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1. A program has a 30% of code that can be parallelized. Since this program is going to be run for a long time, ¿should you invest in a 2 CPU, 4 CPU or 8 CPU server?

For n = 2 and s = 0.70

For n = 4 and s = 0.70

For n = 8 and s = 0.70

It would be recommended to invest (according to time investment) on the 8 CPU server, as it offers the higher speedup factor. However, the 4 CPU server can also be regarded as a possible solution as it has the best improvement of all 3 possible solutions (investing from 2 to 4 servers adds up to the speedup factor 0.1138x, while investing from a 4 to an 8 CPU server only adds 0.0656x). In other words, depending on the priority of the client (highest speedup factor or better cost-relation), the 4 or 8 CPU are viable alternatives.

1. Would it be better to have a program with 10% parallelism and 8 CPUs, 20% with 4 or 25% with 2?

For n = 8 and s = 0.90

For n = 4 and s = 0.80

For n = 2 and s = 0.75

The best alternative would be a 4 CPU device with a 20% paralleled code.

1. Consider you have a program that takes 10 hours to run on a 1 core CPU. You only need to run it once, and you have an 8 CPU computer. Optimizing 5% of the code takes 20 minutes. The code can be optimized to be at most 35% parallel. How much time should you invest optimizing the code so the time for optimization+running is the lowest.

For n = 8 and s = 0.95

For n = 8 and s = 0.90

For n = 8 and s = 0.85

For n = 8 and s = 0.80

For n = 8 and s = 0.75

For n = 8 and s = 0.70

For n = 8 and s = 0.65

With a limit of 35% regarding the maximum code optimization, the best optimization+running time is found when the code has been optimized up to a 35% (the maximum percentage allowed by this exercise).