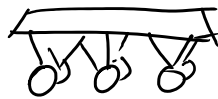


Complexity of their Design.  
Complexity of their Environment.

### 1) Modularity:-

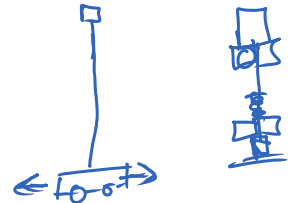
- flat :- one level of organization
- Modular :- separate Modules each with a concern.
- Hierarchical :- Modules decompose into Modules.

Chess, checkers



### 2) Planning Horizon:-

- No Plan.
- Infinite Planning :- plan to continue forever.
- indefinite planning :- plan for a finite (sometimes fixed) number of steps.




### 3) Computational Limits


- Perfect Rationality :- can decide the Best course of action  
Tic-Tac-Toe, checkers, connect four.
- Bounded Rationality :- Agent has to make good decisions based on limitations. Computational Chess, Perceptual Battleship, Memory

### 4) Learning :- Knowledge is Given :-

Chess, opening tables.

How to Represent this knowledge

4) Learning.  
 Knowledge is Given :- Chess, opening tables. → How to Represent this knowledge.  
 Knowledge is acquired :- ANN, →   
 Given and acquired :- Reinforcement L. ←

5) Preference :-  
 - goal to achieve :- chess - win  
 - preferences :- Need to balance (conflicting preferences)  


- deliver quickly
- Save fuel/battery
- save your own integrity

## COMPLEXITY OF ENVIRONMENT

• Uncertainty :- No uncertainty - The agent knows truth.  
 chess, checkers, Go

Disjunctive Uncertainty :-

Agent knows either A or B.

Probabilistic Uncertainty

Probability distribution over possible worlds.

↳ a necessity: Acting is gambling

1) Sensing Uncertainty :- Fully observable world.  
 Chess, Tic-tac-toe, Catan  
 Monopoly,

Partially observable world.  
 Stratego, Magic, poker,

• fog-of-war,

• sensors to the real world  
 sensor noise




2) Effect Uncertainty :- the result of actions.

Deterministic :- resulting state is known given action  
 chess, starcraft, AeE

Stochastic :- uncertain resulting state  
 Catan, CIV

Stochastic.- uncertain resulting state  
Catan, Civ

3) Number of Agents.-

- Alone in the world.- 
- Competing with other agents.- Chess, checkers.
- Collaborating with other agents.-  
Dota 2, • Autonomous Cars.



4) Interaction

reason offline.- before acting  
reason online.- while interacting w/ environment.  
Data.

