Homework 4

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2. Weak scaling study:
Weak scalability is not clear in my experiment. Communication may dominate when p is large.
Fixed lN=100 and max iter=10000.

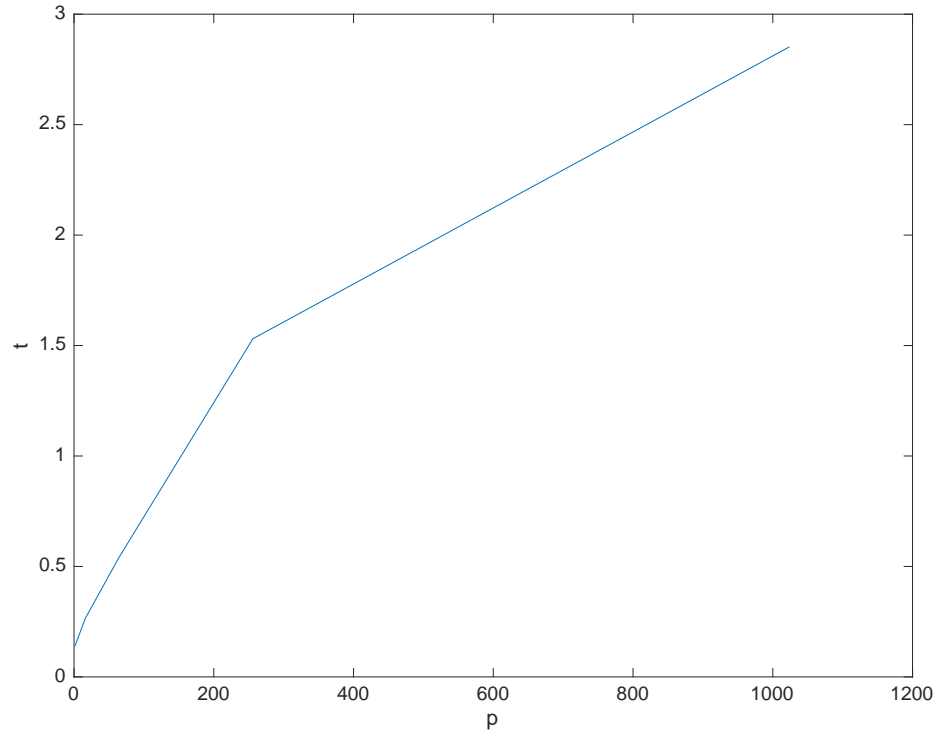| tasks p	total size N	timing
p=1	N=100	0.138146
p=4	N=200	0.162171
p=16	N=400	0.263917
p=64	N=800	0.538999
p=256	N=1600	1.530780
p=1024	N=3200	2.852405

Figure 1: Weak scalability

Strong scaling study:
Strong scalability is clear when p is small. However, when p is larger than 1024, the timing will go
up again. Fixed N=3200 and max iter=10000.

tasks p	lN	timing
p=1	lN=3200	180.602354
p=4	lN=1600	68.047975
p=16	lN= 800	33.142351
p=64	lN= 400	5.049773
p=256	lN=200	2.224540
p=1024	lN=100	2.885109
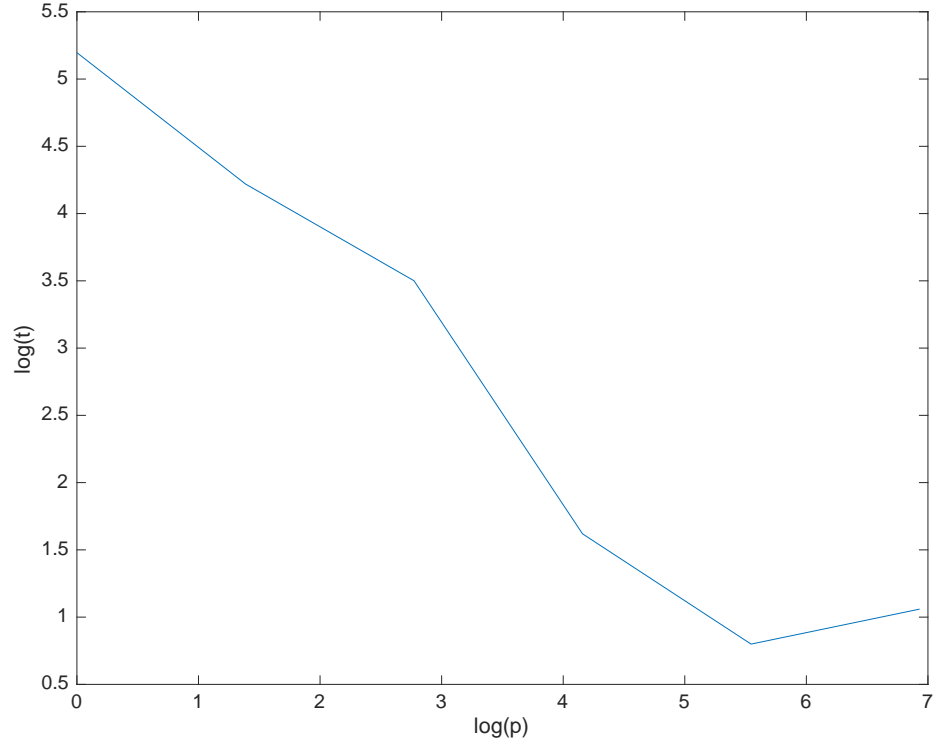
Figure 2: Strong scalability

3. Fixed processor p=64.

the number of elements per processor	timing
N=100	0.005930
N=200	0.006533
N=400	0.012608
N=800	0.013213
N=1600	0.012821
N=3200	0.012808

The timing varies much each time and may not increase with N sometimes. I noticed that this may caused by the unevenly distributed data among the tasks. If one processor has too much data, sorting this data in one processor takes long time.