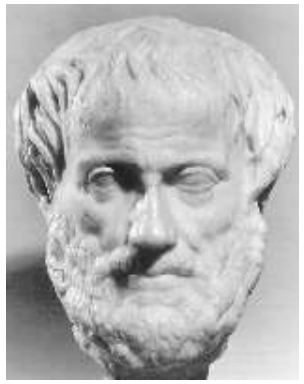
A Brief History of Cognitive Psychology

Introduction to Cognitive Psychology
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Empiricism vs Nativism



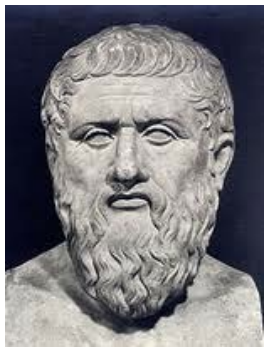
Aristotle

John Locke
"Blank slate"

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Descartes

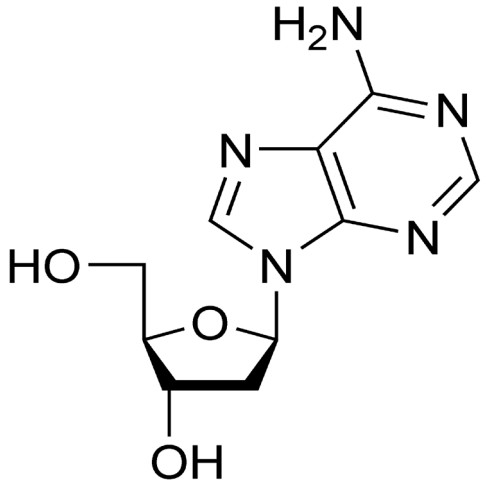


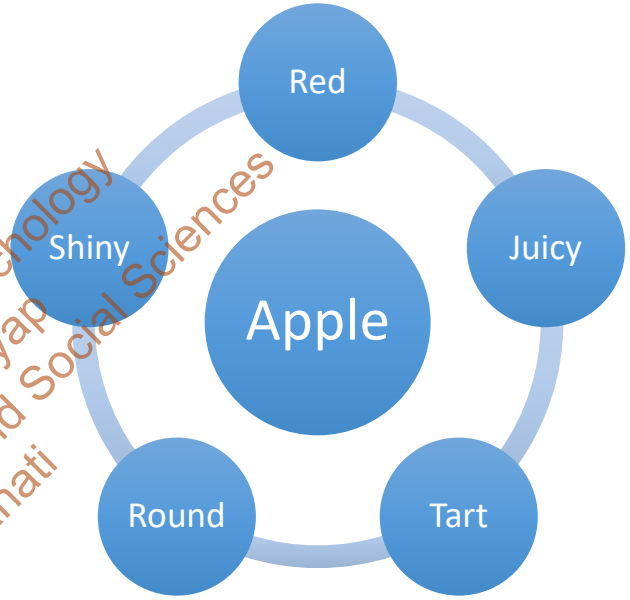
Plato

Experience

Heredity & Biology

Structuralism (Wilhelm Wundt)







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Wundt's school made at least two major contributions:

(1) They showed that mental activity can be broken down into more basic operations.

(2) They developed objective methods for assessing mental activity.

Functionalism (William James)

William James (1842–1910): focused not on the nature of mental activity, but rather on the ***functions*** of specific mental activities in the world.

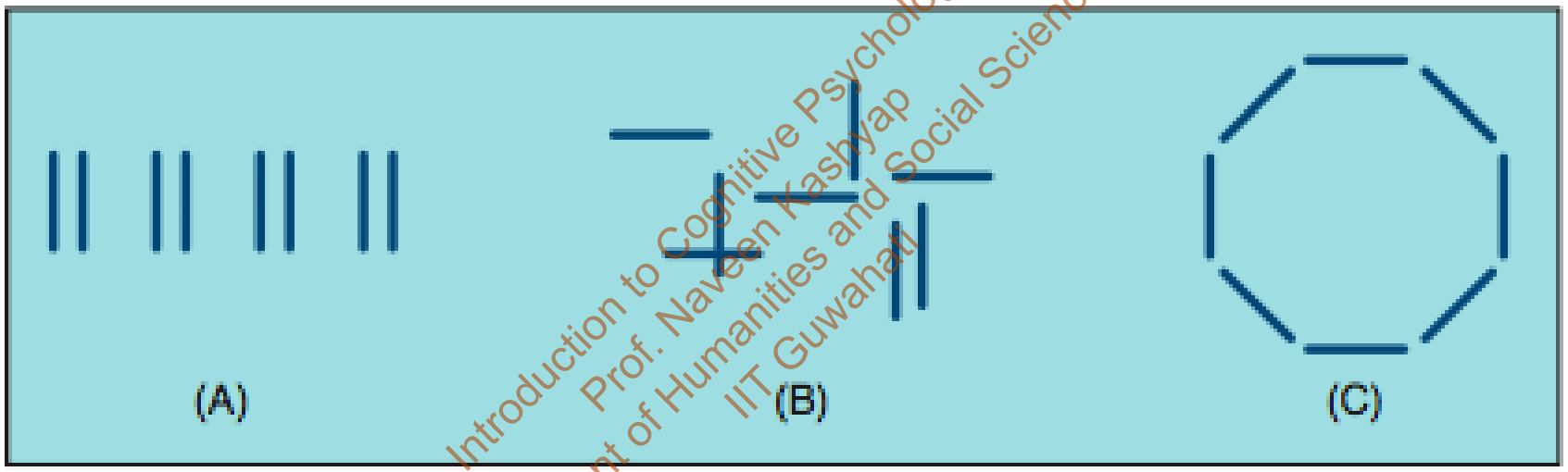
The *functionalist* perspective: certain practices or approaches are better suited than others to accomplishing certain tasks, and that we should change our thoughts and behavior as we discover those that are increasingly "better adapted" to our environment.

It relied in large part on ideas about evolution proposed by **Charles Darwin**.

Preferred to study behavior in the real world rather than a sterile laboratory

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Gestalt Psychology



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The whole is greater than the sum of the parts.

Behaviorism

Clark L. Hull (1884–1952): proposed that internal events that are inferred directly from behavior such as motivation, even though these events were not themselves immediately observable.

B. F. Skinner (1904–1990): went so far as to reject absolutely all discussion of internal events.

Behaviorists limits:

It simply could not explain the most interesting human behaviors, notably language (Chomsky, 1957, 1959). (*p. 7*)

Failed to provide insights into the nature of perception,

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The Cognitive Revolution

This new approach, developed in the late 1950s and early 1960s, was directly tied to the development of the computer (Gardner, 1985).

Researchers seized on the computer as a model for the way in which human mental activity takes place; the computer was a tool that allowed researchers to specify the internal mechanisms that produce behavior.

Herbert A. Simon and **Alan Newell** and linguist **Noam Chomsky** played a central role in this revolution, providing examples of how progress could be achieved by comparing the mind to a computing machine.

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Understanding the Mind

The cognitive revolution led formulation of a theory of mental activities but comparing mental activities with computer programs are not very correct.

The hardware that runs these programs (mental activities vs. computer programs) are made up of different materials.

Also computer OS can run on several machines in the same way, but the same is not true for mental activities

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Mind and Brain

It is not wholly correct to state the mind and brain as comparable to ***hardware and computer programs***. Some times repetitive programs are converted into electrical circuits (hardware) which perform the same functions as software program but the same cannot be done with brain and mind.

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The true distinction between brain and mind can only be understood by examining it through various **levels of analysis**. For e.g., Computer can both be described in terms of its physics (electrical circuits) and OS (software). Similarly for decoding any mental process we need information about its functions as well as the structures that lead to this process. For e.g., Emotions

Mental Representations

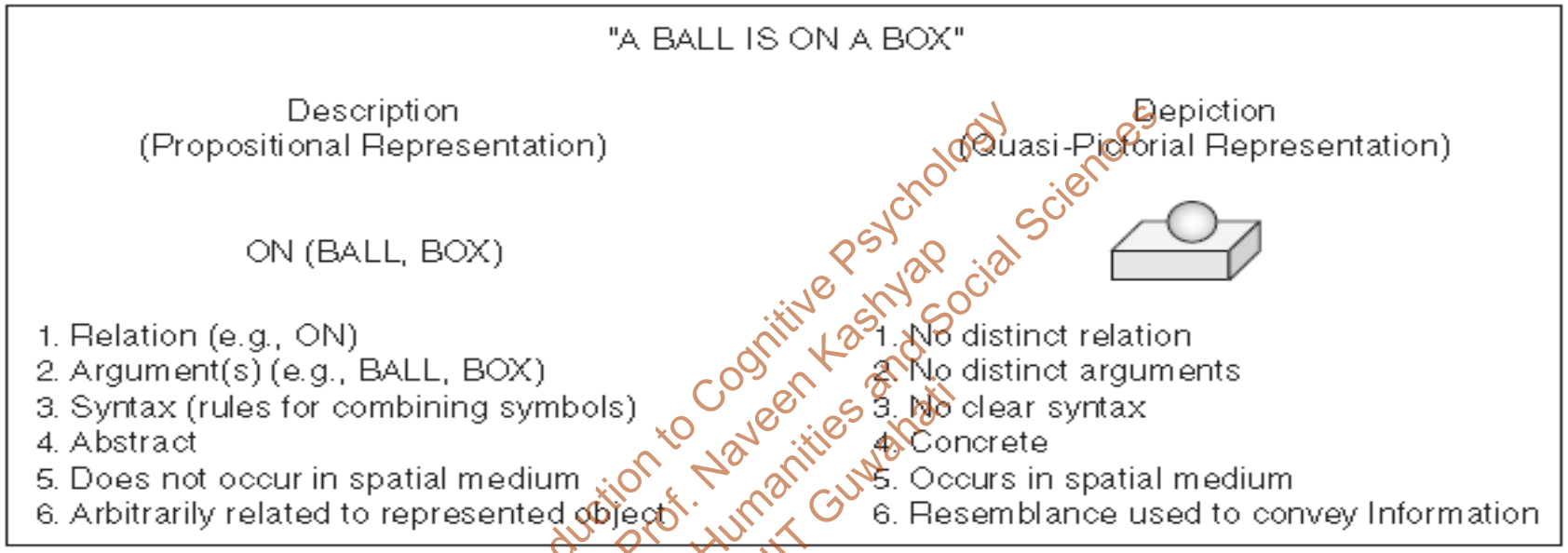
All mental activities are about something – a job choice, a friends face, thoughts about your summer holidays etc. Cognitive psychologists try to understand how information is stored is internally represented.

a representation is a physical state (marks on page, neural connection in the brain, magnetic fields in computers) that conveys information specifying an object, event or category or its characteristics. They have 2 important facets –

(a) form *– the format of conveying information*
(b) content *– the meaning conveyed by the representation*

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Mental Representation



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The same content can be represented either by descriptions (abstract, language-like propositional representations) or depictions (picture-like representations). Some of the differences between the two types of formats are listed. A “relation” specifies how entities are combined, and an “argument” is an entity that is affected by a relation.

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Mental Processing

In order to understand how representations work we need to understand the process that operate on them.

A ***process*** is a transformation of information that obeys well-defined principles to produce a specific output when given a specific input.

A ***processing system*** is a set of processes that work together to accomplish a type of task, using and producing representations as appropriate.

An ***algorithm*** is a step-by-step procedure that guarantees that a certain input will produce a certain output.

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Why study the Brain?

Turning to the brain helps us to grapple with the challenge of identifiability.

Identifiability refers to the ability to specify the correct combination of representations and processes used to accomplish a task.

Facts about the brain can help us test the ***adequacy*** of a theory, which lets us know whether a theory is—to that point—valid.

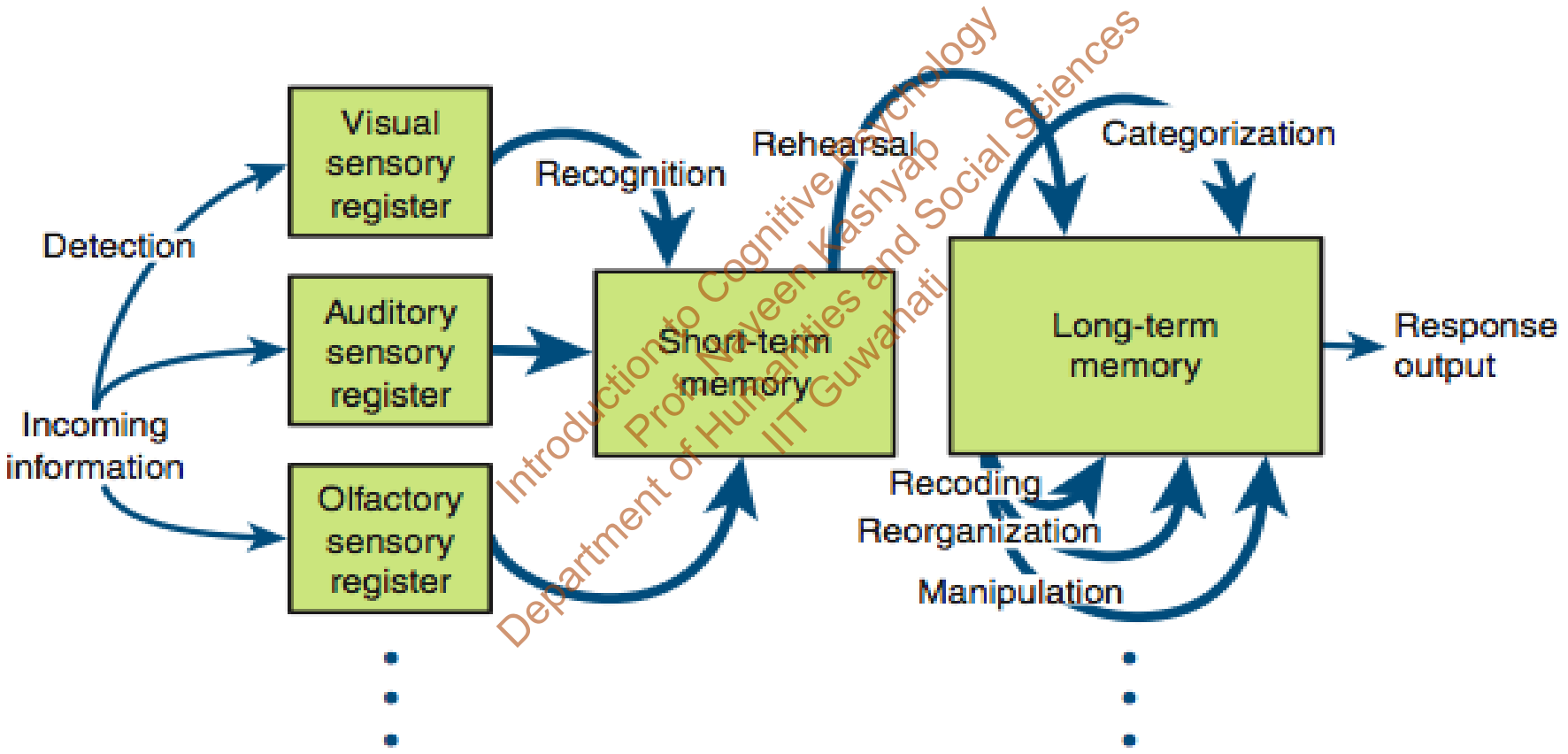
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Paradigms of Cognitive Psychology

- What is a paradigm?
  - Body of knowledge structured according to what its proponents consider important and what they do not
    - Assumptions made by investigators
    - Appropriate types of research methods
    - Appropriate questions for the field
    - Appropriate analogies

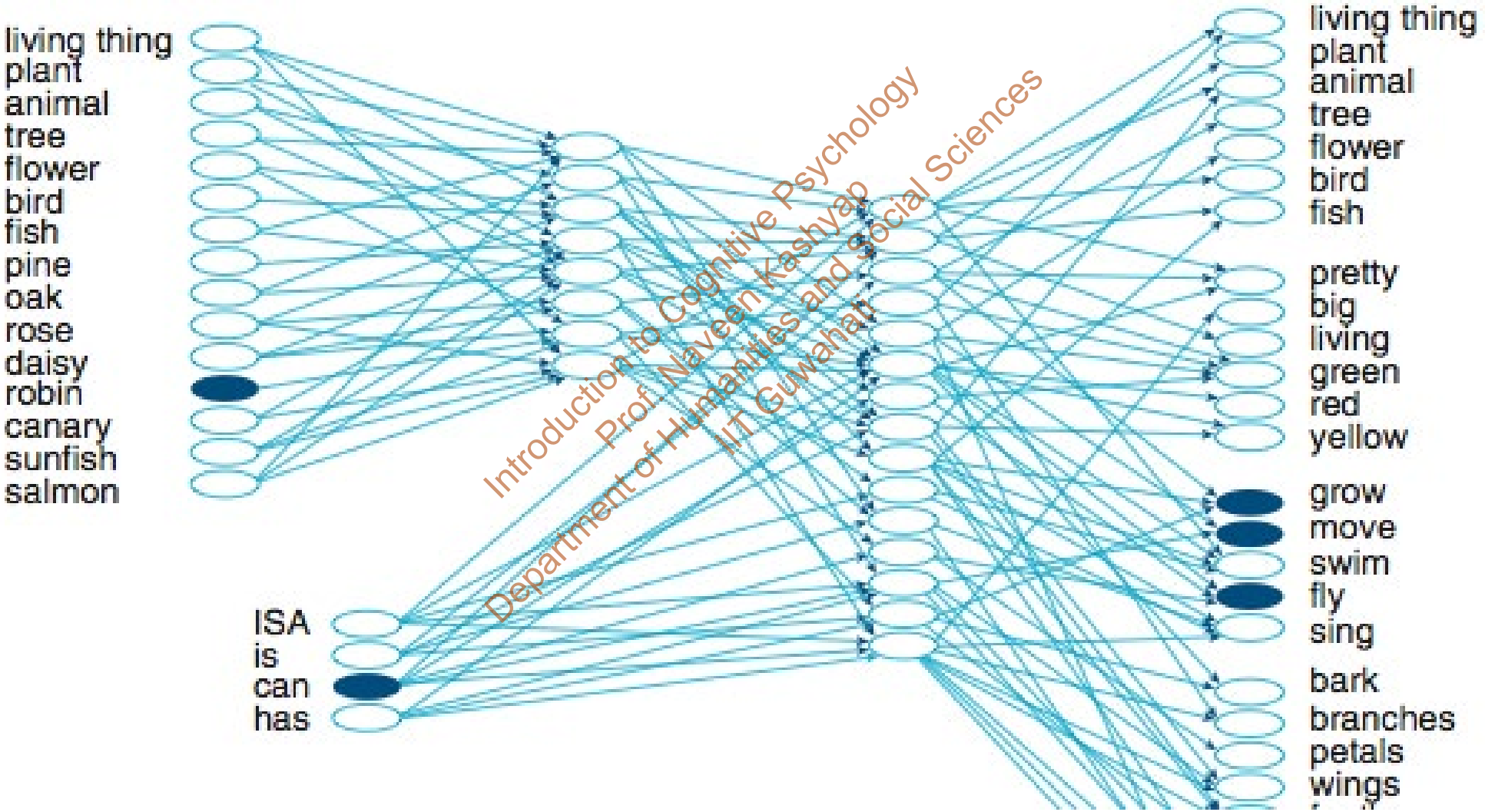
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The Information Processing Approach



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Connectionism



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The Evolutionary Approach

- Human beings have specialized areas of competence produced by our evolutionary heritage
- The environment that shapes us is not only physical, but also ecological and social

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The Ecological Approach

- All cognitive activities are shaped by the culture and by the context in which they occur
- Focus on studying cognition in everyday contexts

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