**RFC for h5diff Attribute Comparisons**

**Issues:**

h5diff currently compares attributes correctly only when two objects have the same number of attributes and attribute names are identical by creation order.

The current implementation creates two problems when the above conditions are not met:

* In some cases, h5diff displays no information about attribute differences.
* In other cases, attributes are compared not by matching the names but by creation order.  This can yield incorrect or undesired output.

**Suggestions:**

* Add two new verbose options, -v1 (--verbose=1) and -v2 (--verbose=2), which will include detailed attribute information.  See the "Output examples" section below.
* Compare attributes by matching names, which is what h5diff does now when comparing datasets in a group or file.

**Output examples:**
Assumption:

* object1 '/d1' has attributes named 'attr1', 'attr2', 'attr3' and 'attr5'.
* object2 '/d2' has attributes named 'attr1', 'attr2', and 'attr4'.

Example 1, with "-v1":

$ h5diff -v1 attrs1.h5 attrs1.h5 /d1 /d2

dataset: </d1> and </d2>
attribute: <attr1 of </d1>> and <attr1 of </d2>>
size:       [2]          [2]
position       attr1 of </d1>  attr1 of </d2>  difference
------------------------------------------------------------
[ 1 ]       1              2                1
1 differences found
attribute: <attr2 of </d1>> and <attr2 of </d2>>
size:       [1]          [1]
position       attr2 of </d1>  attr2 of </d2>  difference
------------------------------------------------------------
[ 0 ]       1              2
[ 0 ]       c              d
2 differences found
**Attributes status:  2 common, 2 only in obj1,  1 only in obj2**
3 differences found

Example 2, with "-v2" :

$ h5diff -v2 attrs1.h5 attrs1.h5 /d1 /d2

dataset: </d1> and </d2>
obj1   obj2
**---------------------------------------**
**x     x    attr1**
**x     x    attr2**
**x          attr3**
**x    attr4**
**x          attr5**

attribute: <attr1 of </d1>> and <attr1 of </d2>>
size:       [2]             [2]
position       attr1 of </d1>  attr1 of </d2>  difference
------------------------------------------------------------
[ 1 ]       1              2                1
1 differences found
attribute: <attr2 of </d1>> and <attr2 of </d2>>
size:       [1]          [1]
position       attr2 of </d1>  attr2 of </d2>  difference
------------------------------------------------------------
[ 0 ]        1            2
[ 0 ]        c            d
2 differences found
**Attributes status:  2 common, 2 only in obj1,  1 only in obj2**
3 differences found

A double 'x' means the attribute is common to both objects.  A single 'x' means the attribute exists only on one of the objects being compared.  (This matches current h5diff output when comparing objects in files or groups.)

If no number is specified with '-v', h5diff will display the same output as is currently displayed to maintain backward compatibility of output.  (‘-v0’ will be same as ‘-v’.)

It is not yet determined whether the attribute status information will appear at the top or bottom of the object section.

**Exit code:**
The exit code will stay same as showing on h5diff help page currently.
  0 - if no differences
  1 - if differences found
  2 - if error