**Problem 1.**

1. Let X be the value of first expression, the state space , the action space .

The dynamic programming equation is

b) , and the result of this problem is 18.



**Problem 2.**

1. Let be the product . The problem is to choose the order of multiplying that will minimize the number of multiplications. Suppose this order divide the matrixes between matrix and , . Thus, this problem is decomposed into two sub-problems. Thus, the number of multiplications of is equal to the number of multiplications of plus , and the number of multiplications computing the product . Hence, we have the following recurrence for the number of multiplications to parenthesize the matrix chain of n matrices. For , let denote the minimum number of multiplications of .
2. The order is ((())), and the minimum number of multiplications needed to compute the product is 6800. The printout is on the following page.****

**Problem 3.**

The shortest path from node 1 to node 10 is 1-4-5-10.

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