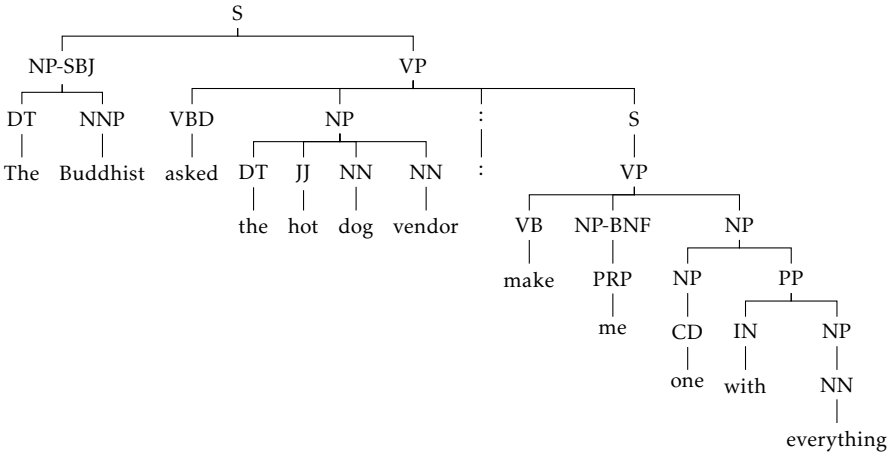
1 Task

Convert the following constituency analysis into a UD-compliant dependency tree:



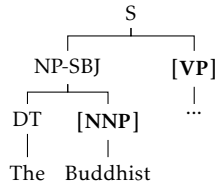
This tree uses Penn treebank annotation: `http://www.surdeanu.info/mihai/teaching/ista555-fall13/readings/PennTreebankConstituents.html`.

- Mark one child as the head in each constituent. Note that in a phrase-structure tree, not only words can be heads, but also phrases. Assume the following heuristic „head-percolation" rules: the head of an NP is its rightmost noun or another NP, the head of S or VP is the main verb or another VP, and the head of PP is NP.
- Determine the implied function labels using the inventory of UD relations. Not all constituents have a grammatical function; for example, it is implied that an NP under a VP is an object. Treat the BNF (benefactor) label as an indirect object.
- Now you have enough information to do a conversion. The dependents of a head word consist of its direct siblings and the head words under siblings of ancestors. Convert the tree step-by-step: start with the main verb of the sentence and identify its dependents. Identify dependents of those dependents, etc., until each word has a dependency relation.

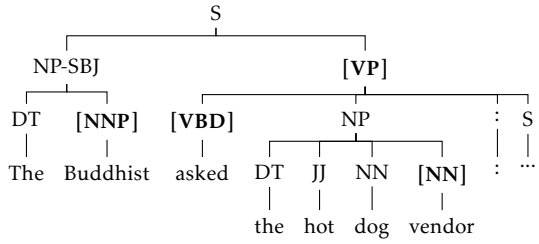
2 Solution

- Mark one child as the head in each constituent.

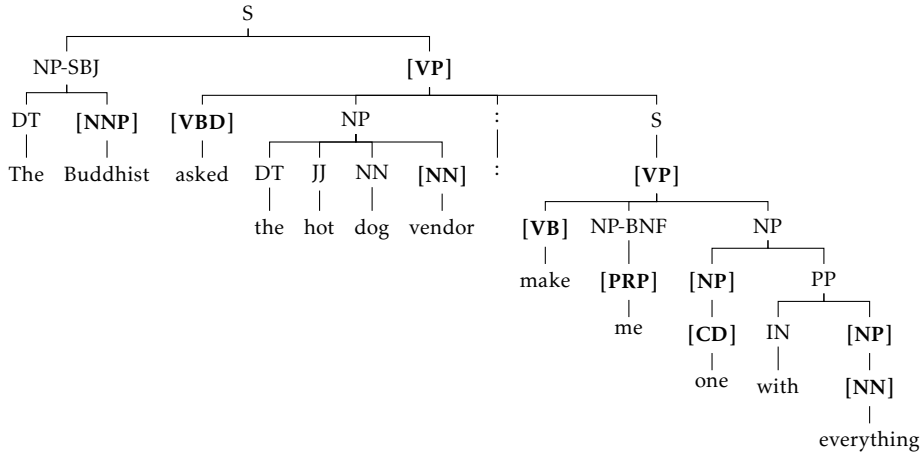
  Following the given heuristic rules, the head of NP-SBJ is its rightmost noun, i.e., *Buddhist*, and the head of the top-level S is its VP child:



  Again, based on the heuristic rules, the head of the VP itself is its main verb („asked"), and the head of its NP child – its rightmost noun („vendor"):

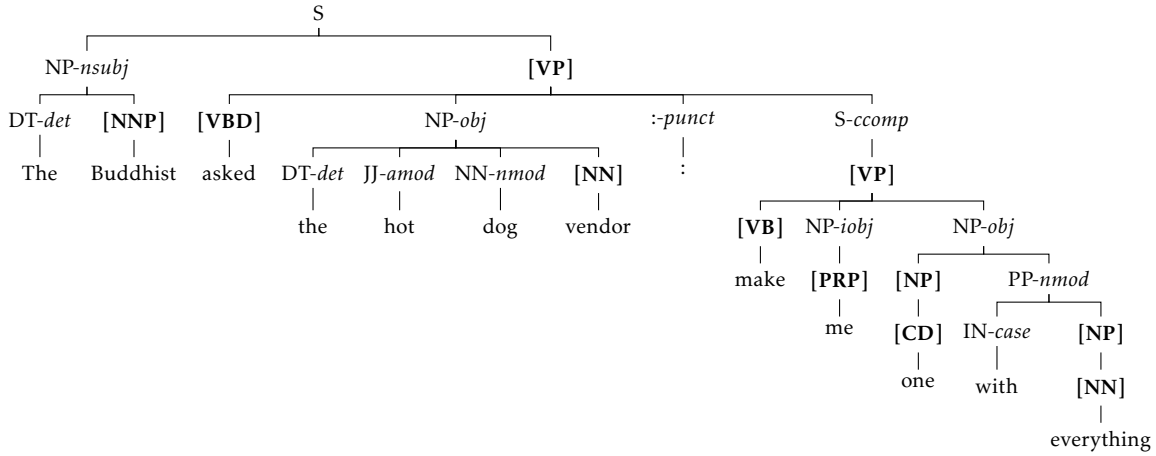


Applying this process to every remaining phrase in the tree leads to:

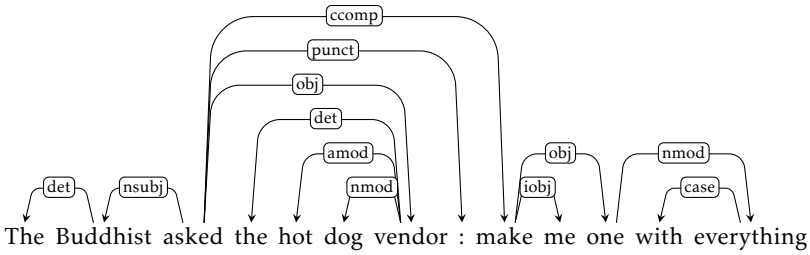


- Add the implied function labels using the inventory of UD relations.

  We can do that on case-by-case basis so as to obtain the desired UD relations. In particular, as hinted in the specification, the PTB -SBJ and -BNF functional labels can be interpreted as *nsubj* and *iobj*, respectively, and an NP under a VP can be interpreted as *obj*.



- Now we have enough information to do the (now fully automatic) conversion.



Note that the resulting analysis of *hot dog* is not correct, due to the flat annotation of the NP „the hot dog vendor" in the source tree. In general, implementing a constituency → dependency conversion as a fully automatic process is not necessarily trivial.