AI Definitions

Intelligence	Is an interior characteristic. Its presence can't be measured directly, but can be detected by observing response to stimulus
AI	It is the study of the mechanism underling intelligent behavior through the construction and evaluation of artifacts that enact those mechanisms
Perception	Link between the outer world (environment) and inner world (conscious)
Conception	Abstraction, generalization or inferring general rules from instances
Cognition	The conscious process of knowing or being aware of thoughts or perceptions including understanding and reasoning
Rationality	Doing the right thing
Heuristic	Rule of thumb (general principle) that isn't guarantee to produce optimal results which usually solves a particular difficult problems for which no optimal solutions available
Turing test	Textual test of intelligent
Cognition AI	Study of mental faculties (seeing, learning, reasoning, …) through computational models
Engineering AI	Making computers do what people currently do better through the automation of reasoning, learning, problem solving, …
Search strategy	Determine the order of nodes expansion
Completeness	Find solution if one exist
Optimality	Find the optimal solution
Time complexity	Number of nodes expanded
Space complexity	Maximum number of nodes in memory
Halting problem	Give input algorithm to another algorithm and ask it to know if input algorithms will halt or not
Symbolic AI	Depends on logic and that intelligence resides in physical symbols
Biological AI	الذكاء ينبثق من المجموع :)
Admissibility	Find the shortest path to a goal whenever it exists $0 \leq h(n) \leq h^*$ for all n
Monotonicity	It guarantee that any visited state won't be found later in the search at cheaper cost $h(Ni) - h(Nj) \leq cost(Ni,Nj)$ $h(goal) = 0$
Informedness	H2 is more informed(better) than h1 if h1(n) <= h2(n) for all states n in the search space
Machine learning	the trend of AI approach at 80s where machine is given rules, facts and experience and it infer new information
Hard Problems	It is the intractable problems and there is two kinds: provably that is proved that will be solved in inpolynomial time, probably can be solved in inpolynomial time but verified in polynomial time
A* Algorithm	An algorithm with an evaluation function h(n) which is less than or equal to the cost of minimal path from n to goal , i.e. $h^*(n)$
Genetic Algorithms	A class of probabilistic algorithms that are likely to find a global optimum of multi-modal surface through an evaluation process where a population of solutions are maintained: good solutions reproduce and bad solutions die and replaced by offspring of good
Crossover	Information exchange process to generate offspring of current solutions

Schema	Is a template describing a subset of strings
Schema order	Number of fixed positions in the template
Schema length	Distance between first and last fixed positions
Building blocks	Highly fit (above average) short lengths low order schemata
Schemata theorem	Low order short length above average schemata receive exponentially increasing trial in subsequent generations
Agent	Intelligent Entity
Convergence	If we get near to the solution, will we lose or reach it
Exploration	Will the algorithm explore another solutions or will stuck at local solution
Production Rules System	Systems based on a widely used knowledge representation technique, namely condition action pairs, it consists of three parts: rule base, context and Interpreter
Production Rule	Statement of the form IF condition holds THEN action is appropriate
Context	It is the area that holds short term memory (buffer) of the system
Interpreter	It is the part of the Production Rule System that decide which productin to fire next
Knowledge Base System	It is an AI program that incorporates knowledge, obtained from various sources about a specialized area (Domain)
Expert System	It is a Knowledge Base system in which the knowledge comes entirely from a group of experts, the user enters facts and questions about the domain and the program produce output using the KB
Expert System Shell	It is a software that contains an inference engine together with additional code, that enables users easily to incorporate their own expert knowledge in any given domain and to draw it later
Propositional Logic	Any declarative statement that can have one of the truth values True/False
Interpretation	It is the assignment of truth values True/False to propositional symbols
Valid Sentence	A sentence is valid iff its truth value is True in all interpretation
Satisfiable Sentence	A sentence is satisfiable iff its truth value is True in at least one interpretation
Invalid Sentence	A sentence is invalid (unsatisfiable) iff its truth value is False in all interpretation
Tautology	It is a logical expression whose value is True regardless of the values of its propositional variables
Entailment	A knowledge base KB entails a sentence S iff every interpretation that makes KB true makes S true
Logically Follow	An expression E logically follow from set of rules S if every interpretation that makes S true will make E true
Proof	It is a way to test whether a KB entails a sentence without enumerating all possible interpretation It is a sentence of lines, each line is either a hypothesis or is constructed from a rule of inference
Sound	An inference rule is sound if every expression produced by the rule from a set of rules S also logically follows from S e.g. Modus Ponens, Resolution, …
Complete	An inference rule is complete if given a set S of expressions, the rule can infer every expression that logically follow from S. e.g. Resolution Refutation
Unification	Process of binding (associating) a value to a variable
Skolemization	Process of replacing each existentially quantified variable with a function that returns the appropriate constant as a function of some or all other variables in the sentence