TSP: Tutorial 4

Question 1

The sorted list of strings is:

`ancestor`, `ancestorial`, `ancestorially`, `ancestors`, `ancestral`, `ancestress`, `ancestresses`, `ancestries`, `ancestry`, `anchor`, `anchorable`, `anchorage`, `anchorages`, `anchorate`, `anchored`, `anchoress`, `anchoretical`, `anchoretish`, `anchoretism`, `anchoring`, `anchorite`, `anchorites`, `anchoritess`, `anchoritic`, `and`

The list can be sorted using a **stable** bucket sort:

- Extend shorter strings with nil until all are the same length.
- Starting at the last character and moving right to left, sort all strings via a stable bucket sort on the current character.

A stable sort is needed (i.e. if $a < b$ and a was ordered before b in the input then a will be ordered before b in the output) to avoid 'undoing' sorting work that was already done on previously-visited positions.

The running time of this sort is $\Theta(n \cdot max\{|L_i|\})$.

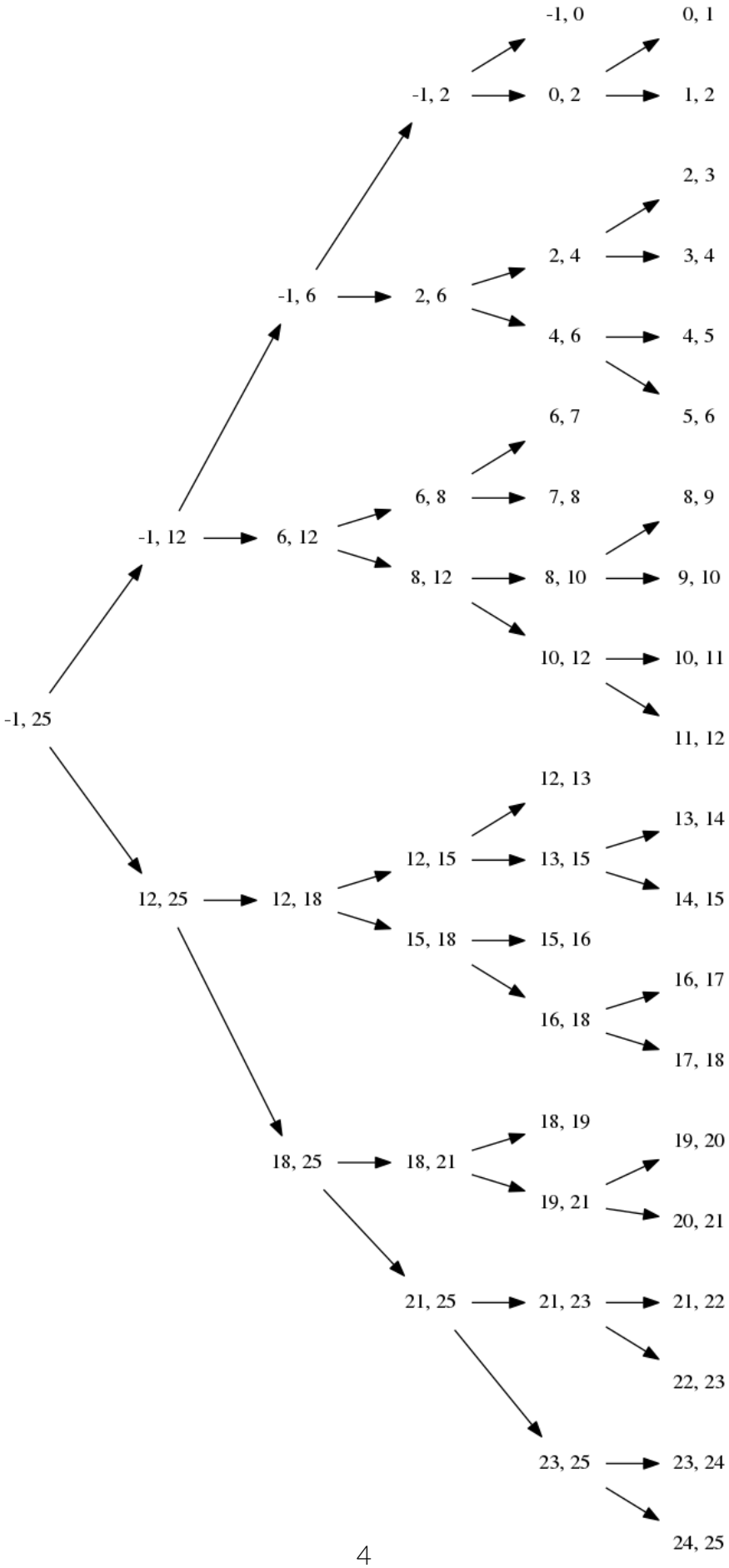
Question 2

There are 25 elements in the list. To allow for the positions $(-1, 0)$ and $(24, 25)$, we create 'imaginary' values at the start and end of the list that are lexicographically smaller and larger respectively than all other items in the list.

This then gives:

- $lcp(-1, 0) = \epsilon$
- $lcp(0, 1) =$ `ancestor`
- $lcp(1, 2) =$ `ancestorial`
- $lcp(2, 3) =$ `ancestor`
- $lcp(3, 4) =$ `ancest`
- $lcp(4, 5) =$ `ancestr`
- $lcp(5, 6) =$ `ancestress`
- $lcp(6, 7) =$ `ancestr`
- $lcp(7, 8) =$ `ancestr`
- $lcp(8, 9) =$ `anc`
- $lcp(9, 10) =$ `anchor`
- $lcp(10, 11) =$ `anchora`
- $lcp(11, 12) =$ `anchorag`
- $lcp(12, 13) =$ `anchora`
- $lcp(13, 14) =$ `anchor`
- $lcp(14, 14) =$ `anchore`
- $lcp(15, 15) =$ `anchore`
- $lcp(16, 16) =$ `anchoreti`
- $lcp(17, 17) =$ `anchoretis`
- $lcp(18, 18) =$ `anchor`
- $lcp(19, 20) =$ `anchori`
- $lcp(20, 21) =$ `anchorite`
- $lcp(21, 22) =$ `anchorites`
- $lcp(22, 23) =$ `anchorit`
- $lcp(23, 24) =$ `an`
- $lcp(24, 25) = \epsilon$

Question 3 & 4


-1, 25
-1, 12
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8, 10
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8, 9
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-1, 6
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12, 25
12, 18
15, 18
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18, 19
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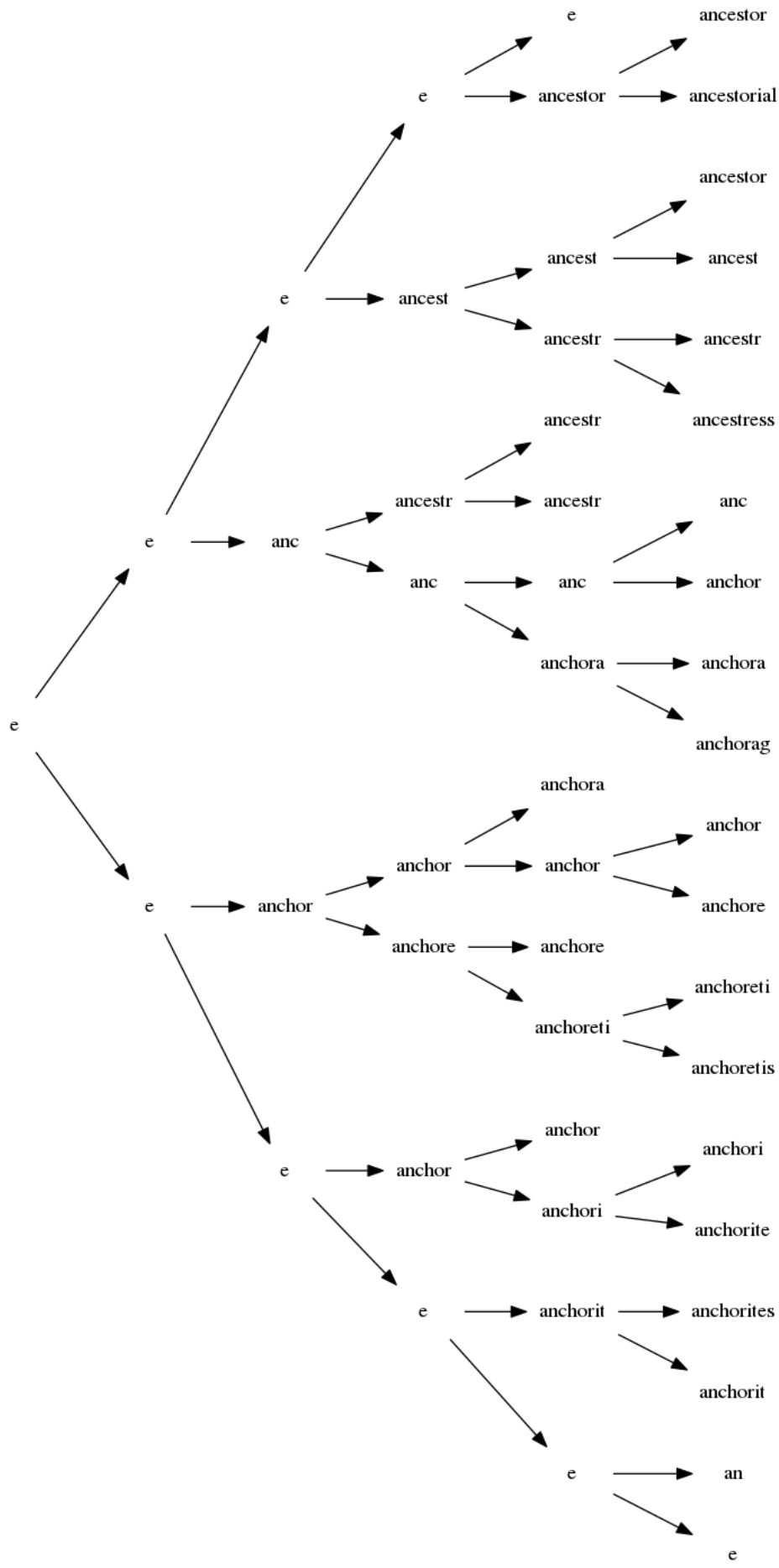
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