

IE531
Programming Assignment #2
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When $k = 200$: probability = 0.9473

```
[Tianqis-MacBook-Pro:Debug wtq$ ./hw2 10000 200 1000 0.1 0.1 JL_Data1 10000 ]
Johnson-Lindenstrauss Lemma Demo
Reading a (10000 x 1000) Matrix from file 'JL_Data1'
Reduced Dimension = 200
epsilon = 0.1
delta = 0.1
Reduced Dimension (i.e. 200) should be >= 922 for the bound to hold with probabi
lity 0.9
It took 0.233488 minutes to read data from file 'JL_Data1'
#Trails for the testing-phase = 10000
It took 0.220404 minutes for testing to be completed
Johnson-Lindenstrauss Lemma is satisfied 9473-many times over 10000 attempts
Empirical Probability = 0.9473 (Theory says it should be at least: 0.9)
Is the JL-Lemma verified:True
```

When $k = 300$: probability = 0.9867

```
[Tianqis-MacBook-Pro:Debug wtq$ ./hw2 10000 300 1000 0.1 0.1 JL_Data1 10000 ]
Johnson-Lindenstrauss Lemma Demo
Reading a (10000 x 1000) Matrix from file 'JL_Data1'
Reduced Dimension = 300
epsilon = 0.1
delta = 0.1
Reduced Dimension (i.e. 300) should be >= 922 for the bound to hold with probabi
lity 0.9
It took 0.232385 minutes to read data from file 'JL_Data1'
#Trails for the testing-phase = 10000
It took 0.210505 minutes for testing to be completed
Johnson-Lindenstrauss Lemma is satisfied 9867-many times over 10000 attempts
Empirical Probability = 0.9867 (Theory says it should be at least: 0.9)
Is the JL-Lemma verified:True _
```

When $k = 500$: probability = 0.9977. The JL-Lemma holds.

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[Tianqis-MacBook-Pro:Debug wtq$ ./hw2 10000 500 1000 0.1 0.1 JL_Data1 10000 ]
Johnson-Lindenstrauss Lemma Demo
Reading a (10000 x 1000) Matrix from file 'JL_Data1'
Reduced Dimension = 500
epsilon = 0.1
delta = 0.1
Reduced Dimension (i.e. 500) should be >= 922 for the bound to hold with probabi
lity 0.9
It took 0.232381 minutes to read data from file 'JL_Data1'
#Trails for the testing-phase = 10000
It took 0.223084 minutes for testing to be completed
Johnson-Lindenstrauss Lemma is satisfied 9977-many times over 10000 attempts
Empirical Probability = 0.9977 (Theory says it should be at least: 0.9)
Is the JL-Lemma verified:True _
```