
json-as-db

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Using JSON file as a very simple and lightweight database.

Save all your records into file as JSON format to be easy to read for human. also fetch from the file just as what you see.

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1.1 Installation

Installing JSON-as-DB is pretty simple.

Note: Using a virtual environment will make the installation easier, and will help to avoid clutter in your system-wide libraries.

JSON-as-DB is available on Pypi as `json-as-db`, so you can install using pip as like following command.

```
$ pip install json-as-db
```

Also you can install directly from source. You will need git in order to clone the repository.

```
$ git clone https://github.com/joonas-yoon/json-as-db.git
$ cd json-as-db
$ pip install -e .
```

If you want to test methods working well, here is the unit tests in `tests/` directory. These unittest-based tests are written using `PyTest`.

Now that you have installed all dependencies, you can run tests to check functions like,

```
$ PYTHONPATH=src python -m pytest
```

1.2 Examples

1.2.1 Database

The *Database* is compatible with `dictionary` where is Python built-in class, except only for some of setters.

So you can use them as dictionary-like, including useful CRUD methods and more.

```
>>> from json_as_db import Database
>>> db = Database()
>>> db.add([
...     { "id": 1001, "type": "Regular" },
...     { "id": 1002, "type": "Chocolate" }
... ])
["aT7kM2pW8L7JisSkNjpAhr", "RUJGcVBFANvNRReXa8U3En"]
>>> db.get("aT7kM2pW8L7JisSkNjpAhr")
```

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```
{ "id": 1001, "type": "Regular" }
>>> db.count()
2
>>> db.all()
[{"id": 1001, "type": "Regular"}, {"id": 1002, "type": "Chocolate"}]
>>> db.save('path/dir/file.json')
```

Moreover, *Database* provides and supports many operations. Please see the following examples.

Basic operations

Add

You can add single item into *Database*. It returns automatically generated ID of added item. This new ID is important to use to get and to manipulate data from *Database*.

```
>>> db.add({
...     "id": 1001,
...     "type": "Regular"
... })
"aT7kM2pW8L7JisSkNjpAhr"
```

It supports to add multiple items with list.

```
>>> db.add([
...     {
...         "id": "1001",
...         "type": "Regular"
...     },
...     {
...         "id": "1002",
...         "type": "Chocolate"
...     },
...     {
...         "id": "1003",
...         "type": "Blueberry"
...     },
... ])
['FqkmbYFSCRAHQWydM69v', 'RUJGcVBFANvNRReXa8U3En', 'F3c3rWpzb3Wh2XYQpoYu9v']
```

Remove

You can remove object(s) in *Database* using remove method by given ID(s). It returns removed object from *Database*.

```
>>> db.remove("aT7kM2pW8L7JisSkNjpAhr")
{'id': '1001', 'type': 'Regular'}
>>> db.remove(['FqkmbYFSCRAHQWydM69v', 'RUJGcVBFANvNRReXa8U3En'])
[{'id': '1001', 'type': 'Regular'}, {'id': '1002', 'type': 'Chocolate'}]
```


Get

You can get object(s) by given ID(s) in two ways, the first one is:

```
>>> db.get("aT7kM2pW8L7JisSkNjpAhr")
{'id': '1001', 'type': 'Regular'}
>>> db.get(["FqkmbYFSCRAHQWydhM69v", "RUJGcVBFANvNRReXa8U3En"])
[{'id': '1001', 'type': 'Regular'}, {'id': '1002', 'type': 'Chocolate'}]
```

The second way, to get a single object with ID, is using getter operation.

```
>>> db["aT7kM2pW8L7JisSkNjpAhr"]
{'id': '1001', 'type': 'Regular'}
```

If there is no key in *Database* with given ID(s), it returns simply *None*.

```
>>> db.get("NotExistKeyString")
None
>>> db.get(['FqkmbYFSCRAHQWydhM69v', 'NotExistKeyString'])
[{'id': '1001', 'type': 'Regular'}, None]
```

Modify

Single item

```
>>> db.modify(
...     id="FqkmbYFSCRAHQWydhM69v",
...     value={
...         "type": "Irregular"
...     })
{'type': 'Irregular'}
```

Multiple items

```
>>> db.modify(
...     id=["FqkmbYFSCRAHQWydhM69v", "RUJGcVBFANvNRReXa8U3En"],
...     value=[
...         {'type': 'Apple'}, {'type': 'Orange'}
...     ])
[{'type': 'Apple'}, {'type': 'Orange'}]
```

Find

You can find objects with passing lambda function to handle each items. For example:

```
>>> db.find(lambda x: x['type'].endswith('e'))
['2g4kaFAiDBPchz66HNPsZa', 'dpKsCc7evmV7Mxq8ikgY89', 'fewugXnJHosmaXeqbXrLtD']
>>> db.get(['2g4kaFAiDBPchz66HNPsZa', 'dpKsCc7evmV7Mxq8ikgY89', 'fewugXnJHosmaXeqbXrLtD'
↪ ''])
[{'id': 1001, 'type': 'Chocolate'}, {'id': 1002, 'type': 'Orange'}, {'id': 1003, 'type':
↪ 'Apple'}]
```

Also we provide flexible wrappers for `==`, `!=`, `<`, `<=`, `>`, `>=` to comparison operators.

```
>>> from json_as_db import Key
>>> db = Database()
>>> db.add([{'product': 'Chocolate', 'amount': 10}, {'product': 'Orange', 'amount': 1}, {
↳ 'product': 'Apple', 'amount': 3}])
['oTTno3xwizirjM6skVrZsi', 'Gw9pwyev6cXJbHkT3sSUaW', 'LVw4smsL9WRgtRo5bTSnuX']
>>> db.find(Key('type') == 'Chocolate')
['oTTno3xwizirjM6skVrZsi']
>>> db.find(Key('product') > 'Apple')
['oTTno3xwizirjM6skVrZsi', 'Gw9pwyev6cXJbHkT3sSUaW']
>>> db.find(Key('amount') <= 3)
['Gw9pwyev6cXJbHkT3sSUaW', 'LVw4smsL9WRgtRo5bTSnuX']
```

Commit & Rollback

When `commit()`, it saves its states and all items at that time. Using `rollback()` restores all states and items from latest commit. Note that *Database* supports to store only for a single commit.

```
>>> db.all() # Show all items before commit
[{'type': 'Orange'}]
>>> db.commit()
>>> db.add([{'type': 'Apple'}, {'type': 'Banana'}]) # Add some items after commit
>>> db.all()
[{'type': 'Orange'}, {'type': 'Apple'}, {'type': 'Banana'}]
>>> db.rollback()
>>> db.all()
[{'type': 'Orange'}]
```

Load

You can get the *Database* object from local JSON formatted file.

This method reads JSON file from directory where given path. In following example, it reads the file from `path/dir/sample.json`.

```
>>> db.load('path/dir/sample.json')
{'data': {'2g4kaFAiDBPchz66HNPsZa': {'type': 'Orange'}}, 'creator': 'json_as_db',
↳ 'created_at': '2022-12-25T14:23:28.906103', 'version': '1.0.0', 'updated_at': '2022-12-
↳ 25T14:23:28.906103'}
```

Save

Save *Database* into file as JSON format. You can read from this saved file.

```
>>> db.save()
```

It supports keyword parameters for JSON formatter and options to file saving. Please refer to the document page of modules in details.

```
>>> db.save(file_kwds={'encoding': 'utf-8'}, json_kwds={'indent': 4})
```

then you can see the file content as like the following,

```
{
  "created_at": "2022-12-25T16:50:02.459068",
  "creator": "json_as_db",
  "data": {
    "AwMJDzrjKpWJCee5iSozXW": {
      "type": "Orange"
    }
  },
  "updated_at": "2022-12-25T17:11:56.790276",
  "version": "1.0.0"
}
```

Other operations

All

We can get all values of items in *Database* without their keys.

```
>>> db.all()
[{'type': 'Yogurt'}, {'type': 'Apple'}, {'type': 'Banana'}]
```

Clear

The clear method removes all of the objects.

```
>>> db.clear()
```

Has

If we want to know whether *Database* has key, here is easy way to know. Please see the following examples.

```
>>> db.keys()
dict_keys(['AwMJDzrjKpWJCee5iSozXW', '5C8SJM54ogkCmsNJA2Cdja', '8LEJS5uGuopxcPQ3uKN8ty'])
>>> db.has('AwMJDzrjKpWJCee5iSozXW')
True
>>> db.has('NotExistsKeyString')
False
```

And it supports the parameter of list type as it will return list of each result as boolean.

```
>>> db.has(['AwMJDzrjKpWJCee5iSozXW', 'NotExistsKeyString'])
[True, False]
```

Count

```
>>> db.count()
3
```

```
>>> len(db)
3
```

Drop

This works as same as `clear()` method, but this returns the count of dropped items. As you know, the count of dropped one is exactly equal to the count using `count()` before dropping.

```
>>> db.all()
[{'type': 'Yogurt'}, {'type': 'Apple'}, {'type': 'Banana'}]
>>> db.drop()
3
>>> db.all()
[]
>>> db.drop()
0
```

Specials

Fields

Metadata

Retrieves metadata from *Database*. This doesn't contain hidden fields in instance of its.

```
>>> db.metadata
{'version': '1.0.0', 'creator': 'json-as-db', 'created_at': '2022-12-25T16:50:02.459068',
↪ 'updated_at': '2022-12-25T17:11:56.790276'}
```

Data

The data field is shortcut to get all items directly in code. It returns all key and values as the following,

```
>>> db.data
{'AwMJDzrjKpWJCee5iSozXW': {'type': 'Orange'}, '5C8SJM54ogkCmsNJA2Cdja': {'type': 'Apple'},
↪ '8LEJS5uGuopxcPQ3uKN8ty': {'type': 'Banana'}}
```

To keep data in safe, actions to set directly is prohibited. So, when you try to set it using syntax like `db.data = {}`, it will fail with *AttributeError* exception.

```
>>> db.data = {'NewInjectedIdWhatIWant': {'type': 'Bug'}}
AttributeError: can't set attribute
```

Version

Note: This does NOT mean the version of package. This is *Database* version for specification to read and parse.

```
>>> db.version
'1.0.0'
```

Accessor

Dictionary-like

Database object is compatible with *dictionary* which is Python built-in class.

All accessors are wrapped and it provides internal data, not metadata. Please check the following example runnings and results.

```
>>> db.data
{'AwMJDzrjKpWJCee5iSozXW': {'type': 'Orange'}, '5C8SJM54ogkCmsNJA2Cdja': {'type': 'Apple'
↪ }}
>>> ID = 'AwMJDzrjKpWJCee5iSozXW'
>>> db.data[ID]
{'type': 'Orange'}
>>> db[ID]
{'type': 'Orange'}
>>> db.get(ID)
{'type': 'Orange'}
>>> db.get(ID).update({'type': 'Yogurt'})
>>> db.data
{'AwMJDzrjKpWJCee5iSozXW': {'type': 'Yogurt'}, '5C8SJM54ogkCmsNJA2Cdja': {'type': 'Apple'
↪ }}
```

1.3 Modules

1.3.1 Database

class json_as_db.core.database.Database(*arg, **kwargs)

Bases: dict

add(item: Union[Any, List[Any]]) → Union[str, List[str]]

Parameters

item (Union[Any, List[Any]]) – Object(s) to add to database

Returns

Automatically generated ID of added item

Return type

Union[str, List[str]]

all() → List[Any]

Provide all items in database.

Returns

All items as list

Return type

List[Any]

clear() → None

Clear all items. This method updates timestamp in metadata.

commit() → None

Save its states and all items at that time.

count() → int

Returns

indicates the count of all data

Return type

int

property data: dict

drop() → int

Returns

indicates the count of dropped items

Return type

int

find(*func: Callable[[...], bool]*) → List[str]

Returns array of IDs that satisfies the provided testing function.

Parameters

func (*Callable[... , bool]*) – A function to execute for each items in database. It will call *func(value)* to determine boolean.

Returns

array with id of found items

Return type

List[str]

get(*key: Union[str, List[str]], default=None*) → Union[Any, List[Any]]

Get objects by given IDs when list is given. When single string is given, returns single object by given key

Parameters

- **key** (*str | List[str]*) – single key or list-like
- **default** (*Any, optional*) – default value if not exists. Defaults to None.

Returns

single object or list-like

Return type

Any | List[Any]

Examples

```
>>> db.get('kcbPuqpfV3YSHT8YbECjvh')
{...}
>>> db.get(['kcbPuqpfV3YSHT8YbECjvh'])
[ {... } ]
>>> db.get(['kcbPuqpfV3YSHT8YbECjvh', 'jmJKBJBAmGES3rGbSb62T'])
[ {... }, { ... } ]
```

has(key: Union[str, List[str]]) → Union[bool, List[bool]]

performs to determine whether has key

Parameters

key (Union[str, List[str]]) – to find with string(s) as key

Returns

boolean or array of boolean.

Return type

Union[bool, List[bool]]

items() → a set-like object providing a view on D's items

keys() → a set-like object providing a view on D's keys

load(path: str, file_args: dict = {'encoding': 'utf-8', 'mode': 'r'}, json_args: dict = {}) → Database

Load database object from a file

Parameters

- **path** (str) – a string containing a file name to load.
- **file_args** (dict, optional) – keyword arguments for file *open*(**kwargs). Defaults to dict(mode="r", encoding="utf-8",).
- **json_args** (dict, optional) – keyword arguments for *json.loads*(**kwargs). Defaults to dict().

Raises

AttributeError – when JSON file does not contain keys and values to read into valid Database object.

Returns

itself

Return type

Database

property metadata: dict

modify(id: Union[str, List[str]], value: Union[Any, List[Any]]) → Union[Any, List[Any]]

Parameters

- **id** (str | List[str]) – id(s) to modify
- **value** (Any | List[Any]) – value(s) to modify

Raises

ValueError – type or length is not matched

Returns

Modified value(s)

Return type

Any | List[Any]

remove(*key*: Union[str, List[str]]) → Union[Any, List[Any]]

Parameters

key (Union[str, List[str]]) – ID(s) to remove from database

Returns

removed items

Return type

Union[Any, List[Any]]

rollback() → None

Restore all states and items from latest commit.

save(*path*: str, *file_args*: dict = {'encoding': 'utf-8', 'mode': 'w'}, *json_args*: dict = {'sort_keys': True}, *make_dirs*: bool = False) → None

Save database object into a file as JSON format

Parameters

- **path** (str) – a string containing a file name to save.
- **file_args** (dict, optional) – keyword arguments for file *open*(**kwags). Defaults to dict(mode="w+", encoding="utf-8",).
- **json_args** (dict, optional) – keyword arguments for *json.dumps*(**kwags). Defaults to dict(sort_keys=True,).
- **make_dirs** (bool, optional) – create non-exists directories in given path. Defaults to False.

update(*mapping*: Union[dict, tuple] = (), **kwags) → None

Note that this method overrides database itself.

values() → an object providing a view on D's values

property version: str

1.3.2 Matcher

class json_as_db.core.matcher.Comparator

Bases: object

evaluate(*other*: dict) → bool

class json_as_db.core.matcher.Condition(*key*: str, *value*: Any, *operator*: Operator)

Bases: Comparator

copy() → Condition

evaluate(*item*: dict) → bool

key: str

operator: `Operator`

value: `Any`

class `json_as_db.core.matcher.Conditions`(*lvalue: Union[Condition, Conditions], rvalue: Union[Condition, Conditions], operator: Operator*)

Bases: `Comparator`

copy() \rightarrow `Conditions`

evaluate(*other: dict*) \rightarrow `bool`

invert() \rightarrow `Conditions`

According boolean algebra that satisfies De Morgan's laws In case of $(a \ \& \ b).invert()$, it returns having the meaning of $(not \ a) \ or \ (not \ b)$ that is equivalent to $(a \ and \ b)$ in logical.

class `json_as_db.core.matcher.Key`

Bases: `str`

**CHAPTER
TWO**

LICENSE

Under the MIT license.

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