Vector Oriented Thinking and Machine Learning Problem Formulation

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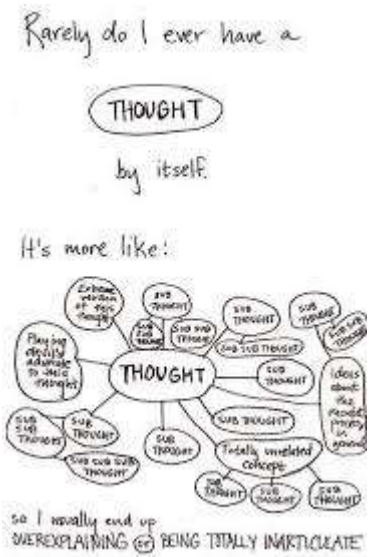
IIT Tirupati

Brief abstract

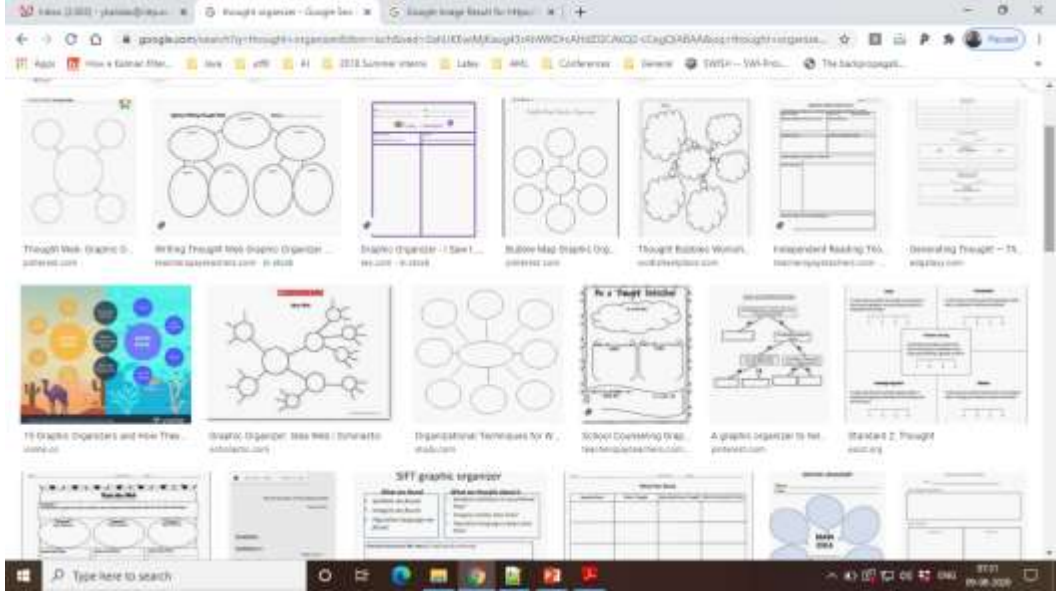
Today there is a lot of buzz around artificial intelligence and machine learning. The categories of people who would want to adopt the technology span across professional domains and with varying levels of mathematical depth. In this context it is important to understand what is the underlying mechanism behind artificial intelligence and machine learning technologies. Can we just call it computational intelligence, where intelligence is defined by the programmer and the system operates according to the parameters? What is the fundamental representation of elements of intelligence? What are the data and operators? We will also see in this talk, notions data, dimensions, loss functions, bias-variance and formulation over some of the popular categories of data. The session is interactive with thought provoking mind based exercises.

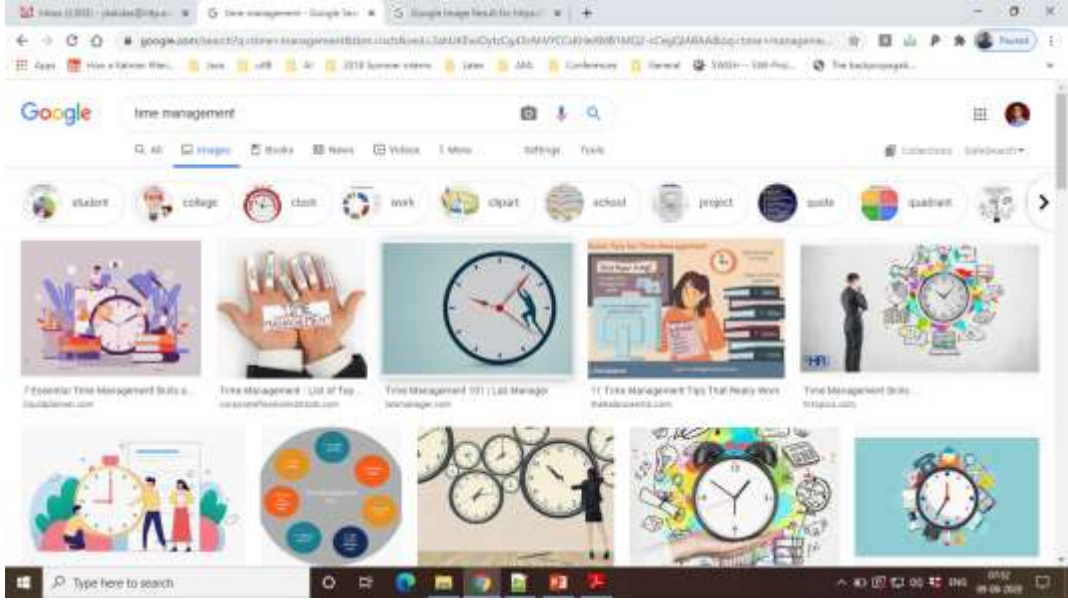
Too many thoughts



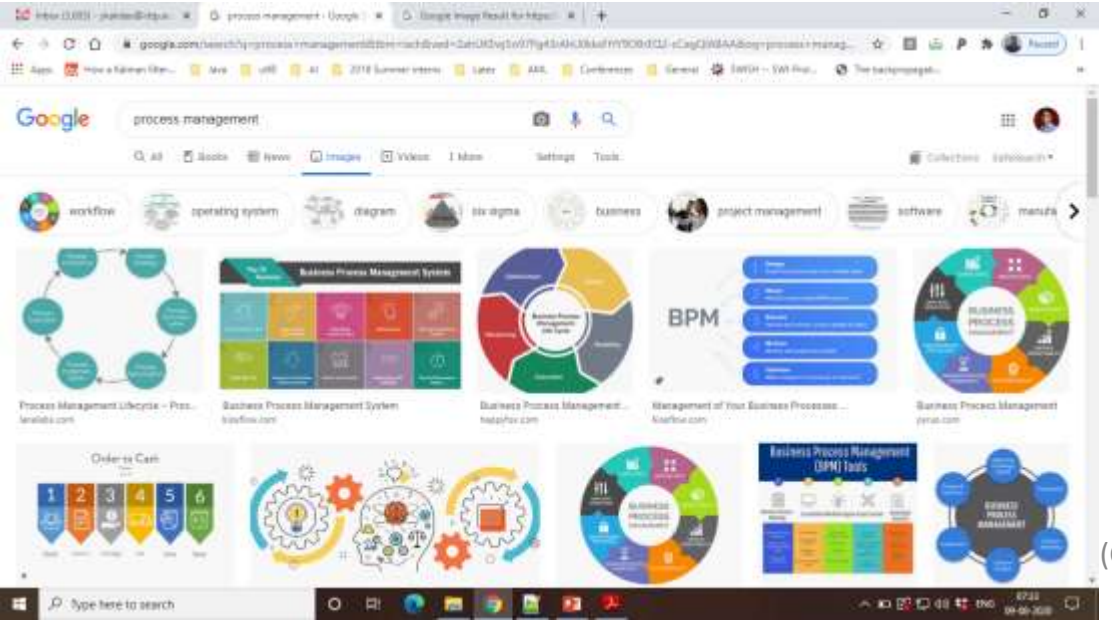
She needs your help *;-)*

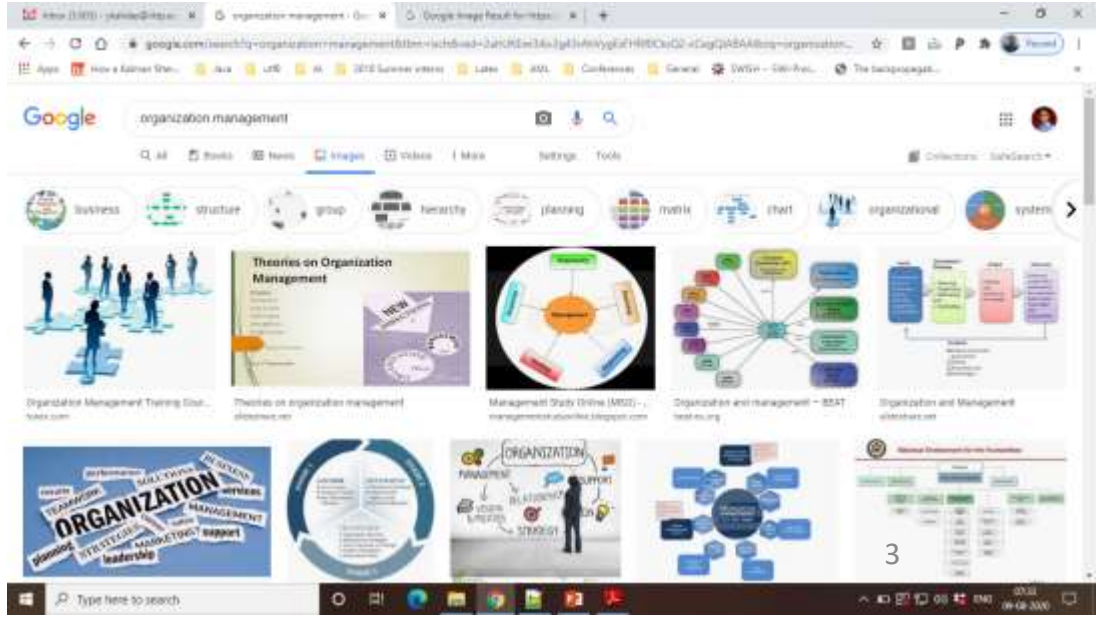
Source – random images in Google search (links here)





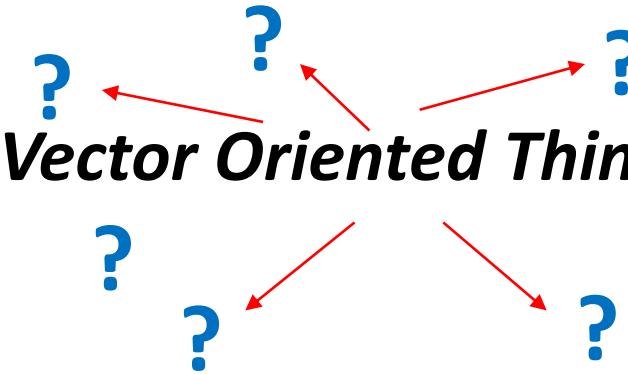
Thought dairy, Time slicing, Process management, Organizational behaviour….

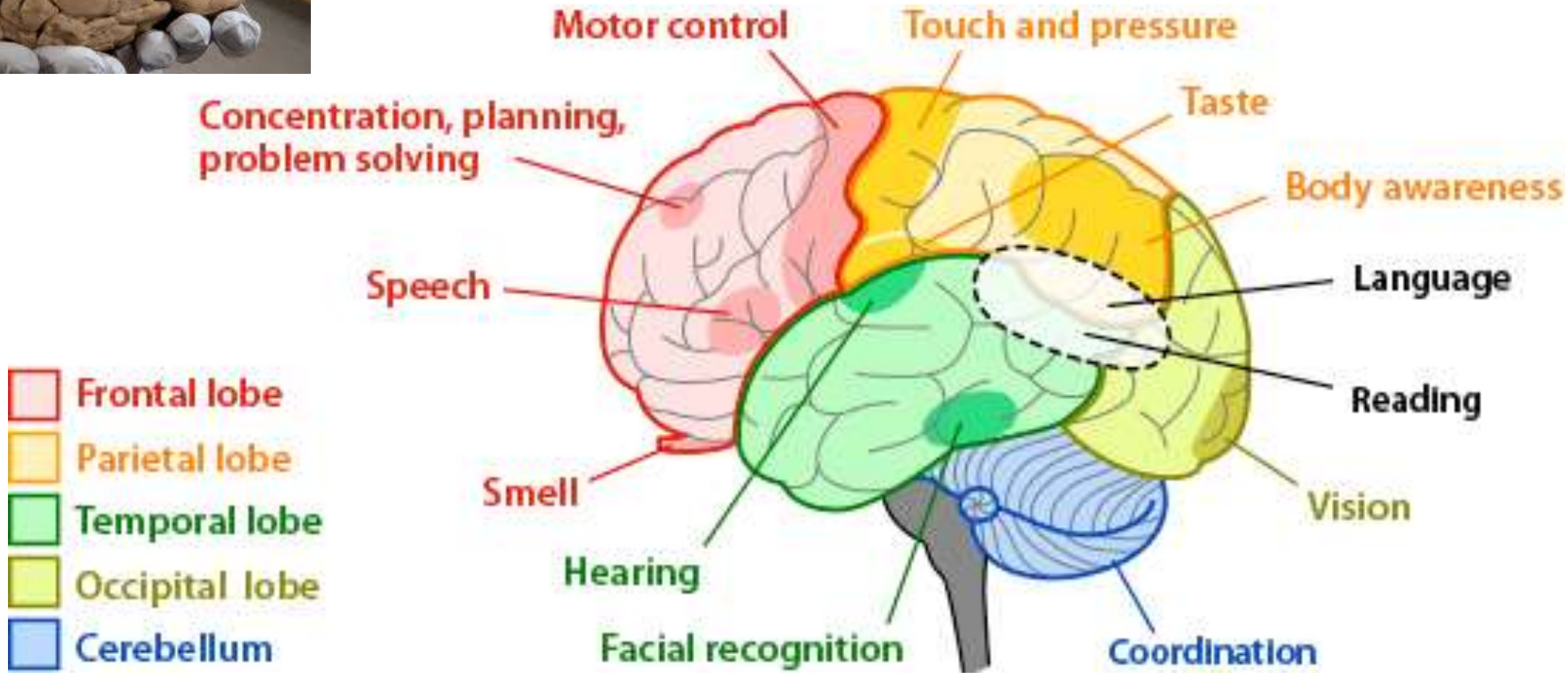




Thinking Paradigms

- Computational Thinking
  - Step by step
  - Sub-steps
  - Starting step
  - Stopping criteria
  - Iteration
- Object Oriented Thinking
  - Every concept is ‘alive’
  - State – instance variable
  - Behaviour – functions
  - Interactions – invocations
- Process Oriented Thinking
  - Services
  - Invocations & SLA
  - Clients
- Table Oriented Thinking
  - Relational Databases
  - Schemas
  - Optimal storage guidelines
- ***Vector Oriented Thinking ???***





Reference – link here anyway and here.

google.com/search?q=brain+activity+ecg&tbm=isch&ved=2ahUKEwi1v-rail3rAhXbU30KHToHBL8Q2-cCegQIABAA&oq=brain+activity+e...

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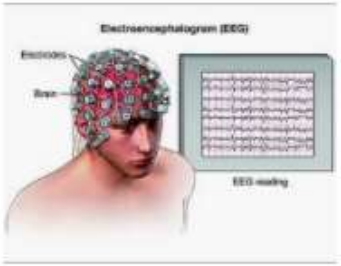
waves | eeg ecg | delta | correlation analysis | electrical activity | human brain death | heart | brain dead | contec kt88 | brain waves | seizures | sleep | rem sleep | kt88 1018

Explainer: How to read brain activity ...
sciencenewsforstudents.org



Know more on Electroencephalogram ...
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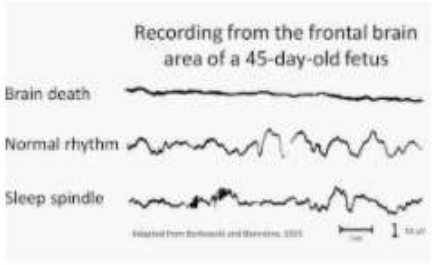
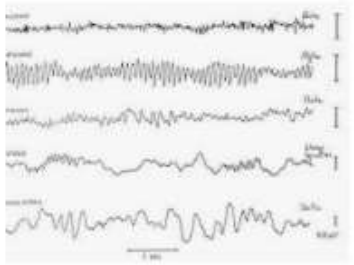
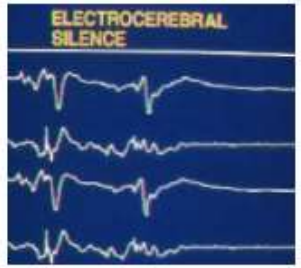


Fetal EEGs: Signals from the Dawn of ...
lozierinstitute.org

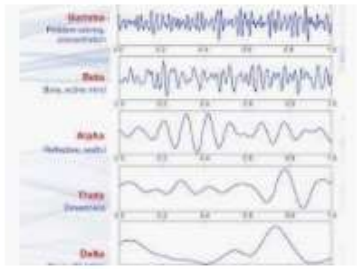
Monitoring and Measuring Brain Activity ...
imotions.com



DIY EEG (and ECG) Circuit | Brain waves...
pinterest.com



Confirming Brain Death - How Br...
science.howstuffworks.com



Brain Waves - an overview ...
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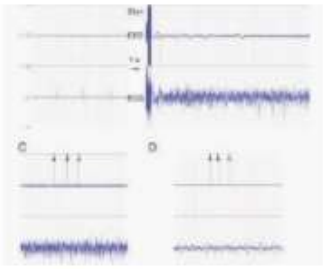

A) EEG and ECG traces before stunni...
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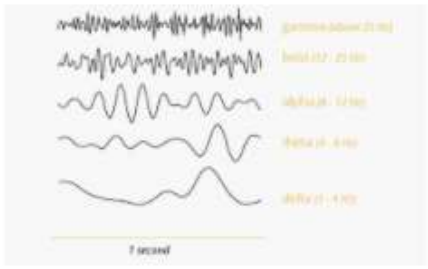

EEG (Electroencephalography): The ...
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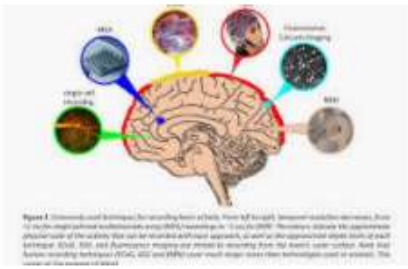
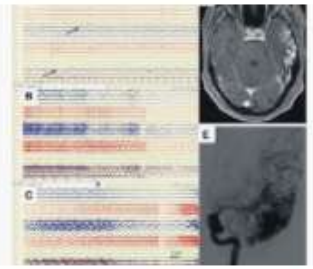


How to measure brain activity in people ...
qbi.uq.edu.au



EEG and ECG data during asystole (a...
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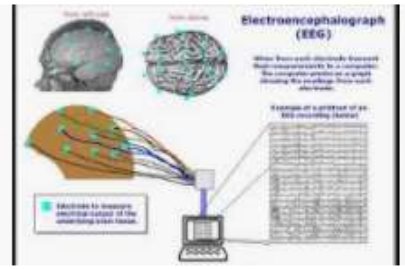

QEEG Assessment
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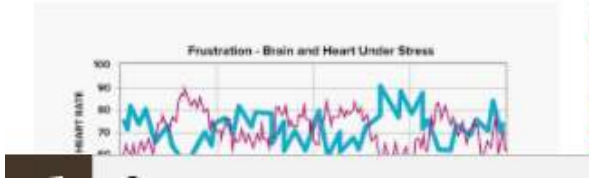
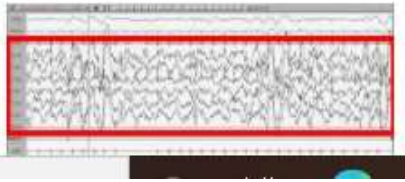
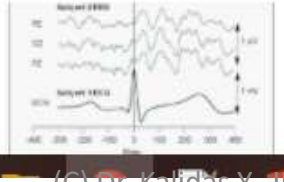
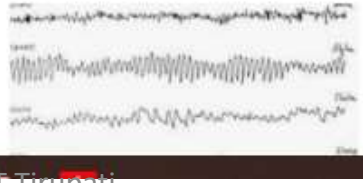
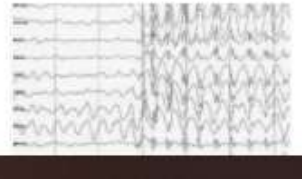


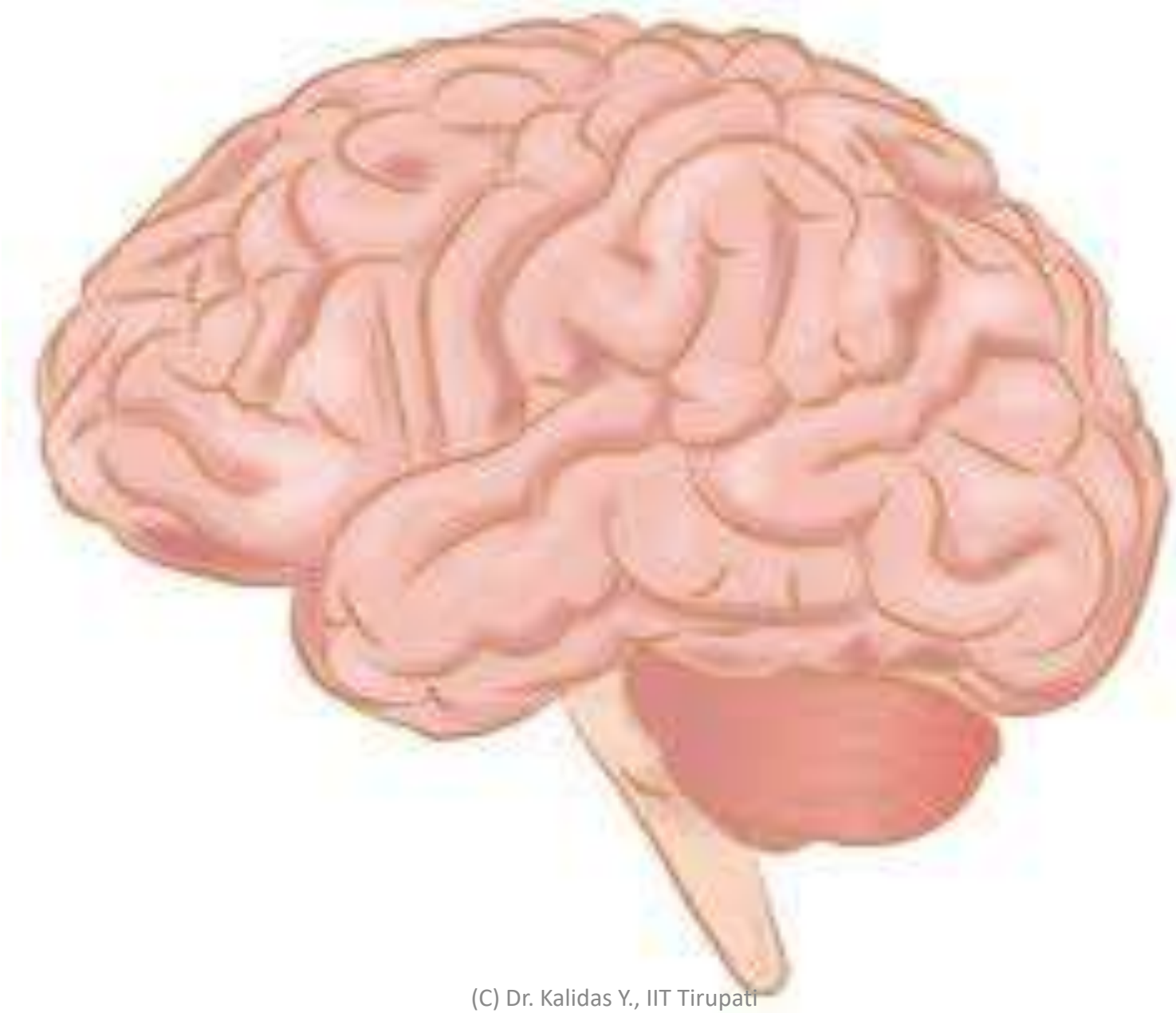








Thought experiment



Brain figure – link here.

Glass

Brain figure – link here.

Glass with water

Brain figure – link here.

Glass with water and spoon

Brain figure – link here.

Glass with water and spoon stirring…

Brain figure – link here.

Representation

Glass with water and spoon stirring…

How to represent?

Brain figure – link here.

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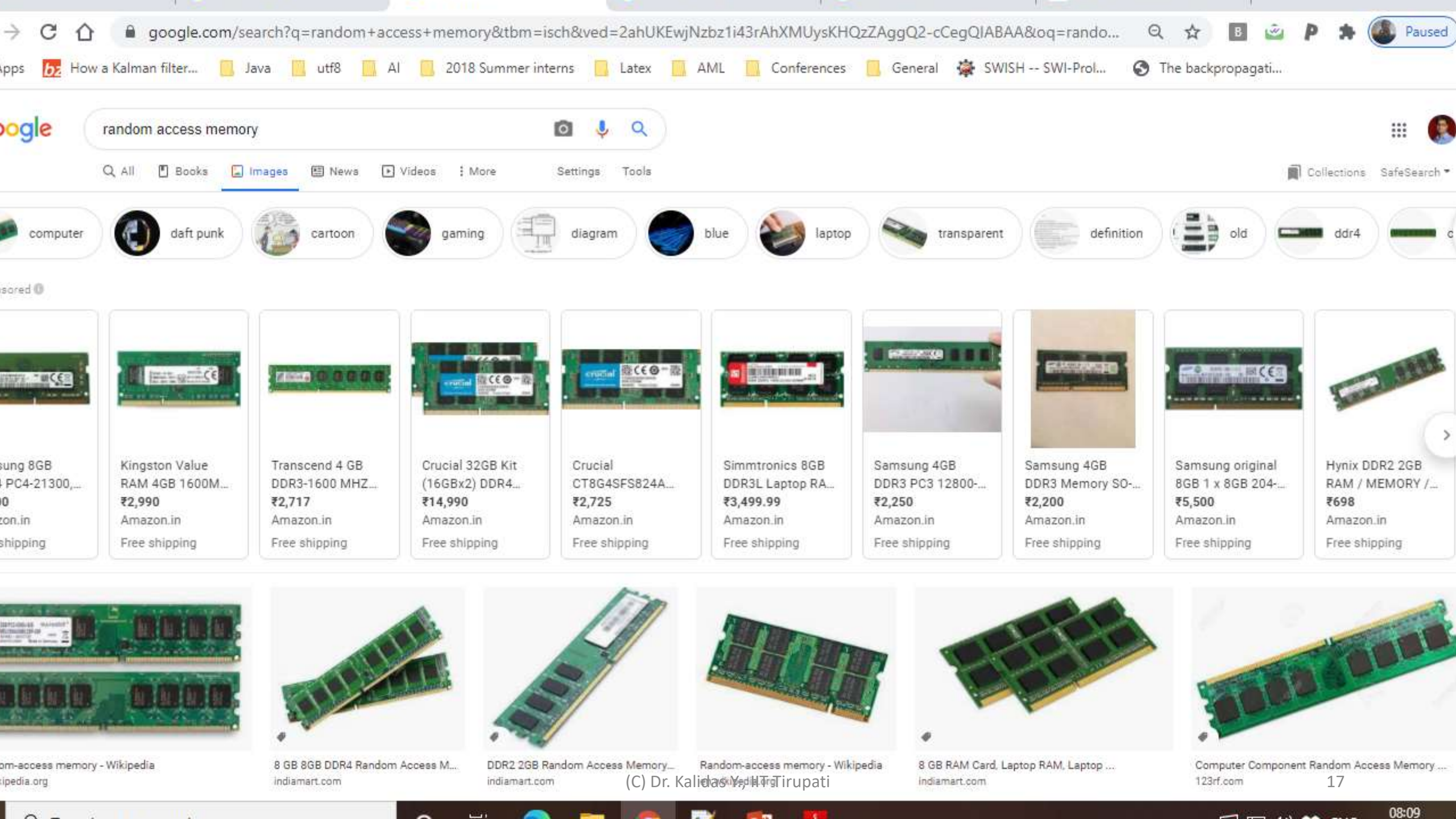
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Random-access memory - Wikipedia
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Computer Component Random Access Memory ...
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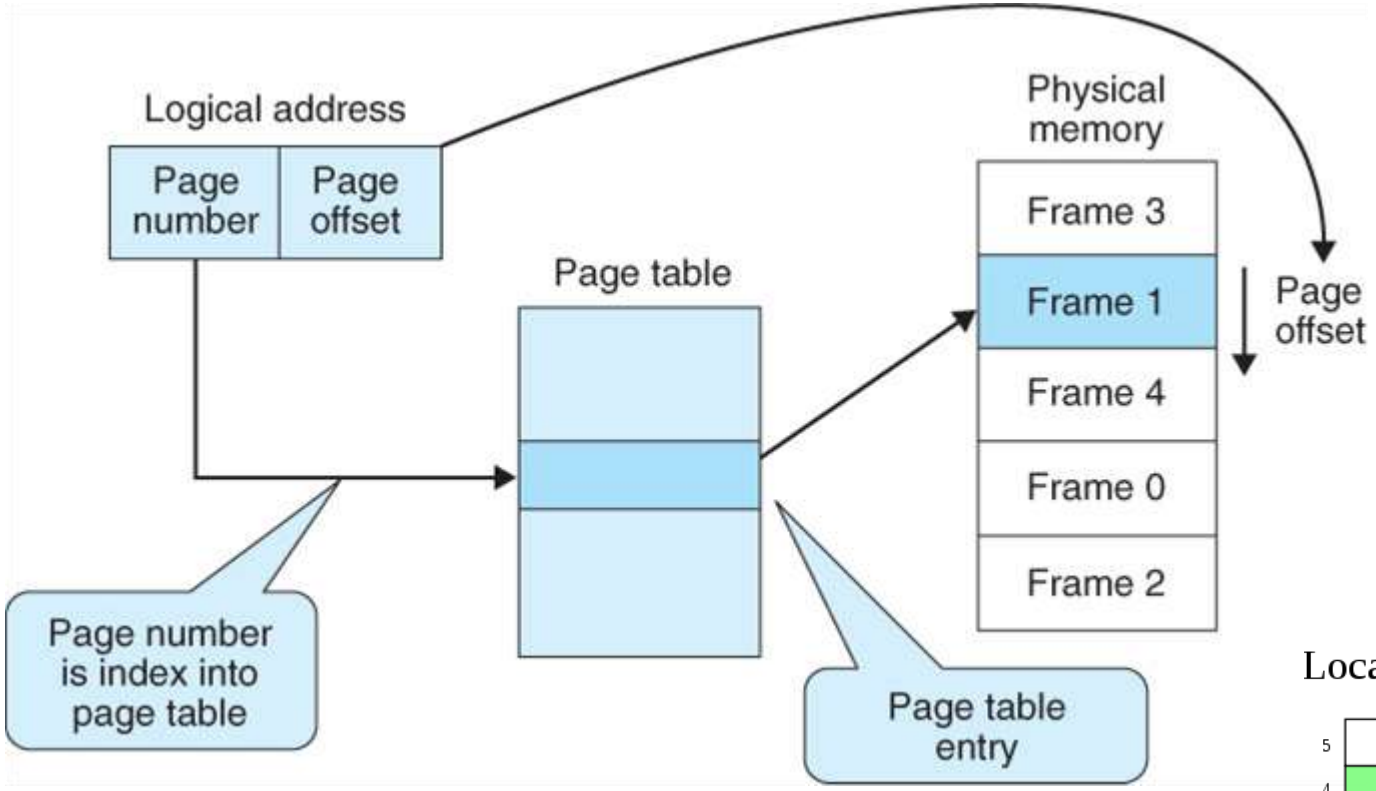

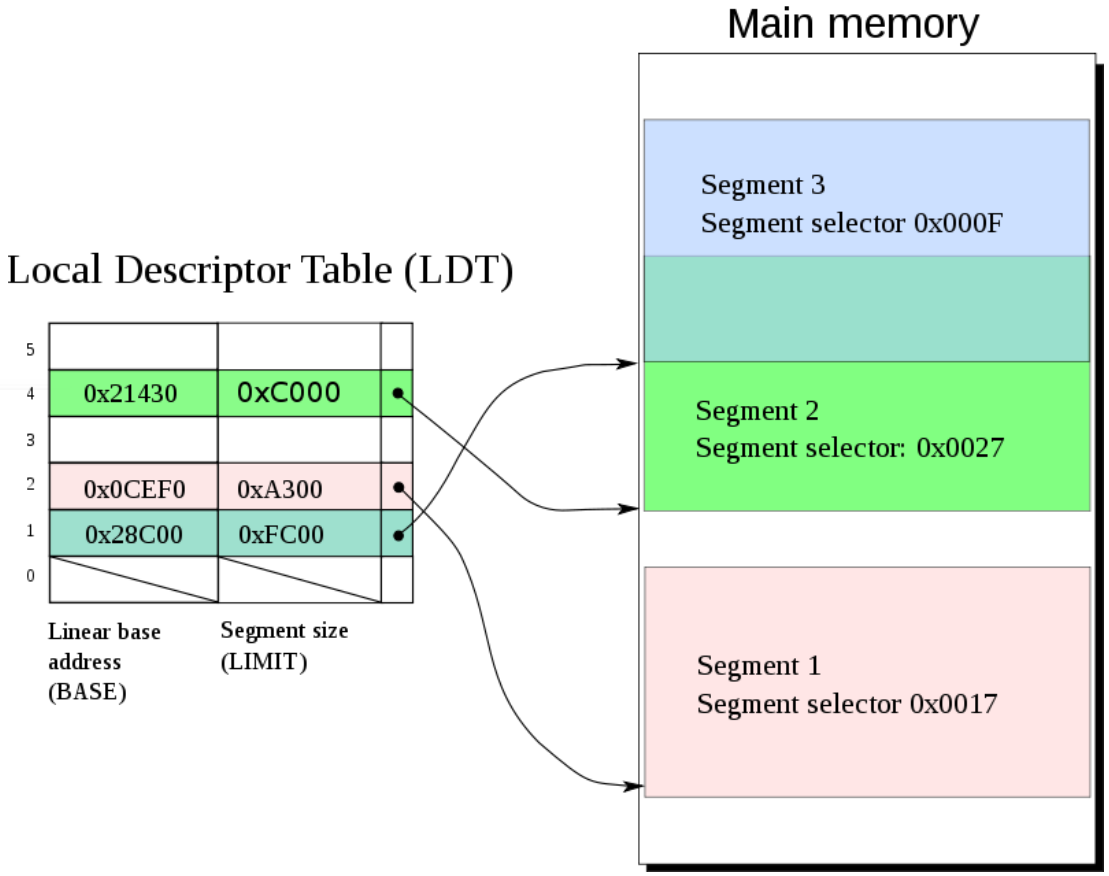

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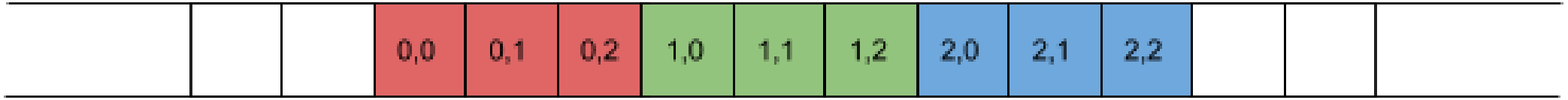

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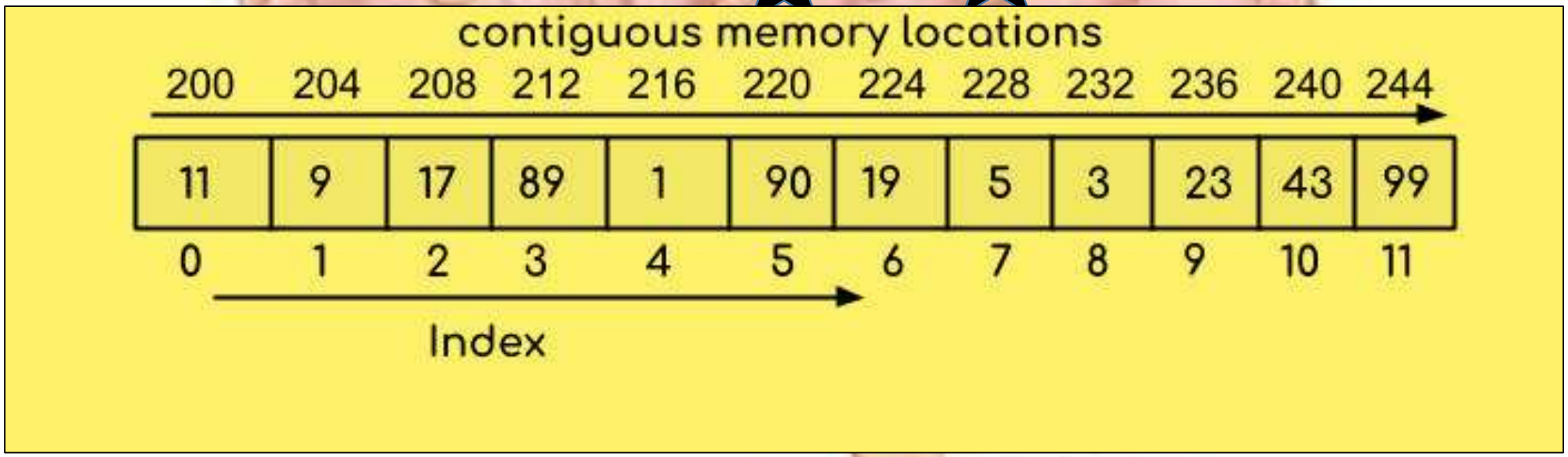
How to represent?

Glass with water and spoon stirring…

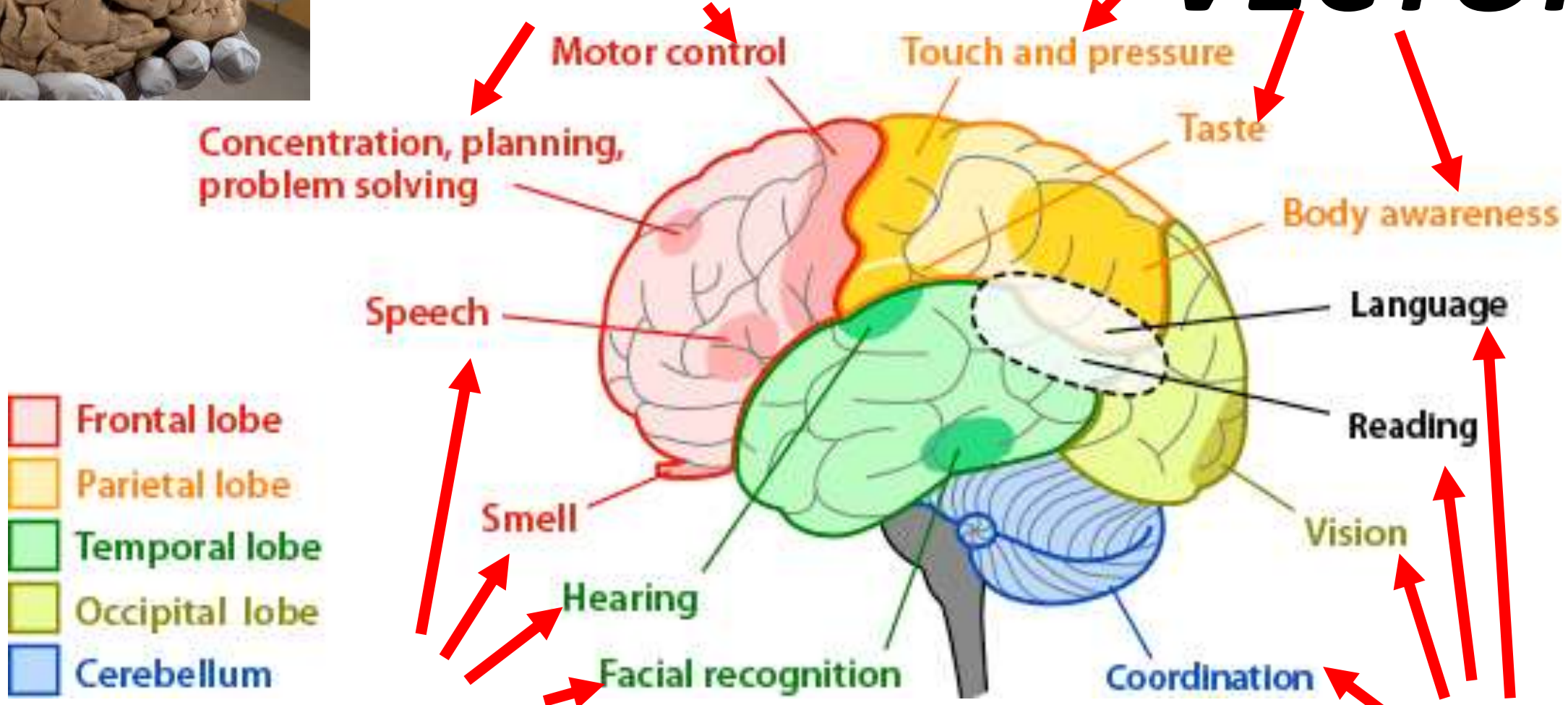


Brain figure – link here and array figure here.

Activity	Array
Glass without water	Very large **array** with value changes
Glass with water	Very large **array** with value changes
Spoon	Very large **array** with value changes
Glass with water and spoon	…
Glass with water and spoon and stirring happening	…
Fast stirring	…
Slow stirring	…
Spill	…
Removal of spoon	…
Voice commands	…
Surroundings	…
Inputs from other senses	…

VECTOR

VECTOR



VECTOR

VECTOR

Reference – link here anyway and here.

Discussion – Vector formulation

- Automatic floor sweeping robot
- Robo-cheff – Robotic arms learning to prepare dishes, cut vegetables etc.,
- English grammar correction tool
- Weather prediction tool
- Mental health assessment based on ECG signals and audio, visionary inputs
- Mr. Vector! Don’t cut jokes about vector ;-)