

Requirement Specification for Title

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1 SEC-0001: Stream Definition

1.1 REQ-0019: Physical representation

The library `stringtools` shall have a method `physical_repr`, transforming a float or integer value to a string with a 1 to 3 digit value followed by the physical prefix for the unit.

1.2 REQ-0020: Time representation

The library `stringtools` shall have a method `physical_repr`, transforming an integer value to a time string like HH:MM:SS.

1.3 REQ-0021: Fraction representation

The library `stringtools` shall have a method `frac_repr`, transforming a float or integer value to a fraction string with a limited denominator.

2 SEC-0002: Human readable value representations

3 SEC-0003: Stream to Human readable String

3.1 REQ-0001: Hexadecimal Values

A Stream shall be converted to a human readable String containing all bytes as hexadecimal values seperated by a Space.

Reason Make non printable characters printable.

Fitcriterion A stream shall be converted at least once and the hex values shall exist in the returnvalue in the correct order.

3.2 REQ-0002: Number of Bytes

The Length of a Stream surrounded by brakets shall be included in the human readable string.

Reason Show the length of a Stream without counting the seperated values.

Fitcriterion The described pattern including the decimal number of bytes is included in the string for at least one Stream.

3.3 REQ-0005: CRLF-Filter

The module `stringtools` shall have a method to replace carriage return and line feed to their escaped representation.

Reason Replace these characters to make output printable (e.g. for logging a string based protocol).

Fitcriterion Filter at least one string and check at least one CR and one LF representation.

4 SEC-0004: Stream Compression

4.1 REQ-0003: Compress

The module stringtools shall have a method compressing a Stream with gzip.

Reason Speed up transfer with low transfer rate.

Fitcriterion Compressed Stream is extractable and results in the original data.

4.2 REQ-0004: Extract

The module stringtools shall have a method extracting a Stream with gzip.

Reason Speed up transfer with low transfer rate.

Fitcriterion Extracted Stream is equal to the original compressed data.

5 SEC-0005: Carriagereturn Separation Protocol (CSP)

5.1 REQ-0006: Frame creation

The CSP module shall support a method to create a Frame from a stream.

Reason Simple message or frame generation for streams (e.g. Keyboard (user input), RFID-Reader, ...).

Fitcriterion Creation of a testframe and checking the result.

5.2 REQ-0007: Frame creation error

The Frame creation Method shall raise ValueError, if a frame separation character is in the Source-String.

Reason String including separation charcter will be splitted in pieces while processing after transport.

Fitcriterion ValueError is raised for at least one String including the separation character.

5.3 REQ-0008: Frame processing

The CSP Module shall support a class including a method to process stream snippets of variable length. This Method shall return an empty list, if no frame has been detected, otherwise it shall return a list including detected frame(s).

Reason Support message analysis of a stream with every size.

Fitcriterion At least one frame given in at least two snippets is identified correctly.

5.4 REQ-0009: Frame processing - Input data type error

If the input data is not bytes for python3 or str for python 2, the process method shall raise TypeError.

Reason Type restriction.

Fitcriterion At least the following types return TypeError (list, int, str for python3, unicode for python 2).

6 SEC-0006: Serial Transfer Protocol (STP)

6.1 REQ-0010: Frame creation

A frame creation method shall create a frame out of given input data.

Reason Message or Frame generation for streams (e.g. data transfer via bluetooth, ethernet, ...).
Fitcriterion Creation of a testframe and checking the result.

6.2 REQ-0015: Frame creation - Start pattern and end pattern inside a message

The frame creation method shall support existence of the start or end pattern in the data to be framed.

Reason Possibility to send any kind of data (including the patterns).
Fitcriterion Creation of a testframe out of data including at least one start pattern and one end pattern and checking the result.

6.3 REQ-0011: Frame processing

The STP Module shall support a class including a method to process stream snippets of variable length. This Method shall return an empty list, if no frame has been detected, otherwise it shall return a list including detected frame(s).

Reason Support message analysis of a stream with every size.
Fitcriterion At least one frame given in at least two snippets is identified correctly.

6.4 REQ-0012: Frame processing - Input data type error

If the input data is not bytes for python3 or str for python 2, the process method shall raise TypeError.

Reason Type restriction.
Fitcriterion At least the following types return TypeError (list, int, str for python3, unicode for python 2).

6.5 REQ-0013: Frame processing - Start pattern and end pattern inside a message

6.6 REQ-0014: Frame processing - Data before the start pattern

Data before the start pattern shall be ignored. A warning shall be given to the logger.

Reason Robustness against wrong or corrupted data.

6.7 REQ-0016: Frame processing - Incorrect start patterns

On receiving an incorrect start pattern, STP shall stay in ESCAPE_1, in case of data sync was received twice or back to state IDLE in all other faulty start patterns starting with data sync. A warning shall be given to the logger.

Reason Robustness against wrong or corrupted data.

6.8 REQ-0017: Frame processing - Incorrect end pattern

On receiving an incorrect end pattern, STP shall change to state STORE_DATA, in case of a start pattern, to ESCAPE_1, in case of data sync was received twice or back to state IDLE in all other faulty end patterns starting with data sync. A warning shall be given to the logger.

Reason Robustness against wrong or corrupted data.

6.9 REQ-0018: Frame processing - After state corruption

The state of STP shall be set to IDLE, after an unknown state was recognised. The currently processed data shall be processed again. An error shall be given to the logger.

Reason Robustness against wrong or corrupted data.
