1. **Draw a comparative table of 5 multidimensional visualization techniques. What are they useful for? What type of observations do they provide? What is their input? What are the advantages and disadvantages? What applications could they support?**

	Sunburst Graph	**Tree maps**	**Node-link**	**Stack graph**	**Force-directed graphs**
Use	The sunburst chart is ideal for displaying hierarchical data. Each level of the hierarchy is represented by one ring or circle with the innermost circle as the top of the hierarchy.	Tree Maps are primarily used to display data that is grouped and nested in a hierarchical (or tree-based) structure.	enable the visualization and analysis of the relationships between entities, where an entity may be a vehicle, a phone, an address, a transaction, or anything else.	Stacked graphs are commonly used on bars, to show multiple values for individual categories, or lines, over time.	It is used to visualize the connections between objects in a network. By grouping the objects connected to each other in a natural way, a Force-Directed Graph is visually interesting and also makes it possible to discover subtle relationships between groups.
Observation	In SunBurst, items in a hierarchy are laid out radially, with the top of the hierarchy at the center and deeper levels farther away from the center. The angle swept out by an item and its color correspond to some attribute of the data.	Tree maps typically have the appearance of horizontally-oriented rectangles subdivided by size into the major categories and subcategories - so as to convey the part-to-whole relationships. Related categories and subcategories of a tree map are typically color-coded to match the highest-level parent categories.	In a node link diagram, entities are represented as *nodes*, and the relationships between entities are represented as lines that are called link*s*.	This type of visualisation depicts items stacked one on top (column) of the other or side-by-side (bar), differentiated by coloured bars or strips. Items are "stacked" in this type of graph allowing the user to add up the underlying data points.	Nodes are represented as points in a plane that are electrically charged and apply repulsive forces against each other. Edges connect these points simulating a spring-force, attracting adjacent nodes. The model iteratively determines the resulting forces that act on the nodes and try to move the nodes closer to an equilibrium where all forces add up to zero, and the position of the nodes stays stable.
Input	Inputs are datatables representing hierarchical data.	Inputs are data tables representing hierarchical data.	Datatables representing points for nodes and links for edges.	Datatable with three or more columns. Values down the first column indicate levels of the primary	Graph

				categorical variable. Each column after the first will then correspond with one level of the secondary categorical variable.	
Advantages	Easily displays hierarchical data. It is easy to see multiple layers of data in sunburst compared to any other visualizations.	identify the relationship between two elements in a hierarchical data structure; optimize the use of space; accurately display multiple elements together; show ratios of each part to the whole	The node-link representation is especially effective for the task of following paths. It's an intuitive visualization for examining the local neighborhood of one node or describing the shortest path between two nodes.	When you need to compare data points, it is easier to see the comparison on a stacked bar. You can see data points more clearly when they are on top of each other, and you can quickly see the percentage of each data point compared to the total value.	-Good-quality results -Flexibility -Intuitive -Interactivity
Disadvantages	It is very hard to represent labels in sunburst. Angles are hard to read By construction, outer parts tend to get bigger than inner part for a same value.	Size Distortion: The more pixels you use to show the hierarchy, the more the size distorts. Requires Interactivity: Treemaps are ill-suited for print. Poor At Handling Any Data: Negative and zero values prove a challenge for heat maps.	The key drawback of node-link diagrams is that they do not scale well to networks with a large number of nodes or with a large number of edges per node. The nodes and edges begin to overlap too much, and the result looks like a « hairball. »	Become visually complex as categories or series are added.	-The typical force-directed algorithms are in general considered to have a running time equivalent to O(n3), where n is the number of nodes of the input graph. -It is easy to see that force-directed algorithms produce a graph with minimal energy, in particular one whose total energy is only a local minimum.