SYLLABLE STRUCTURE

Words as sequences of morphemes:

(1) a. dis-organ-iz-at-ion
b. anti-pre-destin-ar-ian-ism
c. hair-bread-th-s

Words as sequences of syllables:

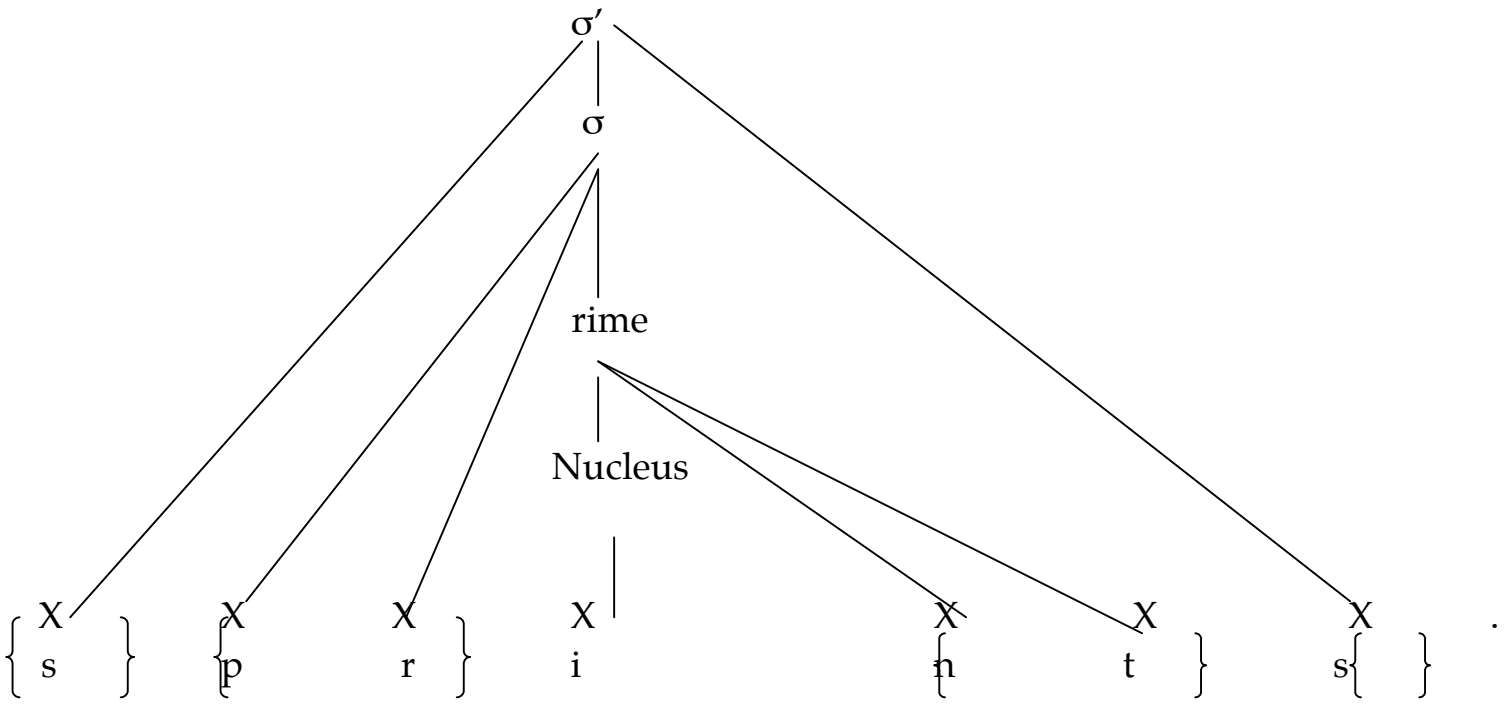
(2) a. dis+or+ga+ni+za+tion
b. an+ti+pre+des+ti+na+ria+nism
c. hair+breadths

The syllables are the locus of the sequential constraints on concatenation of sounds. Such sequential restrictions are among the most striking differences among languages.

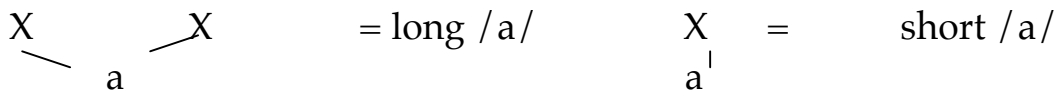
For example, **English** allows a great variety of consonant clusters both in prevocalic position and in postvocalic position of the syllable, whereas **Arabic** requires that there be precisely one consonant in the prevocalic position and no more than three consonants in postvocalic position.

Structure of the syllable (cf Halle (1988)):

(3)



The X are called skeletal positions and are interface elements between melodic segments (i.e., s, p, r, i, n, t, s) and the syllable costituents. They can also be considered abstract time positions. Therefore differences in length are represented by means of skeletal position:



σ-syllables and σ′-syllables

σ-syllables= core syllables

σ′-syllables=extended syllable

To understand the difference between core and extended syllables we have to refer to the notion of sonority:

Segments can be organized into a sonority scale:

non-high vowels	Most sonorous
high vowels	
liquids	
nasals	
fricatives	
stops	Least sonorous

Core syllables are organized according to the following principle:

The sonority sequencing principle:
In a core syllable sonority always decreases from the nucleus towards the margin: e.g. prank, print

Appendices, the elements that make up the extended syllable, violate the sonority sequencing principle and be more sonorous than the adjacent core syllable margin; e.g., the fricative /s/ in sprints

(4) σ-syllables and σ'-syllables

I. In many languages, only s-syllables are admitted.

II. Every syllable must have a nucleus (N), all other syllable constituents are optional.
Vowels can occupy only the nucleus position.
The nucleus , however, may be filled by sonorants sounds other than vowels:

(4) button [bʌtn̩] , kettle [ketl̩]

III. All languages permit an onset (O); a fair number of languages require it.

IV. Many languages permit a coda (C); a number of languages prohibit the coda and require that all syllables end with a nucleus (i.e. a vowel).

V. Syllable-initial appendices (A) are subject to different restrictions than are syllable-final appendices.

English onsets:

(5)

gresh	nsup	rtut	ksig
frep	sniv		
vrag	prid	splad	sbroy
ptat	mbul		

Constraints on English onsets(from Halle (1988)):

(6) a. i. Onsets may dominate at most two timing units.

ii. Onsets may dominate consonants or glides /w, y, h/

iii. If the onset dominates two slots the second is linked to a nonnasal sonorant /r, l, w/ and the first to a voiceless continuant or to a stop /p, t, k, b, d, g/ with the restriction that

a. coronal may not precede /ɬ/

b. labials may not precede /w/

b. Onsets beginning with any sonorant /r, l, n, m, w/ or with a voiceless stop may be preceded by an appendix, which is /S/ before /r/ and /s/ elsewhere.

PROSODIC MORPHOLOGY

Syllable structure in Classical Arabic:

(7) a. Onsets must dominate one timing slot linked to a consonant or a glide.

b. Nuclei must dominate one or two slots linked to a single vowel.

c. Codas may dominate one or two slots linked to consonants or glides. The Coda may dominate two slots only if the Nucleus dominates a single slot.

d. The Coda may be followed by an Appendix dominating a single timing slot linked to a consonant or glide. Appendices are restricted in their distribution being usually allowed only in word final syllables.

A striking property of Arabic as most other Semitic Languages as well as of a number of nonSemitic Languages (e.g. the American Indian language Yokuts) is that <u>in these languages syllable structure is determined primarily by the morphology of the word and only secondarily by the phonological composition of the word</u>.

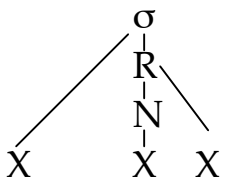
Arabic verbal morphology:

(8) Binyan (plural binyanim) (=derivational category of the verb)

I	katab	‘write’
II	kattab	‘cause to write’
III	kaatab	‘correspond’
IV	?aktab	‘cause to write’
VI	takaatab	‘write to each other’

The last syllable in all binyamin has the structure in (9):

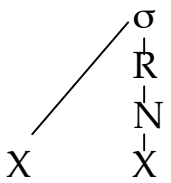
(9)



II and IV have (4) in their first syllable.

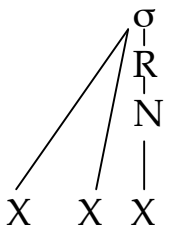
I has (10) in its first syllable:

(10)

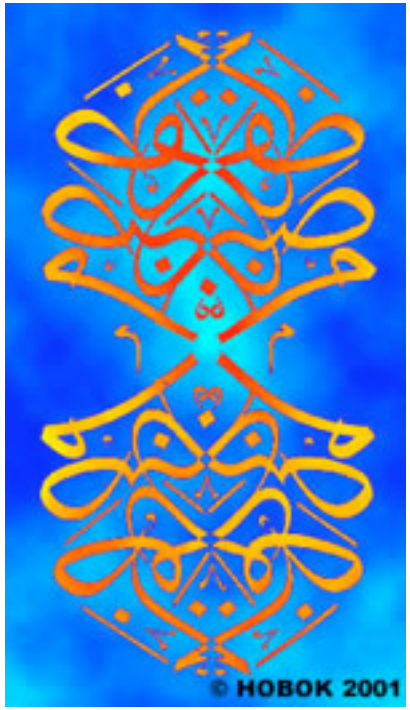


III has (11) in its first syllable:

(11)



The trisyllabic binyan in VI contains (9), (10) and (11).



When a speaker of Arabic decides to use a certain derivational category of the verb, s/he decides by the same token that s/he is going to use a word with a certain syllabic structure; for example if s/he decides to use the causative form of the verb, s/he decides that s/he will use a bisyllabic word both of whose syllables will have the structure (4).

This is different from plural formation in a language like English where the number of syllables and their structure depends exclusively on the sequence of sounds composing the word and the affix.

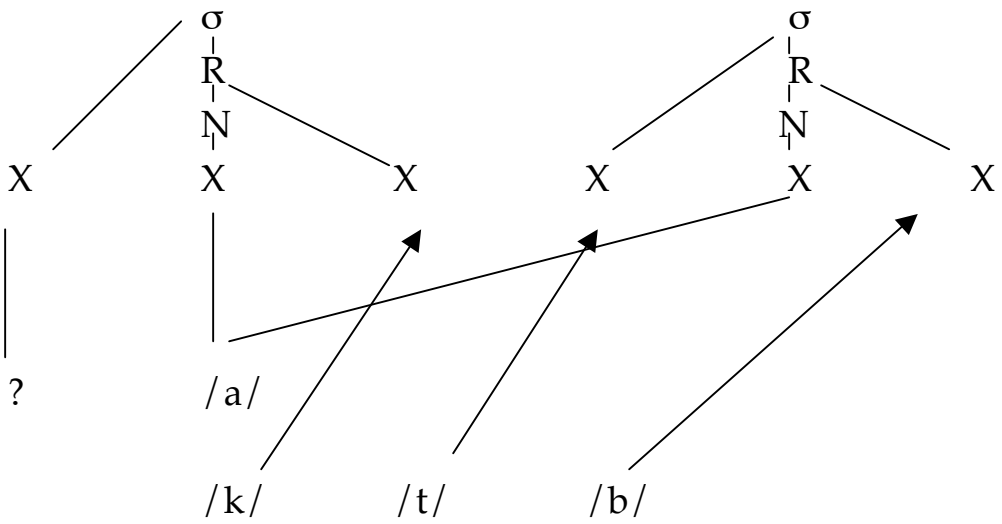
Once the binyamin class is chosen the number of syllables of the word and their structure has been determined.

The consonants of the verb stem carry the lexical meaning of the word:

Thus	/ktb/	represents the verb	'write'
	/kb/		'lie'
	/drb/		'beat'
	etc.		

The vowels are used to signal the aspect, voice and participial vs. finite verb status.

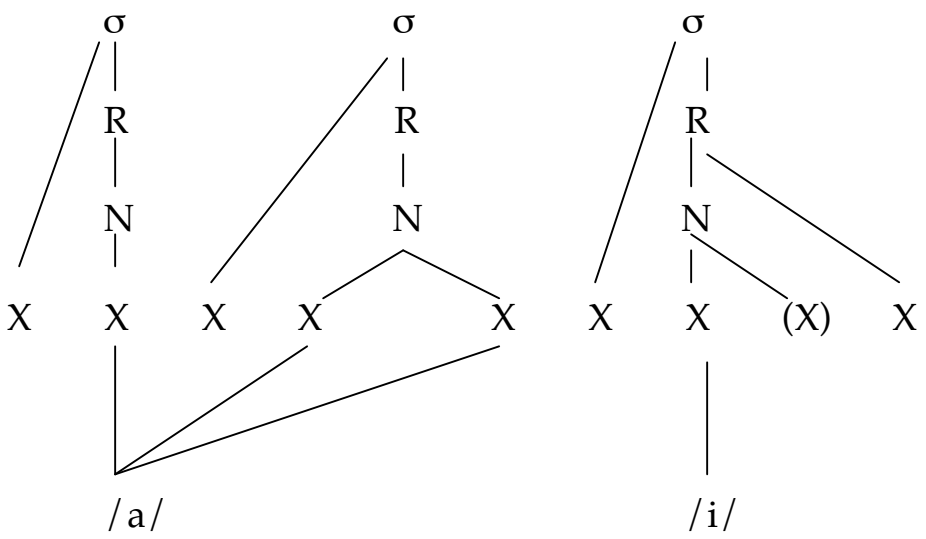
(12)



Broken plurals in Arabic (McCarthy (1982)):

	singular	plural	
(13)	jundab	janaadib	‘locust’
	sultaan	salaatiin	‘sultan’
	duktar	dakaatir	‘doktor’
	safarjal	safaarij	‘quince’
	maktab	makaatib	‘office’
	miftaah	mafaatiih	‘key’
	nuwar	nawaawir	‘white flower’
	ʕandaliib	ʕanaadil	‘nightingale’

(14)



(15) Link unlinked phonemes to empty timing slots from left to right and one for one subject to the constraint that the linking results always in well-formed syllables.

(16)