References: Phonetics

pho·net·ics

Phonetics is a branch of linguistics for the study of sounds of human speech: physical properties, production, acoustics, articulation, etc.

Phoneme

In any given language, a phoneme is the smallest sound segment that can be used to distinguish one word from another. For example "bat" and "chat" have only one sound different but this changes the word. The phonemes in question are "B" and "CH". What exactly these are and how many exist varies a bit and may be influenced by accents included. Generally, US English consists of 39 to 44 phonemes. See ARPAbet below for more phoneme examples.

Grapheme

The definition of a grapheme is somewhat inconsistent in the literature. In our context, a grapheme is the smallest symbol that distinguishes one written word from another. For example, "bat" and "chat" have a difference of two graphemes, even though "CH" is considered to be a single phoneme. In US English, 26 letters and a space combine for 27 possible graphemes.

Lexicon

A lexicon for speech recognition is a lookup file for converting speech parts to words. An example of this is cmudict, the Carnegie Mellon tool for speech recognition compatible with the open source Sphinx project. Here's a short excerpt:

AARDVARK AA R D V AA R K

AARON EH R AH N

AARON'S EH R AH N Z

AARONS EH R AH N Z

AARONSON EH R AH N S AH N

AARONSON'S EH R AH N S AH N Z

AARONSON'S(2) AA R AH N S AH N Z

AARONSON(2) AA R AH N S AH N

. . .

ARPAbet

A set of phonemes developed by the Advanced Research Projects Agency(ARPA) for the Speech Understanding Project (1970's).

ARPAnet on Wikipedia ARPAnet dictionary at CMU:

Phoneme	Example	Translation	
AA	odd	AA D	
AE	at	AE T	
АН	hut	нн ан т	
AO	ought	АО Т	
AW	COW	K AW	
AY	hide	HH AY D	
В	be	ВІҮ	
СН	cheese	CH IY Z	
D	dee	D IY	
DH	thee	DH IY	
EH	Ed	EH D	
ER	hurt	HH ER T	
EY	ate	EY T	
F	fee	FIY	

G green G R IY N HH he HH IY IH it IH T IY eat IY T JH IY K key K IY K key K IY L lee L IY M me M IY N knee N IY NG ping P IH NG OW oat OW T OY toy T OY P pee P IY R read R IY D S sea S IY SH she SH IY T tea T IY TH theta T H EY T AH UH hood HH UH D UW two T UW V vee V IY W we W IY Y yield Y IY L D Z zee Z IY ZH	Phoneme	Example	Translation
IH it IH T IY eat IY T JH gee JH IY K key K IY L lee L IY M me M IY N knee N IY NG ping P IH NG OW oat OW T OY toy T OY P pee P IY R read R IY D S sea S IY SH she SH IY T tea T IY TH theta TH EY T AH UH hood HH UH D UW two T UW V vee V IY W we W IY Y yield Y IY L D Z zee Z IY	G	green	GRIYN
IY eat IY T JH gee JH IY K key K IY L lee L IY M me M IY N knee N IY NG ping P IH NG OW Oat OW T OY toy T OY P pee P IY R read R IY D S sea S IY SH she SH IY T tea T IY TH theta TH EY T AH UH hood HH UH D UW two T UW V vee V IY W we W IY Y yield Y IY L D Z zee Z IY	НН	he	HH IY
JH gee JHIY K key KIY L lee LIY M me MIY N knee NIY NG ping PIH NG OW Oat OW T OY toy TOY P pee PIY R read RIY D S sea SIY SH she SHIY T tea TIY TH theta THEY TAH UH hood HHUH D UW two TUW V vee VIY W we WIY Y yield YIY L D Z zee ZIY	IH	it	IH T
K key K IY L lee L IY M me M IY N knee N IY NG ping P IH NG OW Oat OW T OY toy T OY P pee P IY R read R IY D S sea S IY SH she SH IY T tea T IY TH theta TH EY T AH UH hood HH UH D UW two T UW V vee V IY W we W IY Y yield Y IY L D Z zee Z IY	IY	eat	IY T
L lee LIY M me MIY N knee NIY NG ping PIH NG OW Oat OW T OY toy TOY P pee PIY R read RIY D S sea SIY SH She SHIY T tea TIY TH theta THEY TAH UH hood HH UH D UW two T UW V vee VIY W we WIY Y yield YIY L D Z zee ZIY	JH	gee	JH IY
M me MIY N knee NIY NG ping PIH NG OW oat OW T OY toy TOY P pee PIY R read RIY D S sea SIY SH she SHIY T tea TIY TH theta TH EY T AH UH hood HH UH D UW two T UW V vee VIY W we WIY Y yield YIY L D Z zee Z IY	K	key	KIY
N knee N IY NG ping P IH NG OW oat OW T OY toy T OY P pee P IY R read R IY D S sea S IY SH she SH IY T tea T IY TH theta TH EY T AH UH hood HH UH D UW two T UW V vee V IY W we W IY Y yield Y IY L D Z zee Z IY	L	lee	L IY
NG ping PIH NG OW oat OW T OY toy TOY P pee PIY R read RIY D S sea SIY SH she SHIY T tea TIY TH theta TH EY T AH UH hood HH UH D UW two T UW V vee VIY W we WIY Y yield YIY L D Z zee Z IY	М	me	M IY
OW toy T OY P pee P IY R read R IY D S sea S IY SH she SH IY T tea T IY TH theta TH EY T AH UH hood HH UH D UW two T UW V vee V IY W we W IY Y yield Y IY L D Z zee Z IY	N	knee	N IY
OY toy TOY P pee PIY R read RIYD S sea SIY SH she SHIY T tea TIY TH theta THEYTAH UH hood HHUHD UW two TUW V vee VIY W we WIY Y yield YIYLD Z zee ZIY	NG	ping	P IH NG
P pee PIY R read RIYD S sea SIY SH she SHIY T tea TIY TH theta THEYTAH UH hood HHUHD UW two TUW V vee VIY W we WIY Y yield YIYLD Z zee ZIY	OW	oat	OW T
R read RIYD S sea SIY SH she SHIY T tea TIY TH theta THEYTAH UH hood HHUHD UW two TUW V vee VIY W we WIY Y yield YIYLD Z zee ZIY	OY	toy	T OY
S sea SIY SH she SHIY T tea TIY TH theta THEYTAH UH hood HHUHD UW two TUW V vee VIY W we WIY Y yield YIYLD Z zee ZIY	Р	pee	PIY
SH She SHIY T tea TIY TH theta TH EY T AH UH hood HH UH D UW two T UW V vee VIY W we WIY Y yield Y IY L D Z zee Z IY	R	read	R IY D
T tea T IY TH theta TH EY T AH UH hood HH UH D UW two T UW V vee V IY W we W IY Y yield Y IY L D Z zee Z IY	S	sea	SIY
TH theta TH EY T AH UH hood HH UH D UW two T UW V vee V IY W we W IY Y yield Y IY L D Z zee Z IY	SH	she	SH IY
UH hood HH UH D UW two T UW V vee V IY W we W IY Y yield Y IY L D Z zee Z IY	Т	tea	T IY
UW two T UW V vee V IY W we W IY Y yield Y IY L D Z zee Z IY	TH	theta	TH EY T AH
V vee VIY W we WIY Y yield YIYLD Z zee ZIY	UH	hood	HH UH D
W we WIY Y yield YIYLD Z zee ZIY	UW	two	T UW
Y yield Y IY L D Z zee Z IY	V	vee	VIY
Z zee Z IY	W	we	WIY
	Υ	yield	YIYLD
ZH seizure S IY ZH ER	Z	zee	Z IY
	ZH	seizure	S IY ZH ER