3. In each data cube, you should identify the grain using the business needs as a guideline. You should then indicate relative storage requirements for the grain using the statistics for the data sources. Using the cardinality estimates provided, you should determine either the fact table size or sparsity and then compute the unknown grain size variable. For example, you should compute sparsity if the fact table size is given.

To structure your answer, you should complete the following table. The unadjusted size is the product of the dimension cardinalities. The sparsity is the unadjusted size divided by the estimated fact table size. Put the details of your calculation in a spreadsheet. I encourage you to provide grain estimates for the finest grain and a somewhat coarser grain. For example, the finer grain may involve individual customers while the coarser grain may involve customer postal codes.

Cube	**Grain**	**Unadjusted Size**	**Sparsity**
Invoice_trends	Finest – all customers all locations	450000000000000	0.9999999978
Invoice_trends	Coarse – customers and locations by postcode	1125000000000	0.9999991111
Job_Shipment_performance	Finest – all jobs, subjobs and machinetypes and customer locations	5000000000000000	0.9999999995
Job_Shipment_performance	Coarse – jobs, subjobs in a year and machinetypes and customerlocations by postcode	62500000000000	0.9999999504
financial_performance	Finest – all customers all locations	1000000	0.9928
financial_performance	Coarse – customers and locations by postcode	50000	0.856

Calculation:

Invoice_trends		
	rows	zip codes
Customer	3000	300
location	10	10
SalesAgent	6	6
customerLocation	10000	500
Leadfile	250000	125000
Unadjusted size	450000000000000	1125000000000
Facttable – invoices	1000000	1000000
sparcity 1-(facttable/unadjasted size)	0.9999999978	0.9999991111

Job_shipment_performance		
	rows	zip codes
Machine_type	10	10
Customer_location	10000	500
Job	100000	50000
subjob	500000	250000
Unadjasted size	5000000000000000	62500000000000
facttable(shipment)	2500000	3100000
sparcity 1-(facttable/unadjasted size)	0.9999999995	0.9999999504

Financial_performance		
	rows	zip codes
Customerlocation	10000	500
location	10	10
Machine_type	10	10
Unadjusted size	1000000	50000
facttable(shipment)	7200	7200
sparcity 1-(facttable/unadjasted size)	0.9928	0.856