CSE 6220 High-Performance Computing
Programming Assignment 1 Report
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1 Runtime

The plot of run-time vs processor count for $n = 10^6$ is given in fig. 1.

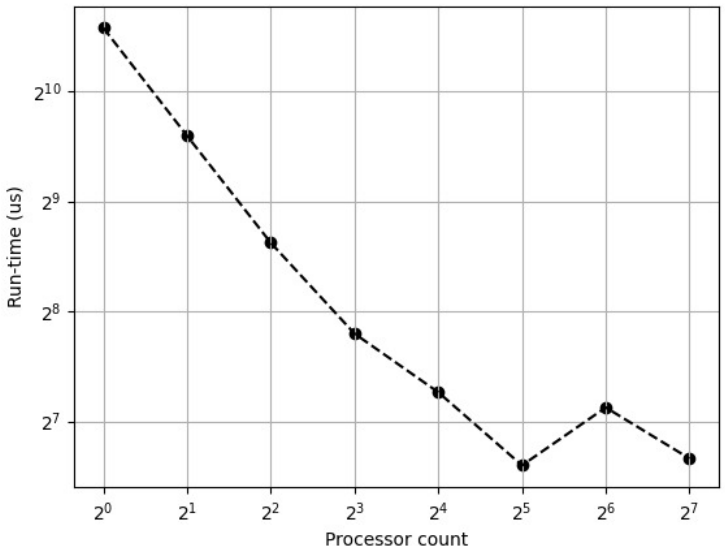

Figure 1: Plot of Program Runtime w.r.t number of processors

2 Speedup

The speedup equation can be given below:

$$S(p) = \frac{T(n,1)}{T(n,p)} = \frac{\Theta(n)}{\Theta\left(\frac{n}{p} + p\right)} = \Theta\left(p \cdot \frac{1}{1 + \frac{p^2}{n}}\right)$$

The speedup graph grows linearly with respect to processors p until the communication overhead exceeds the increase in speed.

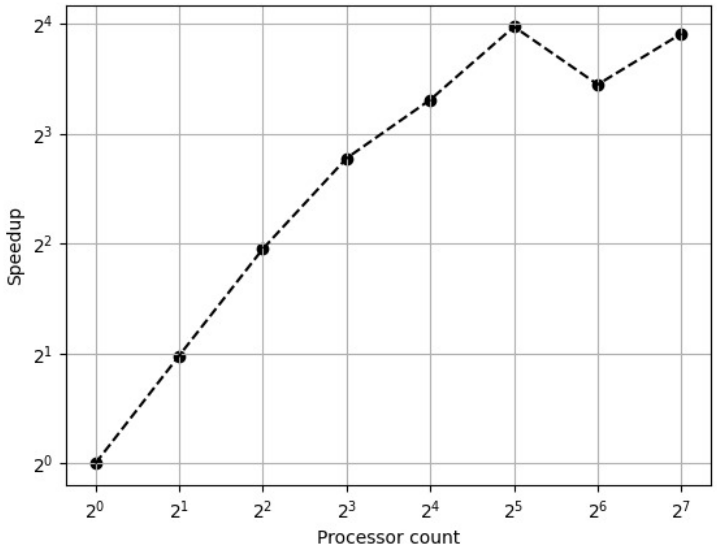

Figure 2: Plot of Program Speedup w.r.t number of processors

The decline in speedup observed at $p = 64$ is likely due to communication overhead, but the exact cause cannot be determined without more information on the architecture of the interconnection network.