M – Mathematics Championships

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In the Mathematical Championships, there are 2^n mathematicians, each with an initial fame value a_i, possibly negative. When a *Mathematical Duel* takes place between two mathematicians, the organizers determine the winner in a way known only to them. The fame of the loser remains unchanged, but the fame of the winner of the duel increases by the fame of the loser (`a[i] += a[j]`). Note that this can even lead to a decrease in the winner's fame!

The championship consists of n stages. In each stage, the organizers pair the participants. Within each pair, a Mathematical Duel takes place, and the winner advances to the next stage, while the loser is eliminated. After the first stage, there will be 2^{n-1} participants left, after the second stage, there will be 2^{n-2} participants left, and so on. Finally, after the nth stage, only one participant remains, and they are awarded a symbolic chocolate.

After the championship, an interview is planned with one of the participants, not necessarily the chocolate holder. The best candidate for the interview is the one among the 2^n mathematicians with the highest final fame. The prestige of the championship and the possibility of attracting sponsors for next year's edition depend on this interview. Help the organizers match the participants in each stage and select the winners to maximize the final fame of one of the mathematicians. Find this maximum value.

Input

The first line of the input contains a single integer n ($1 \le n \le 16$).

The second line contains 2^n integers $a_1, a_2, \ldots, a_{2^n}$. The i-th of these numbers is the initial fame of the i-th participant ($-10^6 \le a_i \le 10^6$).

Output

The output should contain a single integer – the maximum possible fame of one of the 2^n mathematicians after the end of the Championship.

Example

For the input data:

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2
5 -1 2 -10
```

the correct result is:

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7
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Example optimal strategy of the organizers:

In the first stage, the organizers create the following pairs of mathematicians (which is not necessarily the only optimal choice):

- In the pair with fame ($a_1 = 5, a_3 = 2$), let mathematician 3 win; his fame changes from 2 to $2 + 5 = 7$. Participant 1 is eliminated with a fame of 5.
- In the pair ($a_2 = -1, a_4 = -10$), let mathematician 2 win; his fame changes from -1 to $-1 + (-10) = -11$. Participant 4 is eliminated with a fame of -10.

In this scenario, the mathematicians with fame of 7 and -11 advance to the second stage. The organizers select the latter as the winner; their fame changes from -11 to $-11 + 7 = -4$. Participant 3 is eliminated with a fame of 7, and participant 2 receives the chocolate and has a final fame of -4.

The final fame of the four mathematicians are $5, -4, 7, -10$. The highest fame is 7, and this is the maximum possible value.