Big-$\mathcal{O}$ Practice Problem

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Problem Statement

You are given a vector of exactly ten random integers between the values of between 1 and 100, inclusive. There are no other data values in the vector. Develop two algorithms with different time complexities that determine if there is a pair of numbers within the vector that sum to 100.

Examples

Example 1

Consider the following vector of integers:

```
vector<int> exampleVector1 = {28, 54, 91, 94, 5, 28, 77, 16, 23, 17};
```

$77 + 23 = 100$ so this vector *does* have two integers that sum to 100.

Example 2

Consider the following vector of integers:

```
vector<int> exampleVector2 = {39, 95, 80, 66, 44, 64, 66, 7, 68, 66};
```

This vector *does not* contain two values that sum to 100.

Solution Guidelines

Even if you code your solutions, you must include a brief explanation of how they solve the problem. Pseudo-code is acceptable. For each algorithm, explicitly provide the algorithmic complexity using Big-$\mathcal{O}$ notation, and explain why that is the correct complexity. You should also explain which algorithm is superior.