

## Ch. 11 – Problem Solving

- Problem solving is what you use when you want to reach a specific goal; however the solution is not immediately obvious because you are missing important information and/or it is not clear how to reach the goal. It requires you to go beyond the information you were given, so you can reach a goal.

### **Components of problem solving:**

1. Initial state: describes the situation at the beginning of the problem
2. Goal state: when you solve the problem
3. Obstacles: the restrictions that make it difficult to proceed from the initial state to the goal state.

Ex: The Case: You need to reach a classmate to complete a class project

\* Initial state: You can't reach your classmate because you don't have contact information

\* Goal state: You acquired contact information (e.g. email, phone number)

\* Obstacles: Your classmate didn't go to class today and you (obviously) did not have their contact information

**Algorithm:** a problem solving method that will always produce a solution to a problem, although the process can sometimes be inefficient. It is like a type of program coding, a process, or set of rules to be followed.

**Analogy approach:** In problem solving, using a solution to a similar earlier problem to help in solving a new problem. People tend to pay more attention to *surface features* or the superficial content of the problem, than it's abstract underlying meaning. They tend to fail to emphasize *structural features*, or the underlying core that they must understand in order to solve the problem correctly.

\**Problem isomorphs* refers a set of problems that have the same underlying structures and solutions, but different specific details

Ex. A university wants a system for prospective students to to keep track of their applications

- analogy/surface feature: like other universities so looking at other universities' tracking system

- analogy/structural feature: like federal express in needing tracking so look at how they tracked location of packages

**Exhaustive search:** an algorithm where you try out all possible answers using a specified system.

**Heuristic:** a simple efficient rule learned or hard-code, that has been proposed to explain how people make decisions, come to judgments, and solve problems, typically when facing complex problems or incomplete information. In one's mind, it's a general rule that's usually correct. With this this technique, some alternatives are ignored while only those that seem especially likely are explored.

Ex: solving anagrams (voicesranton--> a1, lssstneuiamyoul → a2)= answers are at the end of the section

**Mean-ends analysis/heuristic:** requires one to identify the "ends" (or final result) that you want and then figure out the "means" or methods that you will use to reach those ends.

It has two components: 1. dividing the problem into a number of sub-problems, or smaller problems, and 2. then you try to reduce the difference between=en the initial state and the goal state for each of the sub-problems.

\*It's one of the most effective and flexible problem solving strategies.

**Insight problem:** the problem initially seems impossible to solve, but then an alternative approach suddenly bursts into your consciousness.

\*it is assumed that the person working on an insight problem usually holds some incorrect assumptions when they begin to solve the problem.

Ex: (answer at the end of the section)

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**Creativity:** in terms of problem solving, solutions are both novel and useful

**Divergent thinking:** a thought process or method used to generate creative ideas by exploring many possible solutions. The number of solutions does not indicate novelty or usefulness.

**Extrinsic motivation:** the motivation to work on a task – not because you find it enjoyable- but in order to earn a promised reward or to win a competition. High extrinsic motivation is linked with low creativity, but creativity can be enhanced if the extrinsic factors provide useful feedback.

**Intrinsic motivation:** the motivation to work on a task for its' own sake, because you find it interesting, exciting, or personally challenging. This tends to be the case when people are working on a task they truly enjoy.

**Persistence:** motivation to keep working on a problem despite frustration. Predicts learning after controlling for background knowledge.

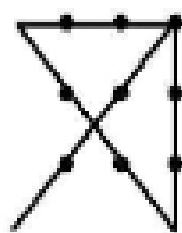
**Functional fixedness:** a cognitive bias that limits a person to using an object only in the way it is traditionally used.

Ex: Using glass cups only for drinking when they can be also used for making music

**Answers to Problems:**

anagram answers: a1- conversation, a2- simultaneously

insight problem answer:



## Ch. 12. - Decision Making

**Decision making:** the act of assessing and choosing among two or more alternatives

**Dual process theory:** distinguishes between two types of cognitive processing

1. **Type 1 processing:** is fast and automatic; requires little conscious attention  
Ex: recognition of facial expressions, automatic stereotyping
2. **Type 2 processing:** is relatively slow and controlled; it requires focused attention  
Ex: when we think of exceptions to a general rule, when we realize we made stereotyped response

Note: Most people only use type 1 processing in decision making

**Heuristic:** a general strategy that works well. But can have many fallacies.

Ex. Assuming that in the "if X, then Y" strategy that Y is always true when in fact it may not be.

**Belief-bias effect:** occurs in reasoning when people make judgments based on prior beliefs and general knowledge, rather than on the rules of logic.

Ex. Assuming you cannot be talked into going to a rave concert because you have never been pressured into going numerous times before

**Confirmation bias:** the tendency to interpret evidence as one's existing beliefs or theories. One would rather try to confirm or support a hypothesis than try to disprove it.

Ex: In the Watson task: "If a card has a vowel on one side, then it has an even number on the other side." One side of four cards say "EJ67." To test if this rule is true, people generally turn over the E card only when turning over the 7 card is equally important.

**Base-rate fallacy:** when emphasizing representativeness, paying too little attention to important information about *base rate*, or how often the item occurs in the population

Ex: When ranking the probability that a person of particular character traits will enter a specific program of study at a university, many people will ignore the *base rate*, in this case, programs with high enrollment rate and pay more attention to representativeness (i.e. the character traits).

**Conjunction fallacy:** a formal fallacy that occurs when it is assumed that the specific