

Homework 5**Problem 1. Solving Inventory Problems by Dynamic Programming.**

Recall the inventory considered in the class. Here is a modified version of it.

- A company is producing airplanes
- 4 production periods
- No inventory at the beginning
- Can produce at most 3 airplanes in each period
- Can keep at most 2 airplanes in inventory
- Set-up cost for each period is 3
- The cost of keeping 1 unit in inventory for one period of time is 1
- The production costs and demands for each period of time are given in the following table:

Period	1	2	3	4
Demand	1	1	2	1
Unit cost	3	4	5	4

Determine a production schedule to minimize the total cost while satisfying the demand. You need to draw a dynamic programming network and show your calculations of optimal policies. Give all the optimal solutions if there are multiple optimal solutions.

Problem 2. Solving Resource Allocation Problems by Dynamic Programming.

A company is planning its advertising strategy for next year for its three major products. Since the three products are quite different, each advertising effort will focus on a single product. In units of millions of dollars, a total of 6 is available for advertising next year, where the advertising expenditure for each product must be an integer greater than or equal to 1. The vice-president for marketing has established the objective: Determine how much to spend on each product in order to maximize total sales. The following table gives the estimated increase in sales (in appropriate units) for the different advertising expenditures:

Advertising expenditure	Product		
	1	2	3
1	7	4	6
2	10	8	9
3	14	11	13
4	17	14	15

Use dynamic programming to solve this problem. You need to draw a dynamic programming network and show your calculations of optimal policies. Give all the optimal solutions if there are multiple optimal solutions.