

BioBIKE Language Syntax

A. Introduction to BioBIKE Language Syntax

A.1. English syntax as a model for the syntax of computer languages

You might think that people who seem to know a computer language either possess some special knowledge or are endowed with some magical ability to sense what's right.

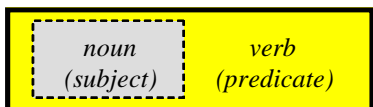
You were probably able to extract some meaning from that complicated sentence, and if so, you have all the basic tools necessary to understand a computer language. You did it, no doubt, without thinking, because you've already internalized the language. How would you understand a language that's not internalized, WITH thinking? Let me help you see the process by translating the sentence into... call it Acknoyd:

*Wei vokdg gdocj gdug haehna bde yaav ge jceb u fevhigal nuckiuka aogdal
 heyyayy yeva yhafoun jcebnazka el ula aczebaz bogd yeva vukofun usonogw ge
 yacya bdug'y lokdg.*

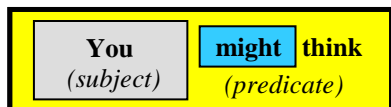
How do you go about understanding THIS sentence?

Well, of course you'd need an Acknoyd dictionary. You look up *Wei* and find that it's a noun and has something to do with "...those being addressed". The word *gdocj* has something to do with cogitation or belief. You could look up the rest the words as well, one by one, and if Acknoyd uses the same rules as your own language, you'll probably manage OK. But if not, you're in trouble. Besides meaning, you also need to know rules as to how words work together,... syntax!

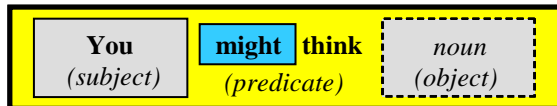
For the sake of our sanity, let's run back to English, imagining that we don't know its syntactical rules. Say you learn that some English sentences fit into the following general structure:



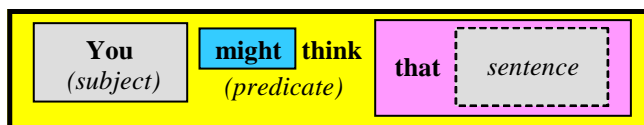
You is a noun and **think** is a verb, says your dictionary, and **might** fits into the structure by modifying the verb. So far:



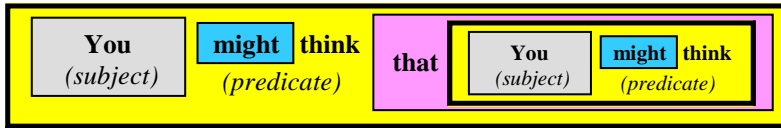
This, evidently, is a legal utterance, but what about the other 25 words of the sentence? Looking more closely at the dictionary entry for *think*, you find that it can serve as either a transitive verb (taking an object) or an intransitive verb (no object). So here's another possibility:



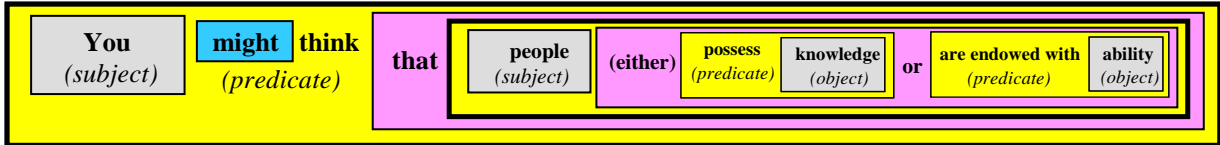
This is useful, because your dictionary says that the fourth word, *that*, can introduce a sentence that can replace a noun:



Any legal declarative sentence can fit into that box, for example:



But our sentence is even more complex, something like (highly simplified):



Looking back on the concepts and conventions I've set forth:

- English, like any language, has structure.
- The basic units of the language are *sentences*, represented here as **yellow boxes with thick solid boundaries**.
- The structure of the sentence is largely determined by its verb.
- The structure consists of *holes* to be filled, represented here as **gray boxes with thin dotted boundaries**. The required content of the hole is given in italics.
- **Filled holes** are represented here as **gray boxes with thin solid boundaries**.
- **Modifiers** are represented here as **blue boxes with thin solid boundaries**.
- Holes can be filled with declarative sentences that provide the required content, leading to sentences nested within other sentences.

English is complicated! Fortunately, computer languages are much simpler (otherwise computers couldn't understand them), and BioBIKE Language (BBL) is about as simple as you can get and still retain the ability to express everything you need in a language. However, like human languages, computer languages increase their powers of expression by permitting forms to be placed within forms multiple times.