PyJSON5 Documentation

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A JSON5 serializer and parser library for Python 3.5 and later.

The serializer returns ASCII data that can safely be used in an HTML template. Apostrophes, ampersands, greater-than, and less-then signs are encoded as unicode escaped sequences. E.g. this snippet is safe for any and all input:

```
"<a onclick='alert(" + encode(data) + ")'>show message</a>"
```

Unless the input contains infinite or NaN values, the result will be valid JSON data.

All valid JSON5 1.0.0 and JSON data can be read, unless the nesting level is absurdly high.

CHAPTER

ONE

INSTALLATION

```
$ pip install pyjson5
```

CHAPTER

TWO

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2.1 Serializer / Encoder

The serializer returns ASCII data that can safely be used in an HTML template. Apostrophes, ampersands, greater-than, and less-then signs are encoded as unicode escaped sequences. E.g. this snippet is safe for any and all input:

```
"<a onclick='alert(" + encode(data) + ")'>show message</a>"
```

Unless the input contains infinite or NaN values, the result will be valid JSON data.

2.1.1 Quick Encoder Summary

encode(data, *[, options])	Serializes a Python object to a JSON5 compatible unicode string.
encode_bytes(data, *[, options])	Serializes a Python object to a JSON5 compatible bytes string.
encode_callback(data, cb[, supply_bytes, . . .])	Serializes a Python object into a callback function.
encode_io(data, fp[, supply_bytes, options])	Serializes a Python object into a file-object.
encode_noop(data, *[, options])	Test if the input is serializable.
dump(obj, fp, **kw)	Serializes a Python object to a JSON5 compatible unicode string.
dumps(obj, **kw)	Serializes a Python object to a JSON5 compatible unicode string.
Options	Customizations for the `encoder_*(...)` function family.
Json5EncoderException	Base class of any exception thrown by the serializer.
Json5UnstringifiableType([message, . . .])	The encoder was not able to stringify the input, or it was told not to by the supplied `Options`.

2.1.2 Full Encoder Description

`pyjson5.encode`(*data*, *, *options=None*, ***options_kw*)

Serializes a Python object to a JSON5 compatible unicode string.

```
encode(['Hello', 'world!']) == '["Hello","world!"]'
```

Parameters

- **data** (*object*) – Python object to serialize.
- **options** (*Optional[Options]*) – Extra options for the encoder. If `options` **and** `options_kw` are specified, then `options.update(**options_kw)` is used.
- **options_kw** – See Option's arguments.

Raises

- ***Json5EncoderException*** – An exception occured while encoding.
- **TypeError** – An argument had a wrong type.

Returns

Unless `float('inf')` or `float('nan')` is encountered, the result will be valid JSON data (as of RFC8259).

The result is always ASCII. All characters outside of the ASCII range are escaped.

The result safe to use in an HTML template, e.g. `<a onclick='alert({{ encode(url) }})'>show message</a>`. Apostrophes `"'"` are encoded as `"\u0027"`, less-than, greater-than, and ampersand likewise.

Return type str

`pyjson5.encode_bytes`(*data*, *, *options=None*, ***options_kw*)

Serializes a Python object to a JSON5 compatible bytes string.

```
encode_bytes(['Hello', 'world!']) == b'["Hello","world!"]'
```

Parameters

- **data** (*object*) – see *encode(...)*
- **options** (*Optional[Options]*) – see *encode(...)*
- **options_kw** – see *encode(...)*

Raises

- ***Json5EncoderException*** – An exception occured while encoding.
- **TypeError** – An argument had a wrong type.

Returns see *encode(...)*

Return type bytes

`pyjson5.encode_callback`(*data*, *cb*, *supply_bytes=False*, *, *options=None*, ***options_kw*)

Serializes a Python object into a callback function.

The callback function `cb` gets called with single characters and strings until the input `data` is fully serialized.

```
encode_callback(['Hello', 'world!'], print)
#prints:
# [
# "
# Hello
# "
# ,
# "
# world!
# "
" ]
```

Parameters

- **data** (*object*) – see *encode(...)*
- **cb** (*Callable[[Union[bytes|str]], None]*) – A callback function. Depending on the truthyness of `supply_bytes` either `bytes` or `str` is supplied.
- **supply_bytes** (*bool*) – Call `cb(...)` with a `bytes` argument if true, otherwise `str`.
- **options** (*Optional[Options]*) – see *encode(...)*
- **options_kw** – see *encode(...)*

Raises

- ***Json5EncoderException*** – An exception occured while encoding.
- **TypeError** – An argument had a wrong type.

Returns The supplied argument `cb`.

Return type Callable[[Union[bytes|str]], None]

`pyjson5.`**encode_io**(*data*, *fp*, *supply_bytes=True*, *, *options=None*, **options_kw*)

Serializes a Python object into a file-object.

The return value of `fp.write(...)` is not checked. If `fp` is unbuffered, then the result will be garbage!

Parameters

- **data** (*object*) – see *encode(...)*
- **fp** (*IOBase*) – A file-like object to serialize into.
- **supply_bytes** (*bool*) – Call `fp.write(...)` with a `bytes` argument if true, otherwise `str`.
- **options** (*Optional[Options]*) – see *encode(...)*
- **options_kw** – see *encode(...)*

Raises

- ***Json5EncoderException*** – An exception occured while encoding.
- **TypeError** – An argument had a wrong type.

Returns The supplied argument `fp`.

Return type IOBase

`pyjson5.encode_noop`(*data*, *, *options=None*, ***options_kw*)

Test if the input is serializable.

Most likely you want to serialize `data` directly, and catch exceptions instead of using this function!

```
encode_noop({47: 11}) == True
encode_noop({47: object()}) == False
```

Parameters

- **data** (*object*) – see *encode(...)*
- **options** (*Optional[Options]*) – see *encode(...)*
- **options_kw** – see *encode(...)*

Returns `True` iff `data` is serializable.

Return type bool

class `pyjson5.Options`

Customizations for the `encoder_*(...)` function family.

Immutable. Use `Options.update(**kw)` to create a **new** Options instance.

Parameters

- **quotationmark** (*str|None*) –
  - **str**: One character string that is used to surround strings.
  - **None**: Use default: `'"'`.
- **tojson** (*str|False|None*) –
  - **str:** A special method to call on objects to return a custom JSON encoded string. Must return ASCII data!
  - **False:** No such member exists. (Default.)
  - **None:** Use default.
- **posinfinity** (*str|False|None*) –
  - **str:** String to represent positive infinity. Must be ASCII.
  - **False:** Throw an exception if `float('+inf')` is encountered.
  - **None:** Use default: `"Infinity"`.
- **neginfinity** (*str|False|None*) –
  - **str:** String to represent negative infinity. Must be ASCII.
  - **False:** Throw an exception if `float('-inf')` is encountered.
  - **None:** Use default: `"-Infinity"`.
- **nan** (*str|False|None*) –
  - **str:** String to represent not-a-number. Must be ASCII.
  - **False:** Throw an exception if `float('NaN')` is encountered.
  - **None:** Use default: `"NaN"`.
- **intformat** (*str|False|None*) –

  - **str:** Format string to use with `int`.
  - **False:** Throw an exception if an `int` is encountered.
  - **None:** Use default: `"%d"`.
- **floatformat** (*str|False|None*) –
  - **str:** Format string to use with `float`.
  - **False:** Throw an exception if a `float` is encountered.
  - **None:** Use default: `"%.6e"`.
- **decimalformat** (*str|False|None*) –
  - **str:** Format string to use with `Decimal`.
  - **False:** Throw an exception if a `Decimal` is encountered.
  - **None:** Use default: `"%s"`.
- **mappingtypes** (*Iterable[type]|False|None*) –
  - **Iterable[type]:** Classes that should be encoded to objects. Must be iterable over their keys, and implement `__getitem__`.
  - **False:** There are no objects. Any object will be encoded as list of keys as in list(obj).
  - **None:** Use default: `[collections.abc.Mapping]`.

decimalformat
The creation argument `decimalformat`. `None` if `False` was specified.

floatformat
The creation argument `floatformat`. `None` if `False` was specified.

intformat
The creation argument `intformat`. `None` if `False` was specified.

mappingtypes
The creation argument `mappingtypes`. `()` if `False` was specified.

nan
The creation argument `nan`. `None` if `False` was specified.

neginfinity
The creation argument `neginfinity`. `None` if `False` was specified.

posinfinity
The creation argument `posinfinity`. `None` if `False` was specified.

quotationmark
The creation argument `quotationmark`.

tojson
The creation argument `tojson`. `None` if `False` was specified.

update (*self*, **args*, ***kw*)
Creates a new Options instance by modifying some members.

2.1.3 Encoder Compatibility Functions

`pyjson5.dump(obj, fp, **kw)`

Serializes a Python object to a JSON5 compatible unicode string.

Use *encode_io(...)* instead!

```
dump(obj, fp) == encode_io(obj, fp)
```

Parameters

- **obj** (*object*) – Python object to serialize.
- **fp** (*IOBase*) – A file-like object to serialize into.
- **kw** – Silently ignored.

`pyjson5.dumps(obj, **kw)`

Serializes a Python object to a JSON5 compatible unicode string.

Use *encode(...)* instead!

```
dumps(obj) == encode(obj)
```

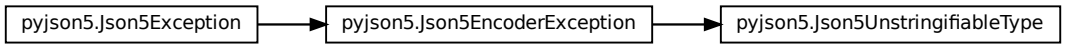
Parameters

- **obj** (*object*) – Python object to serialize.
- **kw** – Silently ignored.

Returns see `encode(data)`

Return type unicode

2.1.4 Encoder Exceptions



class `pyjson5.Json5EncoderException`

Base class of any exception thrown by the serializer.

message

Human readable error description

with_traceback()

Exception.with_traceback(tb) – set self.__traceback__ to tb and return self.

class `pyjson5.Json5UnstringifiableType(message=None, unstringifiable=None)`

The encoder was not able to stringify the input, or it was told not to by the supplied `Options`.

message

Human readable error description

unstringifiable
The value that caused the problem.

with_traceback()
Exception.with_traceback(tb) – set self.__traceback__ to tb and return self.

2.2 Parser / Decoder

All valid JSON5 1.0.0 and JSON data can be read, unless the nesting level is absurdly high.

2.2.1 Quick Decoder Summary

decode(data[, maxdepth, some])	Decodes JSON5 serialized data from an `str` object.
decode_buffer(obj[, maxdepth, some, wordlength])	Decodes JSON5 serialized data from an object that supports the buffer protocol, e.g.
decode_callback(cb[, maxdepth, some, args])	Decodes JSON5 serialized data by invoking a callback.
decode_io(fp[, maxdepth, some])	Decodes JSON5 serialized data from a file-like object.
load(fp, **kw)	Decodes JSON5 serialized data from a file-like object.
loads(s, *[, encoding])	Decodes JSON5 serialized data from a string.
Json5DecoderException([message, result])	Base class of any exception thrown by the parser.
Json5NestingTooDeep	The maximum nesting level on the input data was exceeded.
Json5EOF	The input ended prematurely.
Json5IllegalCharacter([message, result, ...])	An unexpected character was encountered.
Json5ExtraData([message, result, character])	The input contained extranous data.
Json5IllegalType([message, result, value])	The user supplied callback function returned illegal data.

2.2.2 Full Decoder Description

pyjson5.**decode**(*data*, *maxdepth=None*, *some=False*)
Decodes JSON5 serialized data from an `str` object.

```
decode('["Hello", "world!"]') == ['Hello', 'world!']
```

Parameters

- **data** (*unicode*) – JSON5 serialized data
- **maxdepth** (*Optional[int]*) – Maximum nesting level before are the parsing is aborted.
  - If `None` is supplied, then the value of the global variable `DEFAULT_MAX_NESTING_LEVEL` is used instead.
  - If the value is `0`, then only literals are accepted, e.g. `false`, `47.11`, or `"string"`.
  - If the value is negative, then the any nesting level is allowed until Python's recursion limit is hit.
- **some** (*bool*) – Allow trailing junk.

Raises

- ***Json5DecoderException*** – An exception occured while decoding.
- **TypeError** – An argument had a wrong type.

Returns Deserialized data.

Return type object

`pyjson5.decode_buffer(obj, maxdepth=None, some=False, wordlength=None)`

Decodes JSON5 serialized data from an object that supports the buffer protocol, e.g. bytearray.

```
obj = memoryview(b'["Hello", "world!"]')

decode_buffer(obj) == ['Hello', 'world!']
```

Parameters

- **data** (*object*) – JSON5 serialized data. The argument must support Python's buffer protocol, i.e. `memoryview(...)` must work. The buffer must be contigious.
- **maxdepth** (*Optional[int]*) – see *decode(...)*
- **some** (*bool*) – see *decode(...)*
- **wordlength** (*Optional[int]*) – Must be 0, 1, 2, 4 to denote UTF-8, UCS1, USC2 or USC4 data, resp. Surrogates are not supported. Decode the data to an `str` if need be. If `None` is supplied, then the buffer's `itemsize` is used.

Raises

- ***Json5DecoderException*** – An exception occured while decoding.
- **TypeError** – An argument had a wrong type.
- **ValueError** – The value of `wordlength` was invalid.

Returns see *decode(...)*

Return type object

`pyjson5.decode_callback(cb, maxdepth=None, some=False, args=None)`

Decodes JSON5 serialized data by invoking a callback.

```
cb = iter('["Hello","world!"]').__next__

decode_callback(cb) == ['Hello', 'world!']
```

Parameters

- **cb** (*Callable[Any, Union[str|bytes|bytearray|int|None]]*) – A function to get values from. The functions is called like `cb(*args)`, and it returns:
  - **str, bytes, bytearray:** `len(...) == 0` denotes exhausted input. `len(...) == 1` is the next character.
  - **int:** `< 0` denotes exhausted input. `>= 0` is the ordinal value of the next character.
  - **None:** input exhausted
- **maxdepth** (*Optional[int]*) – see *decode(...)*
- **some** (*bool*) – see *decode(...)*
- **args** (*Optional[Iterable[Any]]*) – Arguments to call `cb` with.

Raises

- ***Json5DecoderException*** – An exception occured while decoding.
- **TypeError** – An argument had a wrong type.

Returns see `decode(...)`

Return type object

`pyjson5.`**`decode_io`**(*fp*, *maxdepth=None*, *some=True*)

Decodes JSON5 serialized data from a file-like object.

```
fp = io.StringIO("""
    ['Hello', /* TODO look into specs whom to greet */]
    'Wolrd' // FIXME: look for typos
""")

decode_io(fp) == ['Hello']
decode_io(fp) == 'Wolrd'

fp.seek(0)

decode_io(fp, some=False)
# raises Json5ExtraData('Extra data U+0027 near 56', ['Hello'], "'")
```

Parameters

- **fp** (*IOBase*) – A file-like object to parse from.
- **maxdepth** (*Optional[int] = None*) – see *decode(...)*
- **some** (*bool*) – see *decode(...)*

Raises

- ***Json5DecoderException*** – An exception occured while decoding.
- **TypeError** – An argument had a wrong type.

Returns see `decode(...)`

Return type object

2.2.3 Decoder Compatibility Functions

`pyjson5.`**`load`**(*fp*, ***kw*)

Decodes JSON5 serialized data from a file-like object.

Use *decode_io(...)* instead!

```
load(fp) == decode_io(fp, None, False)
```

Parameters

- **fp** (*IOBase*) – A file-like object to parse from.
- **kw** – Silently ignored.

Returns see `decode(...)`

Return type object

`pyjson5.loads`(*s*, *, *encoding=u'UTF-8'*, ***kw*)

Decodes JSON5 serialized data from a string.

Use *decode(...)* instead!

```
loads(s) == decode(s)
```

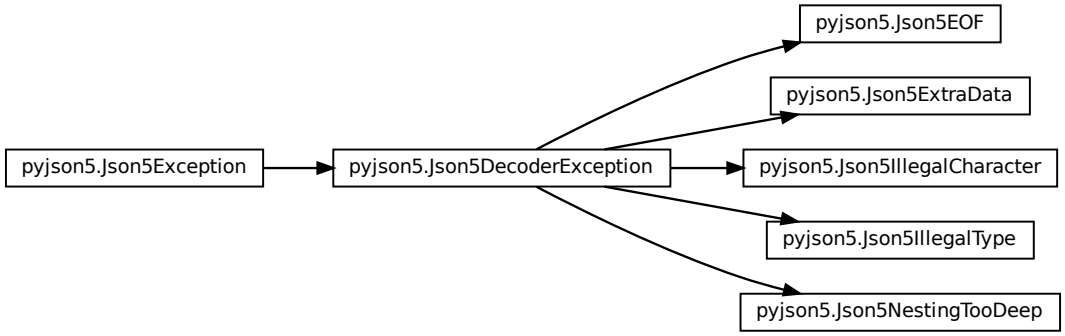
Parameters

- **s** (*object*) – Unless the argument is an `str`, it gets decoded according to the parameter `encoding`.
- **encoding** (*str*) – Codec to use if `s` is not an `str`.
- **kw** – Silently ignored.

Returns see `decode(...)`

Return type object

2.2.4 Decoder Exceptions



class `pyjson5.Json5DecoderException`(*message=None*, *result=None*, **args*)

Base class of any exception thrown by the parser.

message

Human readable error description

result

Deserialized data up until now.

with_traceback()

Exception.with_traceback(tb) – set self.__traceback__ to tb and return self.

class `pyjson5.Json5NestingTooDeep`

The maximum nesting level on the input data was exceeded.

message

Human readable error description

result
Deserialized data up until now.

with_traceback()
Exception.with_traceback(tb) – set self.__traceback__ to tb and return self.

class pyjson5.**Json5EOF**
The input ended prematurely.

message
Human readable error description

result
Deserialized data up until now.

with_traceback()
Exception.with_traceback(tb) – set self.__traceback__ to tb and return self.

class pyjson5.**Json5IllegalCharacter**(*message=None*, *result=None*, *character=None*, **args*)
An unexpected character was encountered.

character
Extranous character.

message
Human readable error description

result
Deserialized data up until now.

with_traceback()
Exception.with_traceback(tb) – set self.__traceback__ to tb and return self.

class pyjson5.**Json5ExtraData**(*message=None*, *result=None*, *character=None*, **args*)
The input contained extranous data.

character
Extranous character.

message
Human readable error description

result
Deserialized data up until now.

with_traceback()
Exception.with_traceback(tb) – set self.__traceback__ to tb and return self.

class pyjson5.**Json5IllegalType**(*message=None*, *result=None*, *value=None*, **args*)
The user supplied callback function returned illegal data.

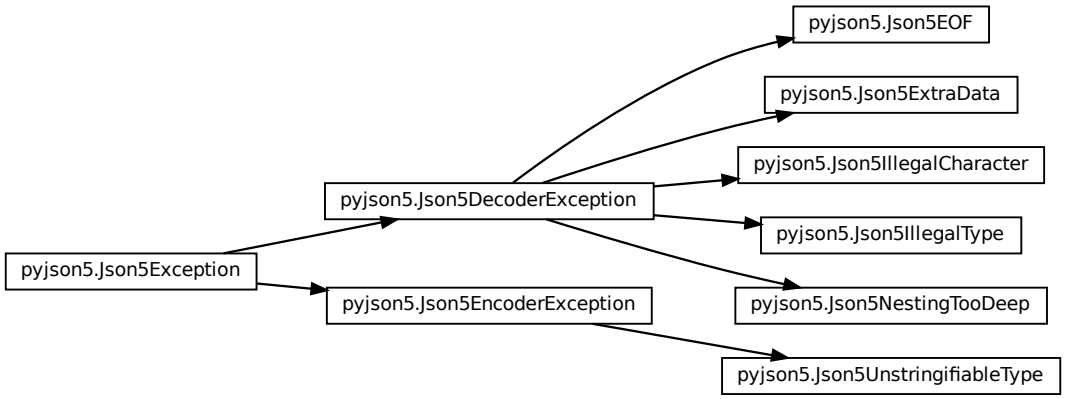
message
Human readable error description

result
Deserialized data up until now.

value
Value that caused the problem.

with_traceback()
Exception.with_traceback(tb) – set self.__traceback__ to tb and return self.

2.3 Exceptions



class `pyjson5.`**`Json5Exception`**(*message=None*, **args*)

Base class of any exception thrown by PyJSON5.

`message`

Human readable error description

`with_traceback`()

Exception.with_traceback(tb) – set self.__traceback__ to tb and return self.

2.4 Performance

This library is written in Cython for a better performance than a pure-Python implementation could give you.

2.4.1 Decoder Performance

The library is a bit slower than the shipped `json` module for *pure* JSON data. If you know that your input does not use JSON5 extension, then this library is probably not what you need.

- Dataset: https://github.com/zemirco/sf-city-lots-json
- Version: 3.9.1 (default, Dec 8 2020, 07:51:42)
- CPU: AMD Ryzen 7 2700 @ 3.7GHz
- *`pyjson5.decode()`*: **3.18** s ± 9.79 ms per loop *(lower is better)*
- `json.loads()`: **2.66** s ± 9.78 ms per loop
- The decoder works correcty: `json.loads(content) == pyjson5.loads(content)`

2.4.2 Encoder Performance

The encoder generates pure JSON data if there are no infinite or NaN values in the input, which are invalid in JSON. The serialized data is XML-safe, i.e. there are no cheverons `<>`, ampersands `&`, apostrophes `'` or control characters in the output. The output is always ASCII regardless if you call *`pyjson5.encode()`* or *`pyjson5.encode_bytes()`*.

- Dataset: https://github.com/zemirco/sf-city-lots-json
- Version: 3.9.1 (default, Dec 8 2020, 07:51:42)
- CPU: AMD Ryzen 7 2700 @ 3.7GHz
- *`pyjson5.encode()`*: **3.21** s ± 25.1 per loop *(lower is better)*
- `json.dumps()`: **3.82** s ± 20.4 ms per loop
- `json.dumps()` + `xml.sax.saxutils.escape()`: **3.95** s ± 18.3 ms per loop
- The encoder works correcty: `obj == json.loads(pyjson5.encode(obj, floatformat='%.16e'))`

CHAPTER

THREE

QUICK SUMMARY

decode(data[, maxdepth, some])	Decodes JSON5 serialized data from an `str` object.
decode_buffer(obj[, maxdepth, some, wordlength])	Decodes JSON5 serialized data from an object that supports the buffer protocol, e.g.
decode_callback(cb[, maxdepth, some, args])	Decodes JSON5 serialized data by invoking a callback.
decode_io(fp[, maxdepth, some])	Decodes JSON5 serialized data from a file-like object.
load(fp, **kw)	Decodes JSON5 serialized data from a file-like object.
loads(s, *[, encoding])	Decodes JSON5 serialized data from a string.
encode(data, *[, options])	Serializes a Python object to a JSON5 compatible unicode string.
encode_bytes(data, *[, options])	Serializes a Python object to a JSON5 compatible bytes string.
encode_callback(data, cb[, supply_bytes, . . .])	Serializes a Python object into a callback function.
encode_io(data, fp[, supply_bytes, options])	Serializes a Python object into a file-object.
encode_noop(data, *[, options])	Test if the input is serializable.
dump(obj, fp, **kw)	Serializes a Python object to a JSON5 compatible unicode string.
dumps(obj, **kw)	Serializes a Python object to a JSON5 compatible unicode string.
Options	Customizations for the `encoder_*(...)` function family.
Json5EncoderException	Base class of any exception thrown by the serializer.
Json5DecoderException([message, result])	Base class of any exception thrown by the parser.

CHAPTER

FOUR

COMPATIBILITY

At least CPython / PyPy 3.5, and a C++11 compatible compiler (such as GCC 5.2+) is needed.

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`with_traceback()` (*pyjson5.Json5UnstringifiableType method*), 11