

Strawberries

The owner of a chain of three grocery stores has purchased five crates of fresh strawberries. The estimated potential sales of the strawberries before spoilage differs among the three stores. Therefore, the owner wishes to know how she should allocate the five crates to the three stores to maximize expected profit.

The owner does not wish to split crates between stores but she is willing to distribute zero crates to any of her stores. The following table gives the estimated expected profit at each store when it is allocated various numbers of crates:

<i>Crates</i>	<i>Store 1</i>	<i>Store 2</i>	<i>Store 3</i>
0	\$0	\$0	\$0
1	\$3	\$5	\$4
2	\$7	\$10	\$6
3	\$9	\$11	\$11
4	\$12	\$11	\$12
5	\$13	\$11	\$12

How many of the five crates should be assigned to each of the three stores to maximize the total expected profit?

Data P_{ja} profit from assigning a crates to store j .

Stages Stores $j \in \{0, 1, 2\}$

State S_j crates available

Actions a_j crates to allocate to store j

Value Function

$V_j(S_j) = \max$ profit from allocating S_j crates to stores $j, \dots, 2$.

want $V_0(5)$

we have $V_2(S_2) = P_2 S_2$

$$V_j(S_j) = \max_{0 \leq a_j \leq S_j} \{ P_{ja_j} + V_{j+1}(S_j - a_j) \}$$