Problem Description

A company manufactures a product for which the demand varies from month to month. The raw material and labor availability exhibit seasonal fluctuations. During the months 1, 2, 3, 10, 11, 12 the company can hire enough labor to produce 1200 and 600 tons per month during regular time and overtime, respectively. In months 4, 5, 6, 7, 8, 9 these labor capacities are 800 and 500 tons, respectively. The product manufactured during a month can be sold anytime during the next month or later. Storage costs are $1.00/ton from one month to the next for the product. Raw material cannot be stored. It has to be used in the month in which it is obtained. Operations begin in month 1 with stock of 50 tons of the product. At the end of month 12 the company should have a stock of at least 50 tons of the product. Determine an optimal production schedule.

Month	Cost of labor ($/ton of production) during		Limit on raw material availability (enough to make tons of product)	Demand (tons)	Selling price ($/ton)
	Regular time	*Overtime*			
1	$4	$6	600	400	18
2	during these		450	700	18
3	months		425	600	18
4	$6	$9	1200	900	25
5	during these		1300	900	25
6	months		1600	900	25
7			1600	800	25
8			1500	600	25
9			1300	800	25
10	$4	$6	500	1200	30
11			500	1100	30
12			500	1400	30