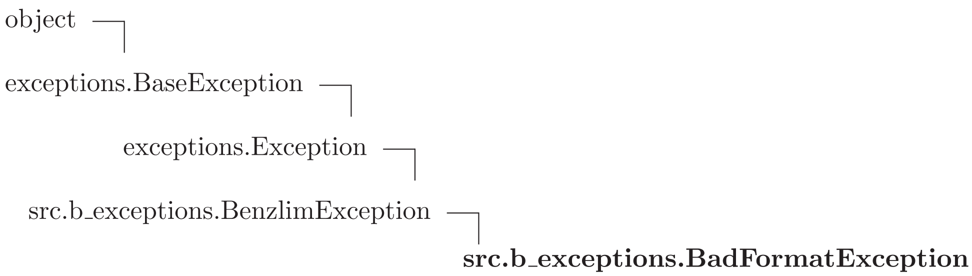
| Name | Description |
|---|---|
| __package__ | **Value:** `None` |

# 3 Module src.b_exceptions

## 3.1 Variables

| Name | Description |
|---|---|
| __package__ | **Value:** `None` |

## 3.2 Class BadFormatException


object
exceptions.BaseException
exceptions.Exception
src.b_exceptions.BenzlimException
src.b_exceptions.BadFormatException

### 3.2.1 Methods

**__init__**(*self*, **args*, ***kwargs*)

x.__init__(...) initializes x; see help(type(x)) for signature

Overrides: object.__init__ extit(inherited documentation)

***Inherited from exceptions.Exception***

__new__()

***Inherited from exceptions.BaseException***

__delattr__(), __getattribute__(), __getitem__(), __getslice__(), __reduce__(), __repr__(), __setattr__(), __setstate__(), __str__(), __unicode__()

***Inherited from object***

__format__(), __hash__(), __reduce_ex__(), __sizeof__(), __subclasshook__()

### 3.2.2 Properties

| Name | Description |
|---|---|
| *Inherited from exceptions.BaseException*<br>args, message | |
| *Inherited from object* | |

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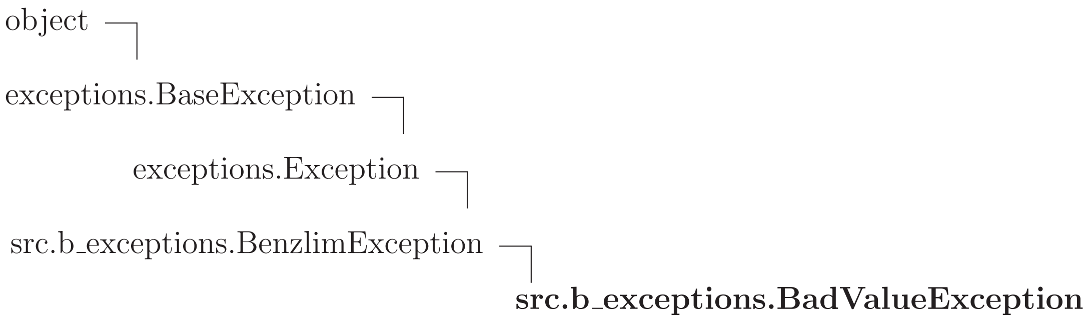
| Name | Description |
|---|---|
| __class__ | |

## 3.3 Class BadValueException


object
exceptions.BaseException
exceptions.Exception
src.b_exceptions.BenzlimException
src.b_exceptions.BadValueException

### 3.3.1 Methods

**__init__**(*self*, **args*, ***kwargs*)

x.__init__(...) initializes x; see help(type(x)) for signature

Overrides: object.__init__ extit(inherited documentation)

***Inherited from exceptions.Exception***

__new__()

***Inherited from exceptions.BaseException***

__delattr__(), __getattribute__(), __getitem__(), __getslice__(), __reduce__(), __repr__(), __setattr__(), __setstate__(), __str__(), __unicode__()

***Inherited from object***

__format__(), __hash__(), __reduce_ex__(), __sizeof__(), __subclasshook__()

### 3.3.2 Properties

| Name | Description |
|---|---|
| *Inherited from exceptions.BaseException*<br>args, message | |
| *Inherited from object*<br>__class__ | |

## 3.4 Class BenzlimException

```
object ─┐
        │
exceptions.BaseException ─┐
                          │
        exceptions.Exception ─┐
                              │
                              src.b_exceptions.BenzlimException
```

**Known Subclasses:** src.b_exceptions.BadFormatException, src.b_exceptions.BadValueException, src.b_exceptions.PriceNotFoundException, src.b_exceptions.StationNotFoundException, src.b_exceptions.T

### 3.4.1 Methods

> **__init__**(*self*, **args*, ***kwargs*)
>
> x.__init__(...) initializes x; see help(type(x)) for signature
>
> Overrides: object.__init__ extit(inherited documentation)

***Inherited from exceptions.Exception***

__new__()

***Inherited from exceptions.BaseException***

__delattr__(), __getattribute__(), __getitem__(), __getslice__(), __reduce__(), __repr__(), __setattr__(), __setstate__(), __str__(), __unicode__()

***Inherited from object***

__format__(), __hash__(), __reduce_ex__(), __sizeof__(), __subclasshook__()

### 3.4.2 Properties

| Name | Description |
|---|---|
| *Inherited from exceptions.BaseException*<br>args, message | |
| *Inherited from object*<br>__class__ | |

## 3.5 Class PriceNotFoundException

object
exceptions.BaseException
exceptions.Exception
src.b_exceptions.BenzlimException
**src.b_exceptions.PriceNotFoundException**

### 3.5.1 Methods

**__init__**(*self*, **args*, ***kwargs*)

x.__init__(...) initializes x; see help(type(x)) for signature

Overrides: object.__init__ extit(inherited documentation)

***Inherited from exceptions.Exception***

__new__()

***Inherited from exceptions.BaseException***

__delattr__(), __getattribute__(), __getitem__(), __getslice__(), __reduce__(), __repr__(), __setattr__(), __setstate__(), __str__(), __unicode__()

***Inherited from object***

__format__(), __hash__(), __reduce_ex__(), __sizeof__(), __subclasshook__()

### 3.5.2 Properties

| Name | Description |
|---|---|
| *Inherited from exceptions.BaseException*<br>args, message | |
| *Inherited from object*<br>__class__ | |

## 3.6 Class StationNotFoundException

```
object ─┐
exceptions.BaseException ─┐
          exceptions.Exception ─┐
src.b_exceptions.BenzlimException ─┐
                                     src.b_exceptions.StationNotFoundException
```

### 3.6.1 Methods

**__init__**(*self*, **args*, ***kwargs*)

x.__init__(...) initializes x; see help(type(x)) for signature

Overrides: object.__init__ extit(inherited documentation)

***Inherited from exceptions.Exception***

__new__()

***Inherited from exceptions.BaseException***

__delattr__(), __getattribute__(), __getitem__(), __getslice__(), __reduce__(), __repr__(), __setattr__(), __setstate__(), __str__(), __unicode__()

***Inherited from object***

__format__(), __hash__(), __reduce_ex__(), __sizeof__(), __subclasshook__()

### 3.6.2 Properties

| Name | Description |
|---|---|
| *Inherited from exceptions.BaseException*<br>args, message | |
| *Inherited from object*<br>__class__ | |

## 3.7 Class TrainingDataMissingException

object
exceptions.BaseException
exceptions.Exception
src.b_exceptions.BenzlimException
**src.b_exceptions.TrainingDataMissingException**

### 3.7.1 Methods

**__init__**(*self*, **args*, ***kwargs*)

x.__init__(...) initializes x; see help(type(x)) for signature

Overrides: object.__init__ extit(inherited documentation)

***Inherited from exceptions.Exception***

__new__()

***Inherited from exceptions.BaseException***

__delattr__(), __getattribute__(), __getitem__(), __getslice__(), __reduce__(), __repr__(), __setattr__(), __setstate__(), __str__(), __unicode__()

***Inherited from object***

__format__(), __hash__(), __reduce_ex__(), __sizeof__(), __subclasshook__()

### 3.7.2 Properties

| Name | Description |
|---|---|
| *Inherited from exceptions.BaseException*<br>args, message | |
| *Inherited from object*<br>__class__ | |

# 4 Module src.benchmark

benchmark.py - Benchmarking tool

## 4.1 Functions

**evaluate_prediction**(*station_id*, *ts*, *ground_ts*, *end_train_timestamp*, *dir_prices*, *nb_predictions*)

**process_benchmark_prediction**(*args*)

**benchmark_with_prices**(*nb_stations*, *nb_predictions*, *dir_prices*)

**benchmark_without_prices**(*nb_stations*, *nb_predictions*, *dir_prices*)

**benchmark_predictions**(*nb_stations*, *nb_predictions*, *dir_prices*)

**benchmark_routing**(*nb_stations*, *nb_predictions*, *dir_prices*)

**process_benchmark**(*dir_prices*, *nb_stations*=`1`, *nb_predictions*=`5`)

## 4.2 Variables

| Name | Description |
|---|---|
| __package__ | **Value:** `'src'` |

# 5 Package src.compat

compat - Compatibility packages for ython2 and python3

## 5.1 Modules

- **py2**: py2 - Python2 compatibility module
  *(Section 6, p. 13)*
- **py3**: py3 - Python3 compatibility module
  *(Section 7, p. 14)*

## 5.2 Variables

| Name | Description |
|---|---|
| __package__ | **Value:** `'src.compat'` |

# 6 Module src.compat.py2

py2 - Python2 compatibility module

## 6.1 Functions

**printf**(**args*, ***kwargs*)

**str2unicode**(*value*)

convert a str to unicode

## 6.2 Variables

| Name | Description |
|---|---|
| __package__ | **Value:** `'src.compat'` |

# 7 Module src.compat.py3

py3 - Python3 compatibility module

## 7.1 Functions

**printf**(**args*, ***kwargs*)

**str2unicode**(*value*)

convert a str to unicode

# 8 Module src.config

config.py - access benzlim's instance configuration

## 8.1 Variables

| Name | Description |
|---|---|
| __package__ | **Value:** `'src'` |

## 8.2 Class Configuration

Contains the configuration to run a benzlim instance

### 8.2.1 Methods

**__init__**(*self*, **kwargs)

**get_instance**(**kwargs)

**config**(**kwargs)

**get_pool**(*self*)

### 8.2.2 Class Variables

| Name | Description |
|---|---|
| RESOURCE_DIR | **Value:** `'resources'` |
| OUTPUT_DIR | **Value:** `'out'` |
| CLASSIFIER_FILENAME | **Value:** `'classifier.pkl'` |
| DATABASE_FILENAME | **Value:** `'db.sqlite3'` |
| TIME_BINS | **Value:** `['00:00', '01:00', '02:00', '03:00', '04:00', '05:00', '0...` |
| h | **Value:** 23 |

# 9 Package src.coverage'

coverage - Coverage informations generation about benzlim

## 9.1 Functions

**clean_benzlim**()

**clean_mp_coverages**(*empty_only*=`True`)

**coverage**()

**execute_coverage**()

## 9.2 Variables

| Name | Description |
|---|---|
| __package__ | **Value:** `'src.coverage'` |

# 10 Package src.dao

dao - Data Access Object packages for IO tasks

## 10.1 Modules

- **csv_**: csv_.py - read/write/investigate csv related files
  *(Section 11, p. 23)*
- **db**: db.py - access station related informations
  *(Section 12, p. 25)*

## 10.2 Class CSVDAO

object
**src.dao.csv_.CSVDAO**

### 10.2.1 Methods

**get_station_filename**(*cls*, *station_id*, *prices_dir*=`None`)

return the filename containing prices for the station <station_id>

**is_prices_available**(*cls*, *station_id*)

return True if prices are avaiable for the given station else False

**get_station_dataframe**(*cls*, *station_id*, *dir_prices*)

return a DataFrame containing timestamps and prices of the station <station_id>

**get_all_extended_stations_infos**(*cls*)

return station informations: id: int => Station id name: str => Station name mark: str => Mark name street: str => streetname street-number: int => house number/ street number zipcode: int => zipcode town: str latitude: float longitude: float prices_available: bool => if prices are available begin_timestamp: str => the first price timestamp

**get_all_stations_infos**(*cls*)

return station informations: id: int => Station id name: str => Station name mark: str => Mark name street: str => streetname street-number: int => house number/ street number zipcode: int => zipcode town: str latitude: float longitude: float

**get_predict_params**(*cls*, *filename*)

return [<end_timestamp>, <prediction_timestamp>, <station_id>]

**get_route_params**(*cls*, *filename*)

return <capacity>, [<timestamp>, <station_id>]

**get_route_prices_params**(*cls*, *filename*)

return [<timestamp>, <station_id>, <pred_price>]

**get_route_as_predict_params**(*cls*, *filename*)

**get_predicted_prices**(*cls*, *filename*)

return [<end_timestamp>, <prediction_timestamp>, <station_id>, <pred_price>]

**export_to_csv**(*cls*, *filename*, *rows*, *header*=`None`)

rows in the file <filename> as csv

### *Inherited from object*

__delattr__(), __format__(), __getattribute__(), __hash__(), __init__(), __new__(), __reduce__(), __reduce_ex__(), __repr__(), __setattr__(), __sizeof__(), __str__(), __subclasshook__()

#### 10.2.2 Properties

| Name | Description |
|---|---|
| *Inherited from object*<br>__class__ | |

## 10.3 Class StationDAO

object

**src.dao.db.StationDAO**

### 10.3.1 Methods

**__init__**(*self*)

x.__init__(...) initializes x; see help(type(x)) for signature

Overrides: object.__init__ extit(inherited documentation)

**get_all**(*cls*)

**get**(*cls*, *pk*)

**get_all_before**(*cls*, *timestamp*)

Return all stations with prices available before <timestamp>

**get_latitude_longitude**(*cls*, *pk*)

Return the latitude and longitude of the station with id <pk>

**is_prices_available**(*cls*, *pk*)

Return True if the station <pk> has prices else False

**get_all_with_prices**(*cls*)

Return all stations with prices available

**get_all_without_prices**(*cls*)

Return all stations without prices available

**populate**(*cls*, *data*)

Populate the corresponding table with items in data.

***Inherited from object***

__delattr__(), __format__(), __getattribute__(), __hash__(), __new__(), __reduce__(), __reduce_ex__(), __repr__(), __setattr__(), __sizeof__(), __str__(), __subclasshook__()

### 10.3.2 Properties

| Name | Description |
|---|---|
| *Inherited from object*<br>__class__ | |

### 10.3.3 Class Variables

| Name | Description |
|---|---|
| table | **Value:** `’stations’` |
| schema | **Value:** `’\nCREATE TABLE IF NOT EXISTS stations(\n id INTEGER P...` |
| indexes | **Value:** `(’CREATE INDEX IF NOT EXISTS prices_index on stations(pri...` |
| select_all_before_sql | **Value:** `’select * from stations where datetime(begin_timestamp\|\|\...` |
| select_all_query_sql | **Value:** `’select * from stations’` |
| select_query_sql | **Value:** `’select * from stations where id=?’` |
| select_all_prices_available_sql | **Value:** `’select * from stations where prices_available’` |
| select_all_prices_missing_sql | **Value:** `’select * from stations where not (prices_available)’` |
| select_prices_is_available_sql | **Value:** `’select prices_available from stations where id=?’` |
| select_latitude_longitude | **Value:** `’select latitude, longitude from stations where id=?’` |
| insert_station_sql | **Value:** `’insert into stations (id, name, mark, street, street_num...` |

## 10.4 Class DBManager

object

**src.dao.db.DBManager**

### 10.4.1 Methods

**open**(*cls*)

**get_conn**(*cls*)

**close**(*cls*)

**init_db**(*cls*)

Init the database if it doesn't exist yet.

**force_init_db**(*cls*)

Force the initialisation of the database and overwrite it.

**execute**(*cls*, *sql*, *data*=`None`)

**executemany**(*cls*, *sql*, *data*=`None`)

**populate_db**(*cls*, *data*, *sql_query*=`None`)

Populate the database with items in data.

**set_auto_commit**(*cls*, *value*=`True`)

enable/disable auto_commits to speed-up batch queries

***Inherited from object***

__delattr__(), __format__(), __getattribute__(), __hash__(), __init__(), __new__(), __reduce__(), __reduce_ex__(), __repr__(), __setattr__(), __sizeof__(), __str__(), __subclasshook__()

### 10.4.2 Properties

| Name | Description |
|---|---|
| *Inherited from object*<br>__class__ | |

### 10.4.3 Class Variables

| Name | Description |
|---|---|
| sql_schemas | **Value:** `('\nCREATE TABLE IF NOT EXISTS stations(\n id INTEGER ...` |
| sql_indexes | **Value:** `('CREATE INDEX IF NOT EXISTS prices_index on stations(pri...` |
| conn | **Value:** `None` |

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| Name | Description |
|---|---|
| table | **Value:** `'stations'` |
| table_stations | **Value:** `'stations'` |
| sql_insert_station_sql | **Value:** `'insert into stations (id, name, mark, street, street_num...` |
| sql_get | **Value:** `''` |
| sql_update | **Value:** `''` |
| sql_delete | **Value:** `''` |
| sql_save | **Value:** `''` |

# 11 Module src.dao.csv_

csv_.py - read/write/investigate csv related files

## 11.1 Variables

| Name | Description |
|---|---|
| __package__ | **Value:** `'src.dao'` |

## 11.2 Class CSVDAO

object ─┐
**src.dao.csv_.CSVDAO**

### 11.2.1 Methods

**get_station_filename**(*cls*, *station_id*, *prices_dir*=`None`)

return the filename containing prices for the station <station_id>

**is_prices_available**(*cls*, *station_id*)

return True if prices are avaiable for the given station else False

**get_station_dataframe**(*cls*, *station_id*, *dir_prices*)

return a DataFrame containing timestamps and prices of the station <station_id>

**get_all_extended_stations_infos**(*cls*)

return station informations: id: int => Station id name: str => Station name mark: str => Mark name street: str => streetname street-number: int => house number/ street number zipcode: int => zipcode town: str latitude: float longitude: float prices_available: bool => if prices are available begin_timestamp: str => the first price timestamp

**get_all_stations_infos**(*cls*)

return station informations: id: int => Station id name: str => Station name mark: str => Mark name street: str => streetname street-number: int => house number/ street number zipcode: int => zipcode town: str latitude: float longitude: float

**get_predict_params**(*cls*, *filename*)

return [<end_timestamp>, <prediction_timestamp>, <station_id>]

**get_route_params**(*cls*, *filename*)

return <capacity>, [<timestamp>, <station_id>]

**get_route_prices_params**(*cls*, *filename*)

return [<timestamp>, <station_id>, <pred_price>]

**get_route_as_predict_params**(*cls*, *filename*)

**get_predicted_prices**(*cls*, *filename*)

return [<end_timestamp>, <prediction_timestamp>, <station_id>, <pred_price>]

**export_to_csv**(*cls*, *filename*, *rows*, *header*=`None`)

rows in the file <filename> as csv

### *Inherited from object*

__delattr__(), __format__(), __getattribute__(), __hash__(), __init__(), __new__(), __reduce__(), __reduce_ex__(), __repr__(), __setattr__(), __sizeof__(), __str__(), __subclasshook__()

#### 11.2.2 Properties

| Name | Description |
|---|---|
| *Inherited from object*<br>__class__ | |

# 12 Module src.dao.db

db.py - access station related informations

## 12.1 Class DBManager

object ─┐
**src.dao.db.DBManager**

### 12.1.1 Methods

**open**(*cls*)

**get_conn**(*cls*)

**close**(*cls*)

**init_db**(*cls*)

Init the database if it doesn't exist yet.

**force_init_db**(*cls*)

Force the initialisation of the database and overwrite it.

**execute**(*cls*, *sql*, *data*=`None`)

**executemany**(*cls*, *sql*, *data*=`None`)

**populate_db**(*cls*, *data*, *sql_query*=`None`)

Populate the database with items in data.

**set_auto_commit**(*cls*, *value*=`True`)

enable/disable auto_commits to speed-up batch queries

***Inherited from object***

__delattr__(), __format__(), __getattribute__(), __hash__(), __init__(), __new__(), __reduce__(), __reduce_ex__(), __repr__(), __setattr__(), __sizeof__(), __str__(), __subclasshook__()

#### 12.1.2 Properties

| Name | Description |
|---|---|
| *Inherited from object*<br>__class__ | |

#### 12.1.3 Class Variables

| Name | Description |
|---|---|
| sql_schemas | **Value:** `('\nCREATE TABLE IF NOT EXISTS stations(\n id INTEGER ...` |
| sql_indexes | **Value:** `('CREATE INDEX IF NOT EXISTS prices_index on stations(pri...` |
| conn | **Value:** `None` |
| table | **Value:** `'stations'` |
| table_stations | **Value:** `'stations'` |
| sql_insert_station_sql | **Value:** `'insert into stations (id, name, mark, street, street_num...` |
| sql_get | **Value:** `''` |
| sql_update | **Value:** `''` |
| sql_delete | **Value:** `''` |
| sql_save | **Value:** `''` |

## 12.2 Class StationDAO

object

**src.dao.db.StationDAO**

#### 12.2.1 Methods

**__init__**(*self*)

x.__init__(...) initializes x; see help(type(x)) for signature

Overrides: object.__init__ extit(inherited documentation)

**get_all**(*cls*)

**get**(*cls*, *pk*)

**get_all_before**(*cls*, *timestamp*)

Return all stations with prices available before <timestamp>

**get_latitude_longitude**(*cls*, *pk*)

Return the latitude and longitude of the station with id <pk>

**is_prices_available**(*cls*, *pk*)

Return True if the station <pk> has prices else False

**get_all_with_prices**(*cls*)

Return all stations with prices available

**get_all_without_prices**(*cls*)

Return all stations without prices available

**populate**(*cls*, *data*)

Populate the corresponding table with items in data.

***Inherited from object***

__delattr__(), __format__(), __getattribute__(), __hash__(), __new__(), __reduce__(), __reduce_ex__(), __repr__(), __setattr__(), __sizeof__(), __str__(), __subclasshook__()

#### 12.2.2 Properties

| Name | Description |
|---|---|
| *Inherited from object*<br>__class__ | |

#### 12.2.3 Class Variables

| Name | Description |
|---|---|
| table | **Value:** `'stations'` |
| schema | **Value:** `'\nCREATE TABLE IF NOT EXISTS stations(\n id INTEGER P...` |
| indexes | **Value:** `('CREATE INDEX IF NOT EXISTS prices_index on stations(pri...` |
| select_all_before_sql | **Value:** `'select * from stations where datetime(begin_timestamp\|\|\...` |

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| Name | Description |
|---|---|
| select_all_query_sql | **Value:** ’select * from stations’ |
| select_query_sql | **Value:** ’select * from stations where id=?’ |
| select_all_prices_available_sql | **Value:** ’select * from stations where prices_available’ |
| select_all_prices_missing_sql | **Value:** ’select * from stations where not (prices_available)’ |
| select_prices_is_available_sql | **Value:** ’select prices_available from stations where id=?’ |
| select_latitude_longitude | **Value:** ’select latitude, longitude from stations where id=?’ |
| insert_station_sql | **Value:** ’insert into stations (id, name, mark, street, street_num... |

# 13 Module src.exceptions_

exceptions_.py - benzlim exceptions

## 13.1 Variables

| Name | Description |
|---|---|
| __package__ | **Value:** `None` |

## 13.2 Class BenzlimException

object
exceptions.BaseException
exceptions.Exception
**src.exceptions_.BenzlimException**

**Known Subclasses:** src.exceptions_.BadFormatException, src.exceptions_.BadValueException, src.exceptions_.PriceNotFoundException, src.exceptions_.StationNotFoundException, src.exceptions_.Train

### 13.2.1 Methods

**__init__**(*self*, *message*, **args*)

x.__init__(...) initializes x; see help(type(x)) for signature

Overrides: object.__init__ extit(inherited documentation)

**__str__**(*self*)

str(x)

Overrides: object.__str__ extit(inherited documentation)

***Inherited from exceptions.Exception***

__new__()

***Inherited from exceptions.BaseException***

__delattr__(), __getattribute__(), __getitem__(), __getslice__(), __reduce__(), __repr__(), __setattr__(), __setstate__(), __unicode__()

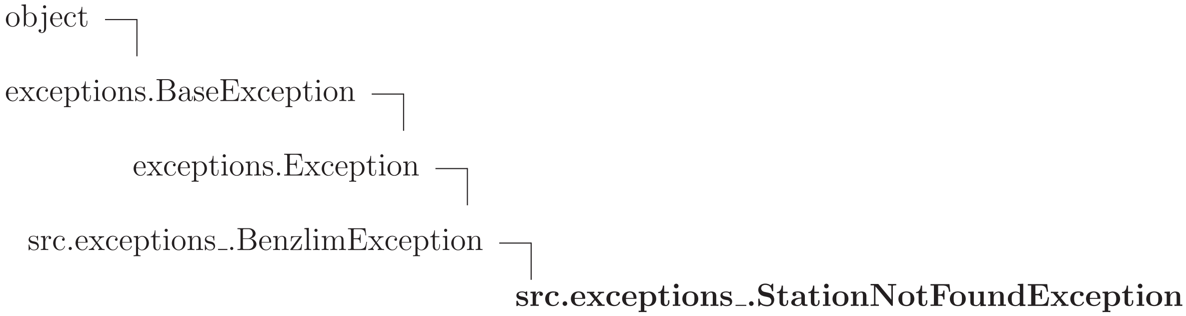
***Inherited from object***

__format__(), __hash__(), __reduce_ex__(), __sizeof__(), __subclasshook__()

#### 13.2.2 Properties

| Name | Description |
|---|---|
| *Inherited from exceptions.BaseException*<br>args, message | |
| *Inherited from object*<br>__class__ | |

### 13.3 Class StationNotFoundException



object

exceptions.BaseException

exceptions.Exception

src.exceptions_.BenzlimException

**src.exceptions_.StationNotFoundException**

#### 13.3.1 Methods

**__init__**(*self*, *message*, **args*)

x.__init__(...) initializes x; see help(type(x)) for signature

Overrides: object.__init__ extit(inherited documentation)

***Inherited from src.exceptions_.BenzlimException(Section 13.2)***

__str__()

***Inherited from exceptions.Exception***

__new__()

***Inherited from exceptions.BaseException***

__delattr__(), __getattribute__(), __getitem__(), __getslice__(), __reduce__(), __repr__(), __setattr__(), __setstate__(), __unicode__()

***Inherited from object***

__format__(), __hash__(), __reduce_ex__(), __sizeof__(), __subclasshook__()

### 13.3.2 Properties

| Name | Description |
|---|---|
| *Inherited from exceptions.BaseException*<br>args, message | |
| *Inherited from object*<br>__class__ | |

## 13.4 Class PriceNotFoundException

```
object ─┐
        │
exceptions.BaseException ─┐
                          │
         exceptions.Exception ─┐
                               │
  src.exceptions_.BenzlimException ─┐
                                    │
                                    src.exceptions_.PriceNotFoundException
```

### 13.4.1 Methods

**__init__**(*self*, *message*, **args*)

x.__init__(...) initializes x; see help(type(x)) for signature

Overrides: object.__init__ extit(inherited documentation)

***Inherited from src.exceptions_.BenzlimException(Section 13.2)***

__str__()

***Inherited from exceptions.Exception***

__new__()

***Inherited from exceptions.BaseException***

__delattr__(), __getattribute__(), __getitem__(), __getslice__(), __reduce__(), __repr__(), __setattr__(), __setstate__(), __unicode__()

***Inherited from object***

__format__(), __hash__(), __reduce_ex__(), __sizeof__(), __subclasshook__()

### 13.4.2 Properties

| Name | Description |
|---|---|
| *Inherited from exceptions.BaseException*<br>args, message | |
| *Inherited from object*<br>__class__ | |

## 13.5 Class TrainingDataMissingException

```
object ─┐
exceptions.BaseException ─┐
          exceptions.Exception ─┐
  src.exceptions_.BenzlimException ─┐
                                  src.exceptions_.TrainingDataMissingException
```

### 13.5.1 Methods

**__init__**(*self*, *message*, **args*)

x.__init__(...) initializes x; see help(type(x)) for signature

Overrides: object.__init__ extit(inherited documentation)

***Inherited from src.exceptions_.BenzlimException(Section 13.2)***

__str__()

***Inherited from exceptions.Exception***

__new__()

***Inherited from exceptions.BaseException***

__delattr__(), __getattribute__(), __getitem__(), __getslice__(), __reduce__(), __repr__(), __setattr__(), __setstate__(), __unicode__()

### *Inherited from object*

__format__(), __hash__(), __reduce_ex__(), __sizeof__(), __subclasshook__()

#### 13.5.2 Properties

| Name | Description |
|---|---|
| *Inherited from exceptions.BaseException*<br>args, message | |
| *Inherited from object*<br>__class__ | |

## 13.6 Class BadFormatException

object

exceptions.BaseException

exceptions.Exception

src.exceptions_.BenzlimException

**src.exceptions_.BadFormatException**

#### 13.6.1 Methods

**__init__**(*self*, *message*, **args*)

x.__init__(...) initializes x; see help(type(x)) for signature

Overrides: object.__init__ extit(inherited documentation)

### *Inherited from src.exceptions_.BenzlimException(Section 13.2)*

__str__()

### *Inherited from exceptions.Exception*

__new__()

### *Inherited from exceptions.BaseException*

__delattr__(), __getattribute__(), __getitem__(), __getslice__(), __reduce__(), __repr__(), __setattr__(), __setstate__(), __unicode__()

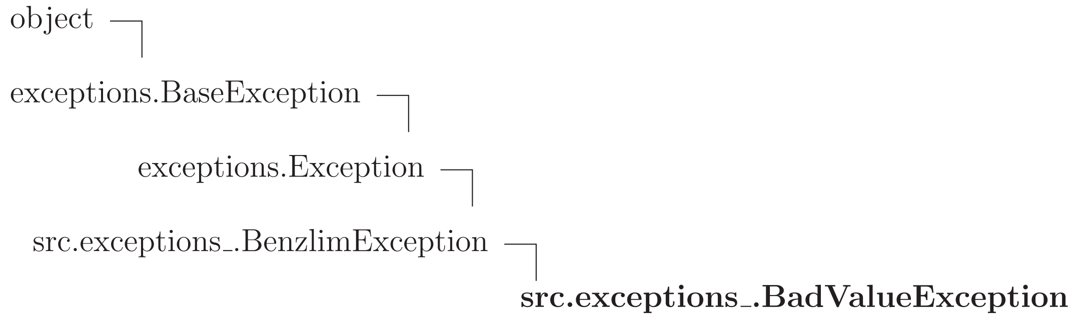
### *Inherited from object*

__format__(), __hash__(), __reduce_ex__(), __sizeof__(), __subclasshook__()

#### 13.6.2 Properties

| Name | Description |
|---|---|
| *Inherited from exceptions.BaseException*<br>args, message | |
| *Inherited from object*<br>__class__ | |

## 13.7 Class BadValueException


object
exceptions.BaseException
exceptions.Exception
src.exceptions_.BenzlimException
src.exceptions_.BadValueException

#### 13.7.1 Methods

**__init__**(*self*, *message*, **args*)

x.__init__(...) initializes x; see help(type(x)) for signature

Overrides: object.__init__ extit(inherited documentation)

### *Inherited from src.exceptions_.BenzlimException(Section 13.2)*

__str__()

### *Inherited from exceptions.Exception*

__new__()

### *Inherited from exceptions.BaseException*

__delattr__(), __getattribute__(), __getitem__(), __getslice__(), __reduce__(), __repr__(), __setattr__(), __setstate__(), __unicode__()

### *Inherited from object*

__format__(), __hash__(), __reduce_ex__(), __sizeof__(), __subclasshook__()

### 13.7.2 Properties

| Name | Description |
|---|---|
| *Inherited from exceptions.BaseException*<br>args, message | |
| *Inherited from object*<br>__class__ | |

# 14 Package src.prediction

prediction - The benzlim core prediction

## 14.1 Modules

- **classification**: classfication.py - gas stations classfication tools *(Section 15, p. 37)*
- **db** *(Section 16, p. 40)*
- **predict**: predict.py - core prediction tools *(Section 17, p. 44)*

## 14.2 Functions

**process_task**(*args*)

**predict_prices_timestamps_x2_stations**(*timestamps_x2_stations*, *dir_prices*, *nb_workers*=None)

return [<end_timestamp>, <timestamp>, <station_id>, <pred_price>],
timestamps_x2_stations: list[<end_timestamp>, <timestamp>, <station_id>]
dir_prices: directory path

**process_predictions**(*filename*, *dir_prices*, *out_filename*=None, *nb_workers*=None)

**process_routing**(*filename*, *dir_prices*, *out_filename*=None, *gas_prices_file*=None, *nb_workers*=None, *auto_end_timestamp*=True)

## 14.3 Variables

| Name | Description |
|---|---|
| __package__ | **Value:** 'src.prediction' |

# 15 Module src.prediction.classification

classfication.py - gas stations classfication tools

## 15.1 Variables

| Name | Description |
|---|---|
| LATITUDE_MAX | **Value:** `90.0` |
| LONGITUDE_MAX | **Value:** `180.0` |
| HASH_MAX | **Value:** `982451653` |
| NB_CHARS | **Value:** `45` |
| __package__ | **Value:** `'src.prediction'` |

## 15.2 Class CSClassifier

object ─┐
**src.prediction.classification.CSClassifier**

### 15.2.1 Methods

**__init__**(*self*, *scoring_function*=`None`, *partition_index*=`0`)

x.__init__(...) initializes x; see help(type(x)) for signature

Overrides: object.__init__ extit(inherited documentation)

**fit**(*self*, *x_values*, *labels*)

**predict**(*self*, *x*, *try_skip_id*=`None`)

predict class for features x based on the training data

***Inherited from object***

__delattr__(), __format__(), __getattribute__(), __hash__(), __new__(), __reduce__(), __reduce_ex__(), __repr__(), __setattr__(), __sizeof__(), __str__(), __subclasshook__()

### 15.2.2 Properties

| Name | Description |
|---|---|
| *Inherited from object*<br>__class__ | |

## 15.3 Class Classifier

object ─┐
**src.prediction.classification.Classifier**

### 15.3.1 Methods

**__init__**(*self*)

x.__init__(...) initializes x; see help(type(x)) for signature

Overrides: object.__init__ extit(inherited documentation)

**get_category**(*cls*, *station_row*)

Return a category for the given station

**station_id2id**(*cls*, *station_id*, *end_train_timestamp*=`None`, *ignore_station*=`False`)

Return a usable station id

**station_row2id**(*cls*, *station_row*, *end_train_timestamp*=`None`, *ignore_station*=`False`)

Return a usable (with prices available) id

**get_station_features**(*cls*, *station_row*)

Return features for the given station

**get_prepared_data**(*cls*, *ext_stations*=`None`)

return features with corresponding classes

**train**(*cls*, *features*=`None`, *classes*=`None`)

**dump**(*cls*, *classifier*, *filename*=`None`)

**load**(*cls*, *filename*=`None`, *create_on_error*=`True`)

***Inherited from object***

__delattr__(), __format__(), __getattribute__(), __hash__(), __new__(), __reduce__(), __reduce_ex__(), __repr__(), __setattr__(), __sizeof__(), __str__(), __subclasshook__()

### 15.3.2 Properties

| Name | Description |
|---|---|
| *Inherited from object*<br>__class__ | |

# 16 Module src.prediction.db

## 16.1 Functions

**icompare**(*text1*, *text2*)

## 16.2 Variables

| Name | Description |
|---|---|
| DB_PATH | **Value:** `'resources/db/db.sqlite3'` |
| DB_SQL_INDEX_MARK | **Value:** `'CREATE INDEX IF NOT EXISTS mark_index on stations(mark C...` |
| DB_SQL_INDEX_NAME | **Value:** `'CREATE INDEX IF NOT EXISTS word_index on stations(name C...` |
| DB_SQL_INDEX_PLACE | **Value:** `'CREATE INDEX IF NOT EXISTS place_index on stations(place...` |
| DB_SQL_INDEX_STATION | **Value:** `'CREATE INDEX IF NOT EXISTS station_index on prices(stati...` |
| DB_SQL_SCHEMA_PRICES | **Value:** `'CREATE TABLE IF NOT EXISTS prices(\n id INTEGER PRIMA...` |
| DB_SQL_SCHEMA_STATIONS | **Value:** `'\nCREATE TABLE IF NOT EXISTS stations(\n id INTEGER P...` |
| __package__ | **Value:** `'src.prediction'` |

## 16.3 Class DBManager

object

**src.prediction.db.DBManager**

### 16.3.1 Methods

**close**(*cls*)

**execute**(*cls*, *sql*, *data*=None)

**executemany**(*cls*, *sql*, *data*=None)

**force_init_db**(*cls*)

Force the initialisation of the database and overwrite it.

**getConn**(*cls*)

**init_db**(*cls*)

Init the database if it doesn't exist yet.

**open**(*cls*)

**populate_db**(*cls*, *data*, *sql_query*=`None`)

Populate the database with items in data.

**set_auto_commit**(*cls*, *value*=`True`)

### *Inherited from object*

__delattr__(), __format__(), __getattribute__(), __hash__(), __init__(), __new__(), __reduce__(), __reduce_ex__(), __repr__(), __setattr__(), __sizeof__(), __str__(), __subclasshook__()

### 16.3.2 Properties

| Name | Description |
|---|---|
| *Inherited from object*<br>__class__ | |

### 16.3.3 Class Variables

| Name | Description |
|---|---|
| conn | **Value:** `None` |
| filename | **Value:** `'resources/db/db.sqlite3'` |
| sql_delete | **Value:** `''` |
| sql_get | **Value:** `''` |
| sql_indexes | **Value:** `('CREATE INDEX IF NOT EXISTS mark_index on stations(mark ...` |
| sql_insert_price | **Value:** `'insert into Prices (id, station_id, timestamp, price) va...` |
| sql_insert_station | **Value:** `'insert into Stations (id, name, mark, street, street_num...` |
| sql_save | **Value:** `''` |

*continued on next page*

| Name | Description |
|---|---|
| sql_schemas | **Value:** `('\nCREATE TABLE IF NOT EXISTS stations(\n id INTEGER ...` |
| sql_update | **Value:** `''` |
| table | **Value:** `'Stations'` |
| table_prices | **Value:** `'Prices'` |
| table_stations | **Value:** `'Stations'` |

## 16.4 Class PriceDAO

### 16.4.1 Methods

**get**(*cls*, *pk*=`None`)

**getAll**(*cls*)

### 16.4.2 Class Variables

| Name | Description |
|---|---|
| select_all_query | **Value:** `'select * from prices'` |
| select_query | **Value:** `'select * from prices where id=?'` |
| table | **Value:** `'prices'` |

## 16.5 Class StationDAO

### 16.5.1 Methods

**get**(*cls*, *pk*)

**getAll**(*cls*)

**get_all_with_prices**(*cls*)

**get_all_without_prices**(*cls*)

**is_prices_missing**(*cls*, *pk*)

### 16.5.2 Class Variables

| Name | Description |
|---|---|
| select_all_prices_available | **Value:** `'select * from stations where prices_available=1'` |
| select_all_prices_missing | **Value:** `'select * from stations where prices_available=0'` |
| select_all_query | **Value:** `'select * from stations'` |
| select_prices_is_available | **Value:** `'select * from stations where id=?'` |
| select_query | **Value:** `'select * from stations where id=?'` |
| table | **Value:** `'stations'` |

# 17 Module src.prediction.predict

predict.py - core prediction tools

## 17.1 Functions

**get_time_range**(*timestamp*)

**get_freq_avg**(*ts*, *freq*=`'10T'`, *fill_method*=`'pad'`, *fill_method2*=`None`)

resample the timeserie with the new frequence <freq> using the fill methods for NANs

**get_time**(*timestamp*, *field*=`None`)

return the corresponding value of the attribut corresponding to <field> timestamp: <pd.Timestamp> field: <str> Y, M, W, D, H, T

**get_price_predictor**(*station_id*, *dir_prices*, *ts*=`None`, *time_begin*=`None`, *time_end*=`None`, *end_train_timestamp*=`None`, *poly_deg*=2)

Generate a price predictor for gas station <station_id> of the timeserie <ts>, station_id: str, the id of the station ts: DataFrame|Serie, the price's timeserie of as gas station time_begin: str, time_end: str, end_train_timestamp: str, the last usable timestamp for learning, poly_deg: int, the degree of polynomial approximation [1,2,3,4,5] return the callable prediction(timestamp)

if station_id is submitted, the predictor is cached resp. recovered from the cache if available

If the difference between the predicted value and the average is bigger than 20% of the average, the predictor will return the average instead of the predicted value

**get_price_predictor2**(*station_id*, *dir_prices*, *ts*=None, *time_begin*=None, *time_end*=None, *end_train_timestamp*=None, *poly_deg*=2)

Generate a price predictor for gas station <station_id> of the timeserie <ts>, station_id: str, the id of the station ts: DataFrame|Series, the price's timeserie of as gas station end_train_timestamp: str, the last usable timestamp for learning, poly_deg: int, the degree of polynomial approximation return the predictor as a numpy.poly1d

if station_id is submitted, the predictor is cached resp. recovered from the cache

If the difference between the predicted value and the average is bigger than 20% of the average, the predictor will return the average instead of the predicted value

**predict_price**(*station_id*, *timestamp*, *end_train_timestamp*, *dir_prices*, *bench_ts*=None)

## 17.2 Variables

| Name | Description |
|---|---|
| MAX_MARGIN_COEF | **Value:** `0.2` |
| CACHE_PREDICTORS | **Value:** {} |
| __package__ | **Value:** `'src.prediction'` |

# 18 Package src.routing

routing - gas tank strategy manager

## 18.1 Modules

- **graph**: graph.y - Tank strategy optimizer for graph based routes
  *(Section 19, p. 47)*
- **node**: node.py - Nodes for graph based representation of gas stations in a route
  *(Section 20, p. 48)*

## 18.2 Functions

**generate_tank_infos**(*capacity*, *timestamps_stations_prices*)

## 18.3 Variables

| Name | Description |
|---|---|
| __package__ | **Value:** `'src.routing'` |

# 19 Module src.routing.graph

graph.y - Tank strategy optimizer for graph based routes

## 19.1 Variables

| Name | Description |
|---|---|
| __package__ | **Value:** `'src.routing'` |

## 19.2 Class Graph

### 19.2.1 Methods

**__init__**(*self*, *capacity*)

**gas_for_km**(*self*, *km*)

**km_for_gas**(*self*, *gas*)

**find_prevs**(*self*)

**find_nexts**(*self*)

**generate_refuel_infos**(*self*)

# 20 Module src.routing.node

node.py - Nodes for graph based representation of gas stations in a route

## 20.1 Variables

| Name | Description |
|---|---|
| __package__ | **Value:** `'src.routing'` |

## 20.2 Class Node

### 20.2.1 Methods

**__init__**(*self*, *id_*, *lat*, *lon*, *price*=`0`, *timestamp*=`''`)

**__lt__**(*self*, *other*)

**__le__**(*self*, *other*)

**__eq__**(*self*, *other*)

**__str__**(*self*)

**__repr__**(*self*)

**distance_to**(*self*, *other*, *g*, *use_tolerance*=`False`)

**price_for_gas**(*self*, *amount*)

**set_price**(*self*, *price*)

### 20.2.2 Properties

| Name | Description |
|---|---|
| key | |

# 21 Package src.tests

tests - Tests runner

## 21.1 Functions

**diff_prices**(*data1*, *data2*)

**get_route_files_prices**()

**get_predict_files_prices**()

**verify_route**(*route_filename*, *route_prices_filename*, *nb_runs*=12)

**test_predict**()

**test_route**()

**test**()

## 21.2 Variables

| Name | Description |
|---|---|
| __package__ | **Value:** `'src.tests'` |

# 22 Module src.train

train.py - manage the whole training

## 22.1 Variables

| Name | Description |
|---|---|
| __package__ | **Value:** `'src'` |

## 22.2 Class Trainer

object
**src.train.Trainer**

### 22.2.1 Methods

**train**(*force_train*=`False`)

**autotrain**()

***Inherited from object***

__delattr__(), __format__(), __getattribute__(), __hash__(), __init__(), __new__(), __reduce__(), __reduce_ex__(), __repr__(), __setattr__(), __sizeof__(), __str__(), __subclasshook__()

### 22.2.2 Properties

| Name | Description |
|---|---|
| *Inherited from object*<br>__class__ | |

# 23 Module src.utils

utils.py - usefool tools

## 23.1 Functions

**diff_score**(*v1*, *v2*)

return the norm of the difference between both vectors

**str2latitute**(*value*)

convert a str to valid latitude

**str2longitude**(*value*)

convert a str to valid longitude

**str2mark**(*value*)

convert a str to unicode

**str2town**(*value*)

convert a str to unicode

**str2zipcode**(*value*)

convert a str to int

**create_file_dirs**(*filename*)

create all directories contained in the tree to filename

**create_dirs**(*path*)

create all directories leading to path (inclusive itself)

## 23.2 Variables

| Name | Description |
|---|---|
| ERROR_FILE_EXISTS | **Value:** `17` |
| __package__ | **Value:** `'src'` |

# Index