LANGUAGE MACHINES
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a (a) 1 the first letter of the English alphabet.

a (ə; stressed ə) adj. or indefinite article. 1 some single; any: Call a doctor. 2 one: a million dollars. 3 each; every: once a year. 4 the same: two at a time. 5 one kind of: Chemistry is a science. 6 to or for each: ten dollars a day. [Old English an one]

a, an. 1 is used before words pronounced with an initial consonant sound, as in a man, a year, a union. Before words pronounced with an initial vowel sound, an is used, as in an apple, an iceberg, an upset. Before words beginning with h in an unaccented syllable, as historic, historian, usage is divided; formerly, in these words, the h- was not pronounced, and an was used before them; now, the h- is pronounced, and most people use a, although an remains in use.

A (ā), n., pl. A's. 1 the sixth tone of the musical scale of C major. 2 a grade given to student work of excellent quality.

a, prefix. 1 in; on; to: Abed = in bed. 2 in the act of: Aflutter = in the act of fluttering. 3 in a — condition: Aweary = in a weary condition. [Old English an, on on]

a2, prefix. form of ab- before m, p, v, as in aver.

a3, prefix. form of ad- before sc, sp, st, as in ascribe, aspire, astringent.

a4, prefix. form of an-1 before consonants except h, as in atonal.

A, 1 former symbol for argon. 2 one of the four main blood groups. 3 angstrom or angstroms. 4 a or 8, 1 acre or acres. 5 amperes or amperes. 6 (100 square meters).

al, adj. informal. A one.

a a (ā) n. solidified lava which has a rough, jagged texture. [Hawaiian a-a]

AA, 1 Alcoholics Anonymous. 2 antiaircraft. A.A., Associate in Arts.

AAA or A.A.A., American Automobile Association. AAS, American Association for the Advancement of Science. Aachen (āˈkən), n. city in W Germany. 232,000. Also, French Aix-la-Chapelle.

aardvark (ärˈdərˈvärk), n. a burrowing African mammal with a piglike snout, a long, sticky tongue, and very strong claws; ant bear. It feeds on ants and termites. [< Afrikaans < aard earth + varken pig]

aardwolf (ärˈdərˈwulf), n., pl. -wolves. a carnivorous mammal of southern and eastern Africa that resembles the hyena. It lives in a burrow, and feeds on carrion. It is smaller than the aardvark. [Afrikaans < aard earth + wolf wolf]

abacus (əˈbākəs) n. a frame used to make calculations by counters of beads that slide back and forth, used especially in Asian countries. In the picture, beads above the middle bar count five each when lowered toward the bar, and beads below the middle bar count one each when raised toward the bar. Beads above and below the middle bar are totaled in each row. Numbers are shown below each wire for the setting of 1,352,964,708. 2 slab forming the top of the capital of a column. See column for picture. [Lat < Latin < Greek abax, abakos]

Aba dān (əˈbā dān), n. city in SW Iran, known for its oil industry. 294,000.

a baft (əˈbāft) adv. at or toward the stern; aft. —prep. back of; behind. [< a1 on + Middle English baft behind]

ab a lone (əˈbā lōˈnē), n. an edible saltwater mollusk with a large, rather flat shell lined with mother-of-pearl, found along the Pacific coast of North America. [< Mexican Spanish abulón < Costanoan (an Amerind language of California) aulun]

a band (ə bānd) v.t. 1 give up entirely; renounce or relinquish: abandon a career. 2 leave without intending to return to: Abandon ship! See desert n. for synonym study. 3 give (oneself) up completely (to a feeling, impulse, etc.); surrender: abandon oneself to despair. —n. a yielding to natural impulses; freedom from restraint: cheer with abandon. [< Old French abandoner < a bandon in the power of] —ab·don·er, n. —a band·don·ment, n.

a bandoned (ə bāndˈnəd) adj. 1 deserted. 2 shamelessly wicked; immoral. 3 unrestrained. —abandoned, adj. —abandoned, adv.

a base (ə bās) n. a bad, a basing. make lower in rank, condition, or character; degrade: A traitor abases himself. [< Old French abaissier < a- to + baissier lower] —base·ment, n.

a bash (ə bāsh) v.t. embarrass and confuse; make uneasy and somewhat ashamed; disconcert: I was not abashed by the laughter of my classmates. [< Old French esbaiss-, a form of esbaire astonish] —bash·ment, n.

a bate (ə bāt) n. a bad, a bat ed, a bating. —v.t. 1 lessen in force or intensity; reduce or decrease: Soft words did not abate her fury. 2 put an end to; stop: abate a nuisance. —v.i. become less in force or intensity; diminish: The storm has abated. [< Old French abatre beat down < a- to + batre to beat] —bath·ble, adj.

a bate ment (ə bātˈmənt) n. 1 a decrease; lessening. 2 amount abated; reduction. 3 a putting an end to.

ab a tis (əˈbā tīs) n., pl. -tis or -tises (-tīˈsēz) a barricade of trees cut down and placed with their sharpened branches directed toward the enemy. [< French]
# Exodus

<table>
<thead>
<tr>
<th>Subjects</th>
<th>(AD) Verbs</th>
</tr>
</thead>
<tbody>
<tr>
<td>I - NAD (me)(my)</td>
<td>WANT - ENG</td>
</tr>
<tr>
<td>YOU, YOU'RE - ANAH</td>
<td>GAVE - EB</td>
</tr>
<tr>
<td>THEY, THEM - ILLA</td>
<td>ARE - TED</td>
</tr>
<tr>
<td>HE - CAM</td>
<td>SAY - NEH</td>
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<tr>
<td>SHE - MEC</td>
<td>GOING - SER</td>
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<tr>
<td>IT - DLL</td>
<td>COMING - MEC</td>
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<tr>
<td>THAT - LIAH (those)</td>
<td>MIGHT - ROYC</td>
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<tr>
<td>WE - AYER</td>
<td>EAT - SOIA</td>
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<tr>
<td>US - HEOT</td>
<td>LET - LOYS</td>
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<tr>
<td>LETS - LOOTE</td>
<td>DO - SEI</td>
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<tr>
<td>TO - THT</td>
<td>SEE - DRAE</td>
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<tr>
<td>DAD - HAR</td>
<td>EPI - AONER</td>
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<tr>
<td>MOM - BRAN</td>
<td>DUMP - HTE</td>
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<tr>
<td>BROTHER - HOXY</td>
<td>LIKE - OHVE</td>
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<tr>
<td>SIS - OHHR</td>
<td>LOVE - KED</td>
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<tr>
<td>MAEL</td>
<td>NOT - DONT - HAM</td>
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<tr>
<td>CRUSH - PIKE</td>
<td>MOVE - RANIL</td>
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<tr>
<td>BROTHER - EZE</td>
<td>DOUX - IRT</td>
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<tr>
<td>THIS - ROM (room)</td>
<td>BRAKE - CAUK</td>
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<tr>
<td>CHILD - COAM</td>
<td>WALK - LOTLAN</td>
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<td>CAPTIV - OMMONT</td>
<td>TROT - ORBY</td>
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<tr>
<td>NAD</td>
<td>RUN - RATLA</td>
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<tr>
<td>NOT - NEBA</td>
<td>SAW - NEBA</td>
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<tr>
<td>LITE - TIS</td>
<td>MADE - BENET</td>
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<tr>
<td>LADE - BENET</td>
<td>SEE - DRIA</td>
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<tr>
<td>DO - ER</td>
<td>SORRY - LILCAN</td>
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<tr>
<td>READ - BOAR</td>
<td>PLEASE - REANE</td>
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<tr>
<td>HONOR - THAK'H</td>
<td>HONOR - THAK'H</td>
</tr>
<tr>
<td>USE - DAN</td>
<td>NAD</td>
</tr>
</tbody>
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LESSON II
MORE WORDS, BASIC SENTENCES

WORDS: Japeth, Nad, Anah, Nera, Sanel, Cam (he) 6er (going), Mec (she) soia (eat), dll (it) sei (go).

Exercises: Write each answer. (Try not to look at words.)

1. Nera
2. Nad
3. Soia
4. Cam
5. Sei
6. Japeth
7. Mec
8. Anah
9. Dll
10. Sanel
11. Ser

Practice:
Say the English.

1. Nad, ser soia anah.
2. Japeth, anah ser soia dll?
3. Cam nera nad!
4. Mec sei soia dll sanel.

-Check up- check your work!
Language is an accumulation of shared meaning

David Gray
• The only thing that links two symbolic signs together is people saying they go together
The only thing that links two symbolic signs together is people saying they go together.

How do people know what symbols mean what?
• The only thing that links two symbolic signs together is people saying they go together
• How do people know what symbols mean what?
• Watching & learning
if (chair) then ...
if (plastic chair) then ...
if (3-legged chair) then ...
if (red chair) then ...
if (chair) then ...
if (wood chair) then ...
if (knee chair) then ...
if (broken chair) then ...
NEURAL NETWORKS
NEURAL NETWORKS ARE PATTERN-RECOGNITION MACHINES.
NEURAL NETWORKS DO THESE THINGS

- Train incrementally
- Are resilient to noisy input
- Recognize novel patterns
PERCEPTRON
PERCEPTRON
PERCEPRON

Diagram showing a neural network with nodes and connections.
PERCEPTRON
PATTERN RECOGNITION

• Is not only fundamental to language...

• ... but underlies every facet of cognition.
When we start to observe patterns, it is natural for humans to start extrapolating these patterns.

This is why we’re here right now!
LR^3

- big ears
- big eyes
- big teeth
- friendly
- wrinkled
- handsome
- run away
- scream
- look for woodcutter
- kiss on cheek
- approach
- offer food
- flirt
LR³

- big ears
- big eyes
- big teeth
- friendly
- wrinkled
- handsome

run away
scream
look for woodcutter
kiss on cheek
approach
offer food
flirt
LR³

big ears
big eyes
big teeth
friendly
wrinkled
handsome
run away
scream
look for woodcutter
kiss on cheek
approach
offer food
flirt
LR$^3$

- big ears
- big eyes
- big teeth
- friendly
- wrinkled
- handsome

- grandmother
- wolf
- woodcutter

- run away
- scream
- look for woodcutter
- kiss on cheek
- approach
- offer food
- flirt
\[ LR^3 \]

diagram showing relationships between words:

- big ears -> grandmother
- big eyes
- big teeth
- friendly
- wrinkled
- handsome

interconnected with:
- run away
- scream
- look for woodcutter
- kiss on cheek
- approach
- offer food
- flirt

nodes for:
- grandmother
- wolf
- woodcutter
PERCEPTIONS & LAYERS

• “Output” nodes of one pair of layers can be the “input” nodes of another pair of layers

• —and the network doesn’t know that this input is “internal” or “external”

• —which means that internal representations can work just the same way as physical sensory perceptions!
PERCEPTIONS & LAYERS

- Activation of the “wolf” node recalls its features.
- Gives rise to the sense of that node as representing “wolfness.”
The ability of the network to flexibly activate the “wolf” node gives rise to the sense of that node as representing “wolfness.”