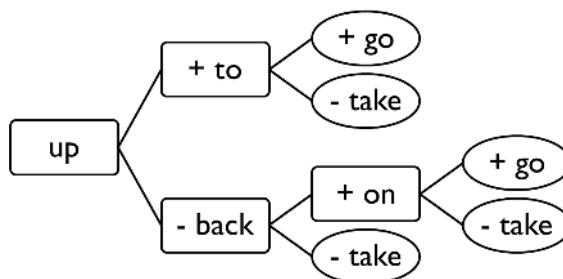


(N) A Tree by Any Other Name (1/2) [10 points]

A decision tree consists of a pivot word, a positive branch, and a negative branch. Each branch has either a decision tree or a final word. A decision tree is applied to a set of words called a *context*. If a context contains the pivot word (anywhere), then the positive branch is followed. If the context does not, the negative branch is followed. When a final word is reached, the tree has classified the context. Decision trees are used to predict words based on their contexts, and they're useful in automatic text processing applications.

For instance, to classify which main verb is used in each phrasal verbs below, based on its context of particles, we could use the following decision tree.

take back
take up with
take to
go back on
go up to



N1. The depth of a tree is the most number of words on a path to any final word. The depth of the example tree above is 3 (up, back, on). Draw the decision tree of least depth that correctly classifies the main verbs {call, check, come} in the following phrasal verbs, based only on their particles {across, as, down, in, on, out, to, up, with}.

call down to
call out to
check in on
check up on
come across as
come down with
come on to
come out with
come up with

(N) A Tree by Any Other Name (2/2)

N2. The size of a tree is the number of final words it contains. The size of the example tree above is 5. Draw the smallest decision tree that distinguishes between "on" and "up" following "hold" in these excerpts from Shakespeare, using any words in the surrounding sentences as context.

Does he not hold up his head, as it were, and strut in his gait?
Must have a word anon. Lay hold on him.
Good people, enter, and lay hold on him.
The law hath yet another hold on you.
Come hither, William; hold up your head; come.
Come on, sirrah; hold up your head; answer your master, be not afraid.
Lay hold on him, I charge you in the duke's name.
With her whom here I cannot hold on shore ;
Away, I say; time wears: hold up your head, and mince.
Like hold on thee. Let go his arm.
Who twice a day their wither'd hands hold up.
Canst thou hold up thy heavy eyes a while,

