**GMT\_Read\_Data for datasets**

This operation returns **D** which may have **n\_tables**, each with a variable number or segments, each with a fixed number of columns but variable number of rows. The dimensions and allocation limits of each item are the same (i.e., we have allocated exactly the space needed per item). Accessing rows simply sets up loops over tables, segments, rows, cols.

**GMT\_Create\_Data for datasets**

**D** = **GMT\_Create\_Data** allocates a known quantity of tables, segments, rows and columns, plus string arrays. However, in many cases we may not yet know some or any of these quantities, which means some aspects cannot be allocated until we know. Often, we allocate a chunk (say 64 segments) and work with those until we need more, and then reallocate to fit the final segment count. Here is how it works

Dimension **n\_tables**: If **n\_tables** == 0 (unknown) then we return a dataset structure with nothing allocated. Otherwise, tables **T**[] are all allocated and **D**->**n\_alloc** is set to **n\_tables** and we move on to segments.

Dimension **n\_segments**: If **n\_segments** == 0 (unknown) then we return a dataset structure with an array of tables **T**[] with no segments **S**[] allocated in them. Otherwise, they are all allocated and **T**[**tbl**]->**n\_alloc** is set to **n\_segments** for each table and we move on to column allocation.

Dimension **n\_columns**: If **n\_columns** == 0 (unknown) then we cannot allocate the segment **S**[**seg**]->**data** arrays of columns. Otherwise, we allocate each **S**[**seg**]->**data** array and set the **S**[**seg**]->**n\_columns** value. We then move on to the rows.

Dimension **n\_rows**: If **n\_rows** == 0 (unknown) then we cannot allocate the data vectors. Otherwise, we loop over the columns (unless 0) and allocate each column’s data vector. If **mode** = **GMT\_WITH\_STRINGS** then we allocate the trailing text string array. **S**[**seg**]->**n\_alloc** is set to reflect how many rows we allocated.

Note: The dataset, table, and segment **n\_alloc** variable holds the number of items of sub-items have been allocated, as does n**\_columns** (which acts both as number of columns allocated and active columns). The counters **n\_records**, **n\_tables**, **n\_segments**, and **n\_rows** should reflect what has actually been filled in with data. Thus, after a call to **GMT\_Create\_Data** these counters should all be zero.

When various items of a dataset are reallocated (e.g., when number of segments become known, or an initial allotment proves too small) we provide the extra memory and update the **n\_alloc** values (and **n\_columns** if it changed). However, the counters remain the same as before.