

# APPROXIMATION BOUNDS FOR HIERARCHICAL CLUSTERING

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Algorithm	This paper's Reward Objective	Dasgupta's Cost Objective
Single Linkage	Flail: $\frac{1}{\Omega(n^{1/3})}$ [Thm. 10]	Line: $\Omega(\frac{n}{\log n})$ [Thm. 11]
Average Linkage	Clique Star: $(1/2 + \delta)$ [Thm. 12]	Clique Star: $\Omega(n^{1/3})$ [Thm. 13]
Complete Linkage	Double Star: $\frac{1}{\Omega(n)}$ [Thm. 14]	Line: $\Omega(\frac{n}{\log n})$ [Thm. 15]
Bisecting $k$ -Means	Double Star: $\frac{1}{\Omega(\sqrt{n})}$ [Thm. 16]	Cycle Star: $\Omega(\sqrt{n})$ [Thm. 17]