

COGNITIVE PSYCHOLOGY

- The branch of psychology that focuses on the study of **higher mental processes**, including thinking, language, memory, problem solving, knowing, reasoning, judging, and decision making.



THINKING

- What are you thinking about at this moment?
- The ability to ask such a question shows how unique human thinking is.
- No other species, analyzes, recollects, or plans the way humans do



- Psychologists define thinking as **brain activity** where we use information like **words, images, sounds, or other data** in our minds.
- Thinking **transforms information into new and different forms**, allowing us to answer questions, **make decisions, solve problems, or make plans**



MENTAL IMAGES:

EXAMINING THE MIND'S EYE

- **Representations in the mind of an object or event.**
- Some experts see the production of **mental images as a way to improve various skills.** ◦ For instance, many athletes use mental image in their training.
- The use of mental image can lead to improved performance in sports.
- **Mental image may improve other types of skills as well.** ◦ For example, piano players who simply **mentally rehearse** an exercise show brain activity that is virtually identical to that of people who actually practice the exercise manually



CONCEPTS: CATEGORIZING THE WORLD

- If someone asks you what is in your room's cupboard you might answer with a detailed list of items such as shirts, tie, jeans perfumes, books, pens ,markers and some unnecessary items(and so forth).
- More likely, though, you would respond by naming some broader categories, such as “clothes” and “stationary.” □ Using such categories reflects the operation of concepts.
Concept
- Cconcept **class room** chairs, whiteboard, study environment
- **canteen** food, enjoyment



CONCEPTS: CATEGORIZING THE WORLD

- Concepts enable us to **organize complex phenomena into cognitive categories that are easier to understand and remember.**
- Concepts enable us to think about and **understand more readily the complex world in which we live.**



REASONING

- Process by which information is used to draw conclusions and make decisions.
- to think rationally and conclude any event, situation and issue with reasonable explanation



ALGORITHMS AND HEURISTICS

- In psychology, algorithms are frequently contrasted with heuristics. Both can be useful when problem-solving, but it is important to understand the differences between them.
- When faced with making a decision, we often turn to various kinds of cognitive shortcuts, known as algorithms and heuristics, to help us. Algorithm .



WHAT ARE ALGORITHMS?

Algorithms are a **set of instructions** programmed specifically to solve a problem or produce an outcome.

Algorithms **require several inputs in order to produce a meaningful output.** This can be data, values, figures and so on.



ALGORITHMS

- An **algorithm** is a defined set of step-by-step procedures that provides the correct answer to a particular problem. By following the instructions correctly, you are guaranteed to arrive at the right answer.



- There are many different examples of how algorithms can be used in daily life. Some common ones include:
- A recipe for cooking a particular dish
- The method a search engine uses to find information on the internet
- Instructions for how to assemble a bicycle
- A process to determine what type of treatment is most appropriate for certain types of mental health conditions.



- Algorithms can be a great problem-solving choice when the **answer needs to be 100% accurate** or when each decision needs to follow the same process.
- A different approach might be needed if speed is the primary concern.



HEURISTICS

- **Heuristics** is a mental shortcut that allows people to solve problems and make judgments quickly and efficiently.
- For many problems and decisions, however, no algorithm is available.
- In those instances, we may be able to use heuristics to help us.



- These mental shortcuts are **typically informed by our past experiences and allow us to act quickly**. However, heuristics are really more of a rule-of-thumb; **they don't always guarantee a correct solution**.
- Eg some students follow heuristic of preparing for a test by ignoring assigned textbook reading and their lecture notes and just focused on their own learning, a strategy that may or may not pay off



SO HOW DO YOU DETERMINE WHEN TO USE A HEURISTIC AND WHEN TO USE AN ALGORITHM?

- When problem-solving, deciding which method to use depends on the **need for either accuracy or speed**.
- If complete accuracy is required, it is best to use an algorithm. By using an algorithm, accuracy is increased and potential mistakes are minimized.
- If you are working in a situation where you absolutely need the correct or best possible answer, your best bet is to use an algorithm.
- On the other hand, if time is an issue, then it may be best to use a heuristic. Mistakes may occur, but this approach allows for speedy decision



Study Alert

Remember that algorithms are rules that *always* provide a solution, while heuristics are shortcuts that *may* provide a solution.

- Algorithms and heuristics may be **characteristic of human thinking**, but scientists are **now programming computers to mimic human thinking and problem solving**.
- In fact, they are making significant inroads with computers in terms of the **ability to solve problems and carry out some forms of intellectual activities** eg artificial intelligence



SOLVING PROBLEMS

- Psychologists have found that problem solving typically involves the three steps:
- preparing to create solutions
- producing solutions,
- evaluating the solutions that have been generated.





PREPARATION: UNDERSTANDING AND DIAGNOSING PROBLEMS

- When approaching a problem, most people begin by trying to understand the problem thoroughly.
- If the problem is a new one, they probably will pay particular attention to any restrictions placed on coming up with a solution.
- If, by contrast, the problem is a familiar one, they spend considerably less time in this preparation stage



- **Problems vary from well defined to ill defined.**
- **Well-defined problem** ◦ such as mathematical equation, **nature of problem itself & information needed to solve it are available & clear.** We can make straightforward judgments about whether a potential solution is appropriate.
- **ill-defined problem** ◦ such as how to bring peace in kashmir, not only may **specific nature of problem be unclear**, information required to solve problem may be even less obvious



PRODUCTION (GENERATING SOLUTIONS)

- At the most basic level, we can solve problems through trial and error.
- The difficulty with trial and error, of course, is that some problems are so complicated that it would take a lifetime to try out every possibility.
- In place of trial and error, complex problem solving often involves the use of heuristics, cognitive shortcuts that can generate solutions.



- **Means-ends analysis involves repeated tests for differences between the desired outcome and what currently exists.**
- In a means-end analysis, each step brings the problem solver closer to a resolution.
- **step-by-step**
- to generate solutions is to divide a problem into intermediate steps, or subgoals, and solve each of those steps



JUDGMENT (EVALUATING SOLUTIONS)

- The final stage in problem solving is **judging suitability of a solution**
- if there is no single correct solution, evaluating solutions becomes more difficult.
- In such instances, we must decide which alternative solution is best

