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# **Celaria Map Toolkit**

**Iceflower S**

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## 1.1 Installation

### 1.1.1 System Requirements

Python is required in the version 3.7. or higher, it can be downloaded at <https://www.python.org/downloads/>.

During the Windows installation you should make sure that the PATH / environment variable is set and pip is installed.

Under Linux it should be ensured that pip is installed, if this is not done with the standard installation.

### 1.1.2 Installation

```
pip install cmt
```

## 1.2 Using cmt

The program is a terminal program, so it runs from the terminal.

Calling with: .. code-block:: none

cmt

**-h, --help**

show this help message and exit

**-v, --version**

show program's version number and exit

**convert** file {cmap,ecmap} {0,1} output

convert file to type, version and output file



## INTERNALS

Reference material.

### 2.1 cmt

#### 2.1.1 cmt.a\_converter

**class** `cmt.a_converter.AConverter`

Bases: `abc.ABC`

**abstract static convert**(*source*)

Convert to the other map format of same version.

**Return type** `AMap`

**abstract static downgrade**(*source*)

Downgrade to the format version below.

**Return type** `AMap`

**abstract static upgrade**(*source*)

Upgrade to the format version above.

**Return type** `AMap`

#### 2.1.2 cmt.a\_map

**class** `cmt.a_map.AMap`(*identifier, version*)

Bases: `abc.ABC`

**abstract classmethod decode**(*data, offset, debug=False*)

**Return type** `AMap`

**abstract encode**()

**Return type** `bytearray`

**class** `cmt.a_map.MapType`(*value*)

Bases: `enum.Enum`

An enumeration.

```
CMAP = 'celaria_map'  
ECMAP = 'celaria_edi'  
static from_str(text)
```

Return type *MapType*

### 2.1.3 cmt.convert

`cmt.convert.convert(source, version, target)`

First convert to the target type and down/upgrade to the correct version. :raises ValueError: something failed

Return type *AMap*

### 2.1.4 cmt.decode

raises `ValueError` something failed

rtype *AMap*

### 2.1.5 cmt.encode

### 2.1.6 cmt.static\_data

### 2.1.7 cmt.utils

```
class cmt.utils.DebugIterUnpack(format_, buffer, what)
```

Bases: `object`

```
cmt.utils.debug_print(data, what, value, offset=None)
```

```
cmt.utils.to_hex(data)
```

```
cmt.utils.unpack_from(format_, buffer, offset, what, debug)
```

Same behaviour as `struct.unpack_from`.

#### Parameters

- **format** –
- **buffer** (`bytes`) –
- **offset** (`int`) –
- **what** (`Tuple[str, ...]`) – tuple of message for every unpacked value
- **debug** (`bool`) – use debug mode

#### Returns

## 2.2 cmt.blender

### 2.2.1 cmt.blender.v2\_80

cmt.blender.v2\_80.import\_menu

cmt.blender.v2\_80.object\_panel

cmt.blender.v2\_80.scene\_panel

cmt.blender.v2\_80.utils

cmt.blender.v2\_80.viewport\_add\_menu

### 2.2.2 cmt.blender.v2\_80.v1

cmt.blender.v2\_80.v1.add\_objects

cmt.blender.v2\_80.v1.codec

## 2.3 cmt.cmap

### 2.3.1 cmt.cmap.a\_cmap

**class** cmt.cmap.a\_cmap.ACMap(*version*)

Bases: *cmt.a\_map.AMap*

**abstract classmethod** decode(*data*, *offset*, *debug=False*)

Return type *ACMap*

**abstract** encode()

Return type *bytearray*

### 2.3.2 cmt.cmap.a\_entity

**class** cmt.cmap.a\_entity.AEntity(*type\_*, *byte\_size*)

Bases: *abc.ABC*

#### Variables

- **type** – entity type
- **byte\_size** – size in bytes the entity uses

**abstract classmethod** decode(*data*, *offset*, *debug=False*)

#### Parameters

- **data** (*bytes*) –

- **offset** (*int*) – without entity type byte
- **debug** (*bool*) –

Return type *AEntity*

**abstract encode()**

Includes the entity type.

Return type *bytearray*

## 2.4 cmt.cmap.v0

### 2.4.1 cmt.cmap.v0.cmap

**class** *cmt.cmap.v0.cmap.CMap*

Bases: *cmt.cmap.a\_cmap.ACMap*

Celaria .cmap format (version 0)

**Datatypes**

Abbreviation	Type	Byte size
<i>uByte</i>	unsigned byte	1
<i>uShort</i>	unsigned short	2
<i>uInt</i>	unsigned int	4
<i>sShort</i>	signed short	2
<i>sInt</i>	signed int	4
<i>f32</i>	float	4
<i>f64</i>	double	8

**Description format**

```
> <datatype> (<number of datatypes in sequence>) // <description>
```

or

```
> [<variable name>] : <datatype> (<number of datatypes in sequence>) // <description>
```

**Format**

```
> uByte (11) // string identifier
> uByte (1) // version

> nameLen : uByte (1) // number of characters in map name
> uByte (nameLen) // map name as String

> uByte (1) - boolean, if the timer will be run in singleplayer

> uByte (1) // unused byte

> times : uByte (1) - number of checkpoint times (including medal time)

> uInt (times) // checkpoint times for platin
```

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```
> uInt (times) // checkpoint times for gold
> uInt (times) // checkpoint times for silver
> uInt (times) // checkpoint times for bronze

> f32 (1) // sun rotation on Z axis
> f32 (1) // sun height expressed as an angle (between 0 and 90 degrees)

> f64 (1) // preview camera position x
> f64 (1) // preview camera position y
> f64 (1) // preview camera position z
> f64 (1) // preview camera look at position x
> f64 (1) // preview camera look at position y
> f64 (1) // preview camera look at position z

> entityNumber : uInt (1) // number of entities on the map

for entity in entityNumber {
  > entityType : uInt (1) // entityType

  switch(entityType) {
    case 0: // block
      > blockType : uByte (1) // blockType/color
      > uByte (1) // unused byte
      > sInt (1) // position x
      > sInt (1) // position y
      > uInt (1) // position z
      > uInt (1) // scale x
      > uInt (1) // scale y
      > uInt (1) // scale z
      > f32 (1) // rotation on Z axis

      if (blockType == 5){ // checkpoint block
        > uByte (1) // checkpoint Number
      }

    case 1: // sphere
      > sInt (1) // position x
      > sInt (1) // position y
      > sInt (1) // position z

    case 2: // player start
      > uByte (1) // unused byte
      > sInt (1) // position x
      > sInt (1) // position y
      > sInt (1) // position z
      > f32 (1) // rotation on Z axis

    case 128: // dummy id
      > uByte (1) // ID
      > sInt (1) // position x
      > sInt (1) // position y
      > uInt (1) // position z
```

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```
    > uInt (1) // scale x
    > uInt (1) // scale y
    > uInt (1) // scale z
    > f32 (1) // rotation on Z axis
}
```

**classmethod** `decode`(*data*, *offset*, *debug=False*)

**Return type** *CMap*

`encode`()

**Return type** *bytearray*

## 2.4.2 `cmt.cmap.v0.entities`

**class** `cmt.cmap.v0.entities.Block`

Bases: `cmt.cmap.a_entity.AEntity`

**classmethod** `decode`(*data*, *offset*, *debug=False*)

**Parameters**

- **data** (*bytes*) –
- **offset** (*int*) – without entity type byte
- **debug** (*bool*) –

**Return type** *Block*

`encode`()

Includes the entity type.

**Return type** *bytearray*

**class** `cmt.cmap.v0.entities.BlockType`(*value*)

Bases: `enum.Enum`

An enumeration.

**CHECKPOINT** = 5

**FINISH** = 1

**ICE** = 4

**JUMP** = 2

**NOTHING** = 0

**SPEED** = 3

**class** `cmt.cmap.v0.entities.Dummy`

Bases: `cmt.cmap.a_entity.AEntity`

**classmethod** `decode`(*data*, *offset*, *debug=False*)

**Parameters**

- **data** (*bytes*) –
- **offset** (*int*) – without entity type byte
- **debug** (*bool*) –

**Return type** *Dummy*

**encode()**

Includes the entity type.

**Return type** *bytearray*

**class** `cmt.cmap.v0.entities.PlayerStart`

Bases: `cmt.cmap.a_entity.AEntity`

**classmethod** `decode(data, offset, debug=False)`

**Parameters**

- **data** (*bytes*) –
- **offset** (*int*) – without entity type byte
- **debug** (*bool*) –

**Return type** *PlayerStart*

**encode()**

Includes the entity type.

**Return type** *bytearray*

**class** `cmt.cmap.v0.entities.Sphere`

Bases: `cmt.cmap.a_entity.AEntity`

**classmethod** `decode(data, offset, debug=False)`

**Parameters**

- **data** (*bytes*) –
- **offset** (*int*) – without entity type byte
- **debug** (*bool*) –

**Return type** *Sphere*

**encode()**

Includes the entity type.

**Return type** *bytearray*

### 2.4.3 cmt.cmap.v0.medal\_time

**class** `cmt.cmap.v0.medal_time.MedalTime`(*platin=0, gold=0, silver=0, bronze=0*)  
 Bases: `object`

`cmt.cmap.v0.medal_time.decode_medal_times`(*data, offset, debug=False*)  
 Must start with the length byte.

**Parameters**

- **data** (`bytes`) –
- **offset** (`int`) –
- **debug** (`bool`) –

**Return type** `List[MedalTime]`

## 2.5 cmt.cmap.v1

### 2.5.1 cmt.cmap.v1.cmap

**class** `cmt.cmap.v1.cmap.CMap`  
 Bases: `cmt.cmap.a_cmap.ACMap`

Celaria .cmap format (version 1)

**Datatypes**

Abbreviation	Type	Byte size
uByte	unsigned byte	1
uShort	unsigned short	2
uInt	unsigned int	4
sShort	signed short	2
sInt	signed int	4
f32	float	4
f64	double	8

**Description format**

> <datatype> (<number of datatypes in sequence>) // <description>

or

> [<variable name>] : <datatype> (<number of datatypes in sequence>) // <description>

**Format**

```
> uByte (11) // string identifier
> uByte (1) // version

> nameLen : uByte (1) // number of characters in map name
> uByte (nameLen) // map name as String

> uByte (1) // unused - gamemode
```

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```
> uByte (1) // number of checkpoint times (including finish line)
> times : uByte (1) // number of checkpoint times (including finish line)
> uInt (times) // checkpoint times for platin
> uInt (times) // checkpoint times for gold
> uInt (times) // checkpoint times for silver
> uInt (times) // checkpoint times for bronze
> f32 (1) // sun rotation on Z axis
> f32 (1) // sun angle to xy plane (between 0 and 90 degrees)
> f64 (1) // preview camera position x
> f64 (1) // preview camera position y
> f64 (1) // preview camera position z
> f64 (1) // preview camera look at position x
> f64 (1) // preview camera look at position y
> f64 (1) // preview camera look at position z
> entityNumber : uInt (1) // number of entities on the map
for entity in entityNumber {
  > entityType : uInt (1) // entityType
  switch(entityType) {
    case 0: // block
      > blockType : uByte (1) // blockType/color
      > sInt (1) // position x
      > sInt (1) // position y
      > uInt (1) // position z
      > uInt (1) // scale x
      > uInt (1) // scale y
      > uInt (1) // scale z
      > f32 (1) // rotation on Z axis
      if (blockType == 5){ // checkpoint block
        > uByte (1) // checkpoint Number
      }
    case 1: // sphere
      > sInt (1) // position x
      > sInt (1) // position y
      > uInt (1) // position z
    case 2: // player start
      > uByte (1) // unknown
      > sInt (1) // position x
      > sInt (1) // position y
      > uInt (1) // position z
      > f32 (1) // rotation on Z axis
```

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```
    case 128: // dummy id
        > uByte (1) // ID
        > sInt (1) // position x
        > sInt (1) // position y
        > uInt (1) // position z
        > uInt (1) // scale x
        > uInt (1) // scale y
        > uInt (1) // scale z
        > f32 (1) // rotation on Z axis
    }
}
```

**classmethod** `decode`(*data*, *offset*, *debug=False*)

**Return type** *CMap*

`encode`()

**Return type** *bytearray*

## 2.5.2 cmt.cmap.v1.entities

**class** `cmt.cmap.v1.entities.Block`

Bases: `cmt.cmap.a_entity.AEntity`

**classmethod** `decode`(*data*, *offset*, *debug=False*)

**Parameters**

- **data** (*bytes*) –
- **offset** (*int*) – without entity type byte
- **debug** (*bool*) –

**Return type** *Block*

`encode`()

Includes the entity type.

**Return type** *bytearray*

**class** `cmt.cmap.v1.entities.BlockType`(*value*)

Bases: `enum.Enum`

An enumeration.

**CHECKPOINT** = 5

**FINISH** = 1

**ICE** = 4

**JUMP** = 2

**NOTHING** = 0

**SPEED** = 3

```
class cmt.cmap.v1.entities.Dummy
    Bases: cmt.cmap.a_entity.AEntity
    classmethod decode(data, offset, debug=False)
```

**Parameters**

- **data** (*bytes*) –
- **offset** (*int*) – without entity type byte
- **debug** (*bool*) –

**Return type** *Dummy*

```
encode()
    Includes the entity type.
```

**Return type** *bytearray*

```
class cmt.cmap.v1.entities.PlayerStart
    Bases: cmt.cmap.a_entity.AEntity
    classmethod decode(data, offset, debug=False)
```

**Parameters**

- **data** (*bytes*) –
- **offset** (*int*) – without entity type byte
- **debug** (*bool*) –

**Return type** *PlayerStart*

```
encode()
    Includes the entity type.
```

**Return type** *bytearray*

```
class cmt.cmap.v1.entities.Sphere
    Bases: cmt.cmap.a_entity.AEntity
    classmethod decode(data, offset, debug=False)
```

**Parameters**

- **data** (*bytes*) –
- **offset** (*int*) – without entity type byte
- **debug** (*bool*) –

```
encode()
    Includes the entity type.
```

**Return type** *bytearray*

### 2.5.3 `cmt.cmap.v1.checkpoint_time`

`class cmt.cmap.v1.checkpoint_time.CheckpointTime(platin=0, gold=0, silver=0, bronze=0)`  
Bases: `object`

`cmt.cmap.v1.checkpoint_time.decode_checkpoint_times(data, offset, debug=False)`  
Must start with the length byte.

**Parameters**

- `data` (`bytes`) –
- `offset` (`int`) –
- `debug` (`bool`) –

**Return type** `List[CheckpointTime]`

## 2.6 `cmt.converter`

### 2.6.1 `cmt.converter.v0`

### 2.6.2 `cmt.converter.v1`

## 2.7 `cmt.cs`

### 2.7.1 `cmt.cs.main`

`cmt.cs.main.main(argv=None)`

Entry point into the program. Gets the arguments from the console and proceed them with `ArgumentParser`.  
Returns if its success successful 0 else 1.

## 2.8 `cmt.ecmap`

### 2.8.1 `cmt.ecmap.a_ecmap`

`class cmt.ecmap.a_ecmap.AEMap(version)`

Bases: `cmt.a_map.AMap`

**abstract classmethod** `decode(data, offset, debug=False)`

**Return type** `AEMap`

**abstract** `encode()`

**Return type** `bytearray`

## 2.9 cmt.ecmap.v0

### 2.9.1 cmt.ecmap.v0.ecmap

**class** `cmt.ecmap.v0.ecmap.ECMap`

Bases: `cmt.ecmap.a_ecmap.AECMap`

Celaria .ecmap format (version 0)

#### Datatypes

Abbreviation	Type	Byte size
uByte	unsigned byte	1
uShort	unsigned short	2
uInt	unsigned int	4
sShort	signed short	2
sInt	signed int	4
f32	float	4
f64	double	8

#### Description format

> <datatype> (<number of datatypes in sequence>) // <description>

or

> [<variable name>] : <datatype> (<number of datatypes in sequence>) // <description>

Difference regarding to the .cmap begins with a '!!'.

Comparing to CMap v0.

#### Format

```
> uByte (11) // string identifier
> uByte (1) // version

> nameLen : uByte (1) // number of characters in map name
> uByte (nameLen) // map name as String

!! // checkpoint times are missing

> f32 (1) // sun rotation on Z axis
> f32 (1) // sun angle to xy plane (between 0 and 90 degrees)

... same as cmap v0 ...
```

**classmethod** `decode(data, offset, debug=False)`

**Return type** `ECMAP`

`encode()`

**Return type** `bytearray`

## 2.10 cmt.ecmap.v1

### 2.10.1 cmt.ecmap.v1.ecmap

**class** `cmt.ecmap.v1.ecmap.ECMap`

Bases: `cmt.ecmap.a_ecmap.AECMap`

Celaria .ecmap format (version 1)

#### Datatypes

Abbreviation	Type	Byte size
uByte	unsigned byte	1
uShort	unsigned short	2
uInt	unsigned int	4
sShort	signed short	2
sInt	signed int	4
f32	float	4
f64	double	8

#### Description format

> <datatype> (<number of datatypes in sequence>) // <description>

or

> [<variable name>] : <datatype> (<number of datatypes in sequence>) // <description>

Difference regarding to the .cmap begins with a '!!'.

Comparing to CMap v1.

#### Format

```

> uByte (11) // string identifier
> uByte (1) // version

> nameLen : uByte (1) // number of characters in map name
> uByte (nameLen) // map name as String

> uByte (1) // unused - gamemode

!! // checkpoint times are missing

> f32 (1) // sun rotation on Z axis
> f32 (1) // sun angle to xy plane (between 0 and 90 degrees)

... same as cmap v1 ...

```

**classmethod** `decode(data, offset, debug=False)`

**Return type** ECMap

`encode()`

Return type `bytearray`

## 2.11 cmt.ecmap.v2

### 2.11.1 cmt.ecmap.v2.ecmap

**class** `cmt.ecmap.v2.ecmap.ECMap`

Bases: `cmt.ecmap.a_ecmap.AECMap`

Celaria .ecmap format (version 2)

#### Datatypes

Abbreviation	Type	Byte size
<code>uByte</code>	unsigned byte	1
<code>uShort</code>	unsigned short	2
<code>uInt</code>	unsigned int	4
<code>sShort</code>	signed short	2
<code>sInt</code>	signed int	4
<code>f32</code>	float	4
<code>f64</code>	double	8

#### Description format

```
> <datatype> (<number of datatypes in sequence>) // <description>
```

or

```
> [<variable name>] : <datatype> (<number of datatypes in sequence>) //
<description>
```

Difference regarding to the .cmap begins with a '!!'.

Comparing to CMap v1.

#### Format

```
> uByte (11) // string identifier
> uByte (1) // version

> nameLen : uByte (1) // number of characters in map name
> uByte (nameLen) // map name as String

!! > uByte (1) // boolean, previewCam_set

> uByte (1) // unused - gamemode

!! // checkpoint times are missing

> f32 (1) // sun rotation on Z axis
> f32 (1) // sun angle to xy plane (between 0 and 90 degrees)

... same as cmap v1 ...
```

**classmethod** `decode(data, offset, debug=False)`

**Return type** `ECMAP`

**encode()**

**Return type** `bytearray`

- `genindex`
- `modindex`

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