Competitive Training Camp

Lecture 8

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Dynamic Programming: a road towards advanced!

- Longest Increasing Subsequence (LIS)
- **Interval**: Palindromic Substring Count (in quadratic time)
- **Tree**: Longest Path in DAG
- **Bitmask**: Traveling Salesman Problem (TSP)
- **Digit**

- **DP Optimization**

Longest Increasing Subsequence (LIS)

(Interval) Palindromic Substring Count

(Tree) Longest Path in DAG

What is DAG?

- **D**irected,

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- **D**irected,
- **A**cyclic,
- **G**raph

Topological Sorting

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- Rinse and repeat!

Topological Sorting

- Of course, you can do it using DFS too!

Topological Sorting: Implementation

```
void dfs(int v) {
  visited[v] = true;
  for (int u : adj[v]) {
    if (!visited[u])
      dfs(u);
  }
  ans.push_back(v);
}
```

Topological Sorting: Implementation

```
void topological_sort() {
  visited.assign(n, false);
  ans.clear();
  for (int i = 0; i < n; ++i)
    if (!visited[i])
      dfs(i);
  reverse(ans.begin(), ans.end());
}
```

Example

(Bitmask) Traveling Salesman Problem (TSP)

Digit