

# Week 1 Part 1

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May 2020

## 1 Types of Problems

Polynomial problems: Deterministic, and can be completed in polynomial time.

NP Problems: Nondeterministic, but solutions can be verified in polynomial time.

NP Complete Problems: Nondeterministic and solution seems to take exponential time.

Well Defined Problems:

- State of problem is known
- Goal state of problem is known
- Actions / allowable operators are defined

Ill Defined Problems:

- No clear goal / solution / expected solution

Hard Problems:

- Well defined
- Computationally hard

- Travelling salesman, chess

Optimization Algorithms:

- Exact Algorithms:
  - Find optimal solution
  - High computational cost
- Approximate Algorithms:
  - Near-optimal solution
  - Low computational cost