CMU MSP 36602 Python Classes HW Due 10:00 PM Tue. May 7

Using the **Clusters.py** template, create a Python class that holds a set of clustering results and has the following characteristics:

- The main *attributes* of the class objects are three lists called 'data', 'groups', and 'method'. We assume that any clustering method produces a dictionary where the keys are the subject ids and the values are the cluster group assignments coded as integers from zero to one less than the number of clusters. The 'data' attribute holds these dictionaries, the 'groups' attribute holds the number of groups, and the 'method' attribute holds the clustering method (e.g., 'hclust', or 'kmeans').
- 2) The user will store all clustering results for one sample of subjects in an instantiation of the class. We assume that each dictionary added to an instantiation has the same subject keys, but you don't need to check that. You also don't need to check for duplicate dictionaries.
- 3) The user may instantiate the class as my_clusters = Clusters() to get an empty object or my_clusters = Clusters(my_dictionary, my_method) to get an object with a single clustering result. Any other attempts to instantiate the class should raise an appropriate exception with a meaningful message.
- 4) You don't need to change repr(), but assure that str(my_clusters) gives a result similar to:

```
4 cluster sets (2-3 groups, 2 methods)
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- 5) You need a method called .add(), run as my_clusters.add(my_next_dict, my_method), which adds in another clustering result.
- 6) Implement my_custers3 = my_clusters1 + my_clusters2 which creates a new Clusters object with all of the clusterings from both objects. You do not need to check for duplicates.
- 7) Implement my_cluster[key] so that it returns the dictionary of the clustering in position "key".
- 8) Finally, implement a .summary() method that takes zero or one argument. With zero arguments, it should show a summary of all clustering similar to this:

Number	Groups	Method
0	3	kmeans
1	2	kmeans
2	2	hclust
3	3	hclust

With an argument that is the name of a method, only clusterings from that method are shown.