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**Part 1:**

Step 1

1. The observed reliability is 90.94%.
2. The execution time of the brute force implementation is 27.209ms.

Step 2

1. The observed reliability is 72.55%.
2. The execution time of the brute force implementation is 0.0203ms.

Step 3

1. Using a Recovery Block of these two implementations, from above we know the reliability of SubsetSum is 90.94%, the reliability of SubsetSumDP is 72.55%, the theoretical reliability is:



1. If having SubsetSum go first, we know the approximate execution time of SubsetSum is 28.5289ms and the execution time of SubsetSumDP is 0.0203ms, so :



1. If having SubsetSumDP go first , the approximate executing time is:



Step 4

1. From Step3, we know the Recovery Block should start with SubsetSumDP module,
2. The reliability of Recovery Block is 94.91%
3. The Execution time of Recovery Block is 1.532ms

Step 5

1. For Retry Block, if a module does not work, it tries again with a different representation of the data with the same implementation of the module. So for brute force solution, likelihood of failure F = (1 – 0.9094) = 0.0906, in order to achieve 95% reliability, the times of execution N should satisfied:



So the choose N = 2, and the approximate theoretical execution time should be:



1. If using the dynamic programming solution, likelihood of failure F = (1 – 0.7255) = 0.2745, in order to achieve 95% reliability, the times of execution N should satisfied:



So the choose N = 3, with T = 0.0203ms, the approximate theoretical execution time should be:



Step 6

1. Form step 5, we know using SubsetSumDP to implement Retry Block is more efficient,