products of sums

Work with 1 or 2 other students, and choose one of your group as the recorder. The recorder should keep a written record of his/her group's discussion of the problem below, which they may use as the basis for a contribution to the problem-solving wiki (see below). Use the following headings to organize the discussion:

- Understand the problem. Are the various ways to represent it?

- Devise a plan or two. What is the "best case" result you expect from your plan?

- Carry out, and verify, your plan.

- Look back, figure out when and how you became stuck, and what insights represented a breakthrough.

The list of positive integers that add up to 1 is (1), and the product of this list (if you allow unary products) is also 1.

There are two lists of positive integers that add up to 2, and they yield two different products: (2) (with product 2), and (1,1) (with product 1).

There are several lists of positive integers that add up to 3, and they yield several different products: (3) (with product 3), (2,1) (with product 2), and (1,1,1) (with product 1).

If n is a positive integer, what is the maximum product that can be formed of a list of positive integers that sum to n?

You can continue working on this problem at my problem-solving site

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HINT 1, ORGANIZE: Even for fairly small number n, your will have quite a large list of numbers that sum to n. Do you have some organizing principle for your lists?

HINT 2, ECONOMIZE: Are there some lists that you can remove from consideration right away?