Parts of strings

Prerequisites

- strings (basic notation)

1 Substrings

A **substring** is a continuous part of a string.

Example 1.
The string *abcd* has 11 substrings:

- ε
- a
- b
- c
- d
- ab
- bc
- cd
- abc
- bcd
- $abcd$

Note that

1. the empty string is a substring of every string, and
2. every string is a substring of itself.

A substring u of v is a **proper** substring iff $u \neq v$.

Example 2.
All the strings listed above are proper substrings of *abcd*, except *abcd* itself.

Exercise 1.
For each one of the gaps below, enter $\sqsubseteq$, $\sqsubsetneq$, or $\not\sqsubseteq$ depending on whether the first string is a substring of the second string, a proper substring, or neither:

- a_aaaa
- a_b
- ε_b
- ε_ε

- aa_abbbca
- bc_abbbca
- cb_abbbca

2 Subsequence

A **subsequence** is a discontinuous part of a string that preserves the order between the symbols.

Example 3.
The string $abcd$ has subsequences:

- ε
- a
- b
- c
- d
- ab
- ac
- ad
- bc
- bd
- cd
- abc
- abd
- bcd
- $abcd$

Note that ca is not a subsequence of $abcd$, but it is a subsequence of $abcda$.

Just like substrings, a subsequence u of v is proper iff $u \neq v$.

Exercise 2.
For each one of the gaps below, enter $\sqsubseteq$, $\sqsubsetneq$, or $\not\sqsubseteq$ depending on whether the first string is a subsequence of the second string, a proper subsequence, or neither:

- a_aaaa
- a_b
- ε_b
- ε_ε
- aa_abbbca
- bc_abbbca

- *cb_abbbca*

Exercise 3.
Say whether the following is True or False: Every substring of some string *s* is also a subsequence of *s*, but not the other way round. Justify your answer.

fixme: add prefixes and suffixes