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function [final_k final_rows] = linear_clustering(dataset)

num_items = size(dataset,2);
is_available = ones(1,num_items);
min_diff = Inf;
i = 1;

%this iterates until every item is claimed, but does not generate mutually exclusive
clusters
while(sum(is_available) > 0)

    min_diff = Inf;

    for k = 1 : num_items - 1

        temp_rows = i : k : num_items;
        cluster_size = size(temp_rows,2);

        if(cluster_size > 1)

            avg_diff = test_cluster_difference(dataset, temp_rows);

        else %otherwise it's a single entry

            avg_diff = 0;

        endif

        if(avg_diff < min_diff)

            min_diff = avg_diff;
            final_rows{i} = temp_rows;
            final_k(i) = k;

        endif

    endfor

    is_available(final_rows{i}) = 0;
    i = i + 1;

endwhile

endfunction

```