Inquiries about a variable in CDAT

Goal: Learn how to inquiry about a variable in CDAT.

Here are some very useful inquiry commands that you can use to learn about the variables and their attributes.

```
# open example NetCDF file
import cdms, os, sys
filepath = os.path.join(sys.prefix, 'sample_data/clt.nc')
f = cdms.open( filepath )

# print the list of all variables in the file
f.listvariables()
['clt','u','v']

# create the file variable pointing to 'clt'
v = f['clt']

v.shape
(120, 46, 72)

v.rank()
3

# show variables units
v.units
'%'

v.attributes.keys()
['units', 'time_statistic', 'long_name', 'grid_name',
  'comments', 'missing_value', 'grid_type']
v.time_statistic
'average'
v.long_name
'Total cloudiness'

# show variable binary type
v.typecode()
'f'

# show variable size in ...
v.size()
397440

v.id
'clt'

v.grid_type
'gaussian'

v.attributes
AttributeDict ({'_grid_': Grid has Python id -0x491b5834.
Gridtype: gaussian
Grid shape: (46, 72)
Order: yx
```

```
, 'domain': [(   id: time
   Designated a time axis.
   units:  months since 1979-1-1 0
   Length: 120
   First:  0.0
   Last:   119.0
   Python id:  -0x491b58f4
, 0, 120, 120), (   id: latitude
   Designated a latitude axis.
   units:  degrees_north
   Length: 46
   First:  -90.0
   Last:   90.0
   Other axis attributes:
      long_name: Latitude
   Python id:  -0x491b58d4
, 0, 46, 46), (   id: longitude
   Designated a longitude axis.
   units:  degrees_east
   Length: 72
   First:  -180.0
   Last:   175.0
   Other axis attributes:
      long_name: Longitude
   Python id:  -0x491b5914
, 0, 72, 72)], 'units': '%', 'parent': <CDMS file
  '.../sample_data/clt.nc', mode 'r' at b6e3ba70,
  status: open>, '_numericType_': 'd', 'name_in_file':
  'clt', 'time_statistic': 'average', 'long_name':
  'Total cloudiness', 'grid_name': 'YONU4X5', 'comments':
  'YONU_AMIP1', '_obj_': <CdunifVariable object at 0xb6e3bda0>,
  'missing_value': None, '_node_': None, 'id': 'clt',
  'grid_type': 'gaussian'})

# show all info about the dimensions
v.showdim()
** Dimension 1 **
   id: time
   Designated a time axis.
   units:  months since 1979-1-1 0
   Length: 120
   First:  0.0
   Last:   119.0
   Python id:  -0x491b58f4
   Values:
[   0.,   1.,   2.,   3.,   .....  ]
   Bounds:
None
** Dimension 2 **
   id: latitude
   Designated a latitude axis.
   units:  degrees_north
   Length: 46
   First:  -90.0
   Last:   90.0
   Other axis attributes:
      long_name: Latitude
   Python id:  -0x491b58d4
   Values:
[-90.,-86.,-82.,-78.,-74., .... ]
   Bounds:
[[-90.,-88.,]
 [-88.,-84.,]    ....  ]
** Dimension 3 **
```

```
   id: longitude
   Designated a longitude axis.
   units:  degrees_east
   Length: 72
   First:  -180.0
   Last:   175.0
   Other axis attributes:
      long_name: Longitude
   Python id:  -0x491b5914
   Values:
[-180.,-175.,-170., .... ]
   Bounds:
[[-182.5,-177.5,]
 [-177.5,-172.5,]  .... ]

v.parent
<CDMS file '.../sample_data/clt.nc',
  mode 'r' at b6e3ba70, status: open>

v.info
<bound method FileVariable.info of
  <Variable: clt, file: .../sample_data/clt.nc,
  shape: (120, 46, 72)>>

# show all the information about the variable
v.info()
*** Description of Slab clt ***
id: clt
shape: (120, 46, 72)
filename: /home/mccoy20/utils/cdat/sample_data/clt.nc
missing_value: None
comments: YONU_AMIP1
grid_name: YONU4X5
grid_type: gaussian
time_statistic: average
long_name: Total cloudiness
units: %
Grid has Python id -0x491b5834.
Gridtype: gaussian
Grid shape: (46, 72)
Order: yx
** Dimension 1 **
   id: time
   Designated a time axis.
   units:  months since 1979-1-1 0
   Length: 120
   First:  0.0
   Last:   119.0
   Python id:  -0x491b58f4
** Dimension 2 **
   id: latitude
   Designated a latitude axis.
   units:  degrees_north
   Length: 46
   First:  -90.0
   Last:   90.0
   Other axis attributes:
      long_name: Latitude
   Python id:  -0x491b58d4
** Dimension 3 **
   id: longitude
   Designated a longitude axis.
   units:  degrees_east
   Length: 72
```

```
   First:  -180.0
   Last:   175.0
   Other axis attributes:
      long_name: Longitude
   Python id:  -0x491b5914
*** End of description for clt ***

# show all info about the variable in a short form
v.listall()
['*** Description of Slab clt ***', 'id: clt',
  'shape: (120, 46, 72)', 'filename: .../sample_data/clt.nc',
  'missing_value: None', 'comments: YONU_AMIP1',
  'grid_name: YONU4X5', 'grid_type: gaussian',
  'time_statistic: average', 'long_name: Total cloudiness',
  'units: %', 'Grid has Python id -0x491b5834.',
  'Gridtype: gaussian', 'Grid shape: (46, 72)', 'Order: yx',
  '** Dimension 1 **', '   id: time',
  '   Designated a time axis.',
  '   units:  months since 1979-1-1 0', '   Length: 120',
  '   First:  0.0', '   Last:   119.0',
  '   Python id:  -0x491b58f4', '** Dimension 2 **',
  '   id: latitude', '   Designated a latitude axis.',
  '   units:  degrees_north', '   Length: 46',
  '   First:  -90.0', '   Last:   90.0',
  '   Other axis attributes:', '      long_name: Latitude',
  '   Python id:  -0x491b58d4', '** Dimension 3 **',
  '   id: longitude', '   Designated a longitude axis.',
  '   units:  degrees_east', '   Length: 72',
  '   First:  -180.0', '   Last:   175.0',
  '   Other axis attributes:', '      long_name: Longitude',
  '   Python id:  -0x491b5914',
  '*** End of description for clt ***']
```

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