openpyxl Documentation

Release 2.4.0

See AUTHORS

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Author Eric Gazoni, Charlie Clark

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Issues http://bitbucket.org/openpyxl/openpyxl/issues

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CHAPTER 1

Introduction

Openpyxl is a Python library for reading and writing Excel 2010 xlsx/xlsm/xltx/xltm files.

It was born from lack of existing library to read/write natively from Python the Office Open XML format.

All kudos to the PHPExcel team as openpyxl was initially based on PHPExcel.

1.1 Support

This is an open source project, maintained by volunteers in their spare time. This may well mean that particular features or functions that you would like are missing. But things don't have to stay that way. You can contribute the project development yourself or contract a developer for particular features.

Professional support for openpyxl is available from Clark Consulting & Research and Adimian. Donations to the project to support further development and maintenance are welcome.

Bug reports and feature requests should be submitted using the issue tracker. Please provide a full traceback of any error you see and if possible a sample file. If for reasons of confidentiality you are unable to make a file publicly available then contact of one the developers.

1.2 Sample code:

```
from openpyxl import Workbook
wb = Workbook()

# grab the active worksheet
ws = wb.active

# Data can be assigned directly to cells
ws['A1'] = 42

# Rows can also be appended
ws.append([1, 2, 3])

# Python types will automatically be converted
import datetime
ws['A2'] = datetime.datetime.now()

# Save the file
wb.save("sample.xlsx")
```

CHAPTER 2

User List

Official user list can be found on http://groups.google.com/group/openpyxl-users

How to Contribute Code

Any help will be greatly appreciated, just follow those steps:

1. Please start a new fork (https://bitbucket.org/openpyxl/openpyxl/fork) for each independent feature, don't try to fix all problems at the same time, it's easier for those who will review and merge your changes ;-)

2. Hack hack hack

3. Don't forget to add unit tests for your changes! (YES, even if it's a one-liner, changes without tests will **not** be accepted.) There are plenty of examples in the source if you lack know-how or inspiration.

4. If you added a whole new feature, or just improved something, you can be proud of it, so add yourself to the AUTHORS file :-)

5. Let people know about the shiny thing you just implemented, update the docs!

6. When it's done, just issue a pull request (click on the large "pull request" button on *your* repository) and wait for your code to be reviewed, and, if you followed all theses steps, merged into the main repository.

For further information see Development

CHAPTER 4

Other ways to help

There are several ways to contribute, even if you can't code (or can't code well):

- triaging bugs on the bug tracker: closing bugs that have already been closed, are not relevant, cannot be reproduced, ...
- updating documentation in virtually every area: many large features have been added (mainly about charts and images at the moment) but without any documentation, it's pretty hard to do anything with it
- proposing compatibility fixes for different versions of Python: we support 2.6 to 3.5, so if it does not work on your environment, let us know :-)

Installation

Install openpyxl using pip. It is advisable to do this in a Python virtualenv without system packages:

```
$ pip install openpyxl
```

Note: There is support for the popular lxml library which will be used if it is installed. This is particular useful when creating large files.

Warning: To be able to include images (jpeg, png, bmp,...) into an openpyxl file, you will also need the "pillow" library that can be installed with:

```
$ pip install pillow
```

or browse https://pypi.python.org/pypi/Pillow/, pick the latest version and head to the bottom of the page for Windows binaries.

CHAPTER 6

Working with a checkout

Sometimes you might want to work with the checkout of a particular version. This may be the case if bugs have been fixed but a release has not yet been made.

```
$ pip hg+https://bitbucket.org/openpyxl/openpyxl@2.4#egg=openpyxl
```

CHAPTER 7

Usage examples

7.1 Tutorial

7.1.1 Manipulating a workbook in memory

Create a workbook

There is no need to create a file on the filesystem to get started with openpyxl. Just import the Workbook class and start using it

```
>>> from openpyxl import Workbook
>>> wb = Workbook()
```

A workbook is always created with at least one worksheet. You can get it by using the `openpyxl.workbook.Workbook.active()` property

```
>>> ws = wb.active
```

Note: This function uses the *_active_sheet_index* property, set to 0 by default. Unless you modify its value, you will always get the first worksheet by using this method.

You can also create new worksheets by using the `openpyxl.workbook.Workbook.create_sheet()` method

```
>>> ws1 = wb.create_sheet() # insert at the end (default)
# or
>>> ws2 = wb.create_sheet(0) # insert at first position
```

Sheets are given a name automatically when they are created. They are numbered in sequence (Sheet, Sheet1, Sheet2, ...). You can change this name at any time with the *title* property:

```
ws.title = "New Title"
```

The background color of the tab holding this title is white by default. You can change this providing an RRGGBB color code to the sheet_properties.tabColor property:

```
ws.sheet_properties.tabColor = "1072BA"
```

Once you gave a worksheet a name, you can get it as a key of the workbook or using the `openpyxl.workbook.Workbook.get_sheet_by_name()` method

```
>>> ws3 = wb["New Title"]
>>> ws4 = wb.get_sheet_by_name("New Title")
>>> ws is ws3 is ws4
True
```

You can review the names of all worksheets of the workbook with the `openpyxl.workbook.Workbook.get_sheet_names()` method

```
>>> print(wb.get_sheet_names())
['Sheet2', 'New Title', 'Sheet1']
```

You can loop through worksheets

```
>>> for sheet in wb:
...     print(sheet.title)
```

Playing with data

Accessing one cell

Now we know how to access a worksheet, we can start modifying cells content.

Cells can be accessed directly as keys of the worksheet

```
>>> c = ws['A4']
```

This will return the cell at A4 or create one if it does not exist yet. Values can be directly assigned

```
>>> ws['A4'] = 4
```

There is also the `openpyxl.worksheet.Worksheet.cell()` method:

```
>>> c = ws.cell('A4')
```

You can also access a cell using row and column notation:

```
>>> d = ws.cell(row = 4, column = 2)
```

Note: When a worksheet is created in memory, it contains no *cells*. They are created when first accessed. This way we don't create objects that would never be accessed, thus reducing the memory footprint.

Warning: Because of this feature, scrolling through cells instead of accessing them directly will create them all in memory, even if you don't assign them a value.
Something like

```
>>> for i in range(1,101):
...         for j in range(1,101):
...             ws.cell(row = i, column = j)
```

will create 100x100 cells in memory, for nothing.
However, there is a way to clean all those unwanted cells, we'll see that later.

Accessing many cells

Ranges of cells can be accessed using slicing

```
>>> cell_range = ws['A1':'C2']
```

You can also use the `openpyxl.worksheet.Worksheet.iter_rows()` method:

```
>>> tuple(ws.iter_rows('A1:C2'))
((<Cell Sheet1.A1>, <Cell Sheet1.B1>, <Cell Sheet1.C1>),
 (<Cell Sheet1.A2>, <Cell Sheet1.B2>, <Cell Sheet1.C2>))

>>> for row in ws.iter_rows('A1:C2'):
...        for cell in row:
...            print cell
<Cell Sheet1.A1>
<Cell Sheet1.B1>
<Cell Sheet1.C1>
<Cell Sheet1.A2>
<Cell Sheet1.B2>
<Cell Sheet1.C2>
```

If you need to iterate through all the rows or columns of a file, you can instead use the `openpyxl.worksheet.Worksheet.rows()` property:

```
>>> ws = wb.active
>>> ws['C9'] = 'hello world'
>>> ws.rows
((<Cell Sheet.A1>, <Cell Sheet.B1>, <Cell Sheet.C1>),
(<Cell Sheet.A2>, <Cell Sheet.B2>, <Cell Sheet.C2>),
(<Cell Sheet.A3>, <Cell Sheet.B3>, <Cell Sheet.C3>),
(<Cell Sheet.A4>, <Cell Sheet.B4>, <Cell Sheet.C4>),
(<Cell Sheet.A5>, <Cell Sheet.B5>, <Cell Sheet.C5>),
(<Cell Sheet.A6>, <Cell Sheet.B6>, <Cell Sheet.C6>),
(<Cell Sheet.A7>, <Cell Sheet.B7>, <Cell Sheet.C7>),
(<Cell Sheet.A8>, <Cell Sheet.B8>, <Cell Sheet.C8>),
(<Cell Sheet.A9>, <Cell Sheet.B9>, <Cell Sheet.C9>))
```

or the `openpyxl.worksheet.Worksheet.columns()` property:

```
>>> ws.columns
((<Cell Sheet.A1>,
<Cell Sheet.A2>,
<Cell Sheet.A3>,
<Cell Sheet.A4>,
<Cell Sheet.A5>,
<Cell Sheet.A6>,
...
<Cell Sheet.B7>,
<Cell Sheet.B8>,
<Cell Sheet.B9>),
(<Cell Sheet.C1>,
<Cell Sheet.C2>,
<Cell Sheet.C3>,
<Cell Sheet.C4>,
<Cell Sheet.C5>,
<Cell Sheet.C6>,
<Cell Sheet.C7>,
<Cell Sheet.C8>,
<Cell Sheet.C9>))
```

Data storage

Once we have a `openpyxl.cell.Cell`, we can assign it a value:

```
>>> c.value = 'hello, world'
>>> print(c.value)
'hello, world'

>>> d.value = 3.14
>>> print(d.value)
3.14
```

You can also enable type and format inference:

```
>>> wb = Workbook(guess_types=True)
>>> c.value = '12%'
>>> print(c.value)
0.12

>>> import datetime
>>> d.value = datetime.datetime.now()
>>> print d.value
datetime.datetime(2010, 9, 10, 22, 25, 18)

>>> c.value = '31.50'
>>> print(c.value)
31.5
```

7.1.2 Saving to a file

The simplest and safest way to save a workbook is by using the `openpyxl.workbook.Workbook.save()` method of the `openpyxl.workbook.Workbook` object:

```
>>> wb = Workbook()
>>> wb.save('balances.xlsx')
```

Warning: This operation will overwrite existing files without warning.

Note: Extension is not forced to be xlsx or xlsm, although you might have some trouble opening it directly with another application if you don't use an official extension.

As OOXML files are basically ZIP files, you can also end the filename with .zip and open it with your favourite ZIP archive manager.

You can specify the attribute as_template=True, to save the document as a template

```
>>> wb = load_workbook('document.xlsx')
>>> wb.save('document_template.xltx', as_template=True)
```

or specify the attribute as_template=False (by default), to save the document template (or document) as document.

```
>>> wb = load_workbook('document_template.xltx')
>>> wb.save('document.xlsx', as_template=False)
```

```
>>> wb = load_workbook('document.xlsx')
>>> wb.save('new_document.xlsx', as_template=False)
```

Warning: You should monitor the data attributes and document extensions for saving documents in the document templates and vice versa, otherwise the result table engine can not open the document.

Note: The following will fail:

```
>>> wb = load_workbook('document.xlsx')
>>> # Need to save with the extension *.xlsx
>>> wb.save('new_document.xlsm')
>>> # MS Excel can't open the document
>>>
>>> # or
>>>
>>> # Need specify attribute keep_vba=True
>>> wb = load_workbook('document.xlsm')
>>> wb.save('new_document.xlsm')
>>> # MS Excel can't open the document
>>>
>>> # or
>>>
>>> wb = load_workbook('document.xltm', keep_vba=True)
>>> # If us need template document, then we need specify extension as *.xltm.
>>> # If us need document, then we need specify attribute as_template=False.
>>> wb.save('new_document.xlsm', as_template=True)
>>> # MS Excel can't open the document
```

7.1.3 Loading from a file

The same way as writing, you can import `openpyxl.load_workbook()` to open an existing workbook:

```
>>> from openpyxl import load_workbook
>>> wb2 = load_workbook('test.xlsx')
>>> print wb2.get_sheet_names()
['Sheet2', 'New Title', 'Sheet1']
```

This ends the tutorial for now, you can proceed to the Simple usage section

7.2 Cookbook

7.2.1 Simple usage

Write a workbook

```
>>> from openpyxl import Workbook
>>> from openpyxl.compat import range
>>> from openpyxl.cell import get_column_letter
>>>
>>> wb = Workbook()
>>>
>>> dest_filename = 'empty_book.xlsx'
>>>
>>> ws1 = wb.active
>>> ws1.title = "range names"
```

```
>>>
>>> for row in range(1, 40):
...     ws1.append(range(600))
>>>
>>> ws2 = wb.create_sheet(title="Pi")
>>>
>>> ws2['F5'] = 3.14
>>>
>>> ws3 = wb.create_sheet(title="Data")
>>> for row in range(10, 20):
...     for col in range(27, 54):
...         _ = ws3.cell(column=col, row=row, value="%s" % get_column_letter(col))
>>> print(ws3['AA10'].value)
AA
>>> wb.save(filename = dest_filename)
```

Write a workbook from *.xltx as *.xlsx

```
>>> from openpyxl import load_workbook
>>>
>>>
>>> wb = load_workbook('sample_book.xltx')
>>> ws = wb.active
>>> ws['D2'] = 42
>>>
>>> wb.save('sample_book.xlsx')
>>>
>>> # or you can overwrite the current document template
>>> # wb.save('sample_book.xltx')
```

Write a workbook from *.xltm as *.xlsm

```
>>> from openpyxl import load_workbook
>>>
>>>
>>> wb = load_workbook('sample_book.xltm', keep_vba=True)
>>> ws = wb.active
>>> ws['D2'] = 42
>>>
>>> wb.save('sample_book.xlsm')
>>>
>>> # or you can overwrite the current document template
>>> # wb.save('sample_book.xltm')
```

Read an existing workbook

```
>>> from openpyxl import load_workbook
>>> wb = load_workbook(filename = 'empty_book.xlsx')
>>> sheet_ranges = wb['range names']
>>> print(sheet_ranges['D18'].value)
3
```

Note: There are several flags that can be used in load_workbook.

- *guess_types* will enable or disable (default) type inference when reading cells.
- *data_only* controls whether cells with formulae have either the formula (default) or the value stored the last time Excel read the sheet.
- *keep_vba* controls whether any Visual Basic elements are preserved or not (default). If they are preserved they are still not editable.

Warning: openpyxl does currently not read all possible items in an Excel file so images and charts will be lost from existing files if they are opened and saved with the same name.

Using number formats

```
>>> import datetime
>>> from openpyxl import Workbook
>>> wb = Workbook()
>>> ws = wb.active
>>> # set date using a Python datetime
>>> ws['A1'] = datetime.datetime(2010, 7, 21)
>>>
>>> ws['A1'].number_format
'yyyy-mm-dd h:mm:ss'
>>> # You can enable type inference on a case-by-case basis
>>> wb.guess_types = True
>>> # set percentage using a string followed by the percent sign
>>> ws['B1'] = '3.14%'
>>> wb.guess_types = False
>>> ws['B1'].value
0.031400000000000004
>>>
>>> ws['B1'].number_format
'0%'
```

Using formulae

```
>>> from openpyxl import Workbook
>>> wb = Workbook()
>>> ws = wb.active
>>> # add a simple formula
>>> ws["A1"] = "=SUM(1, 1)"
>>> wb.save("formula.xlsx")
```

Warning: NB you must use the English name for a function and function arguments *must* be separated by commas and not other punctuation such as semi-colons.

openpyxl never evaluates formula but it is possible to check the name of a formula:

```
>>> from openpyxl.utils import FORMULAE
>>> "HEX2DEC" in FORMULAE
True
```

If you're trying to use a formula that isn't known this could be because you're using a formula that was not included in the initial specification. Such formulae must be prefixed with *xlfn.* to work.

Merge / Unmerge cells

```
>>> from openpyxl.workbook import Workbook
>>>
>>> wb = Workbook()
>>> ws = wb.active
>>>
>>> ws.merge_cells('A1:B1')
>>> ws.unmerge_cells('A1:B1')
>>>
>>> # or
>>> ws.merge_cells(start_row=2,start_column=1,end_row=2,end_column=4)
>>> ws.unmerge_cells(start_row=2,start_column=1,end_row=2,end_column=4)
```

Inserting an image

```
>>> from openpyxl import Workbook
>>> from openpyxl.drawing.image import Image
>>>
>>> wb = Workbook()
>>> ws = wb.active
>>> ws['A1'] = 'You should see three logos below'
```

```
>>> # create an image
>>> img = Image('logo.png')
```

```
>>> # add to worksheet and anchor next to cells
>>> ws.add_image(img, 'A1')
>>> wb.save('logo.xlsx')
```

Fold columns (outline)

```
>>> import openpyxl
>>> wb = openpyxl.Workbook()
>>> ws = wb.create_sheet()
>>> ws.column_dimensions.group('A','D', hidden=True)
>>> wb.save('group.xlsx')
```

7.3 Charts

7.3.1 Charts

Warning: Openpyxl currently supports chart creation within a worksheet only. Charts in existing workbooks will be lost.

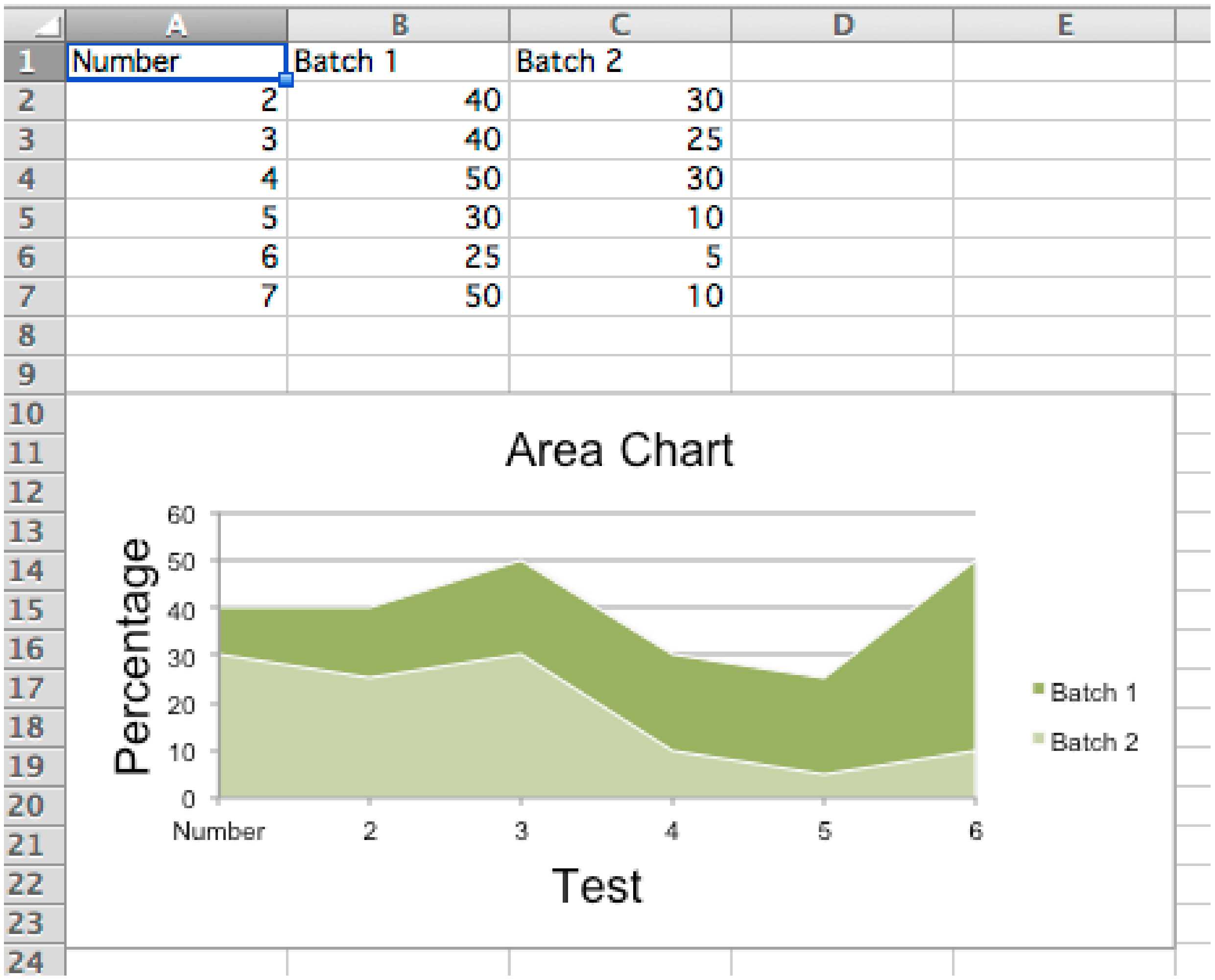
Chart types

The following charts are available:

Area Charts

2D Area Charts Area charts are similar to line charts with the addition that the area underneath the plotted line is filled. Different variants are available by setting the grouping to "standard", "stacked" or "percentStacked"; "standard" is the default.

```python
from openpyxl import Workbook
from openpyxl.chart import (
    AreaChart,
    Reference,
    Series,
)

wb = Workbook()
ws = wb.active

rows = [
    ['Number', 'Batch 1', 'Batch 2'],
    [2, 40, 30],
    [3, 40, 25],
    [4, 50, 30],
    [5, 30, 10],
    [6, 25, 5],
    [7, 50, 10],
]

for row in rows:
    ws.append(row)

chart = AreaChart()
chart.title = "Area Chart"
chart.style = 13
chart.x_axis.title = 'Test'
chart.y_axis.title = 'Percentage'

cats = Reference(ws, min_col=1, min_row=1, max_row=7)
data = Reference(ws, min_col=2, min_row=1, max_col=3, max_row=7)
chart.add_data(data, titles_from_data=True)
chart.set_categories(cats)

ws.add_chart(chart, "A10")

wb.save("area.xlsx")
```

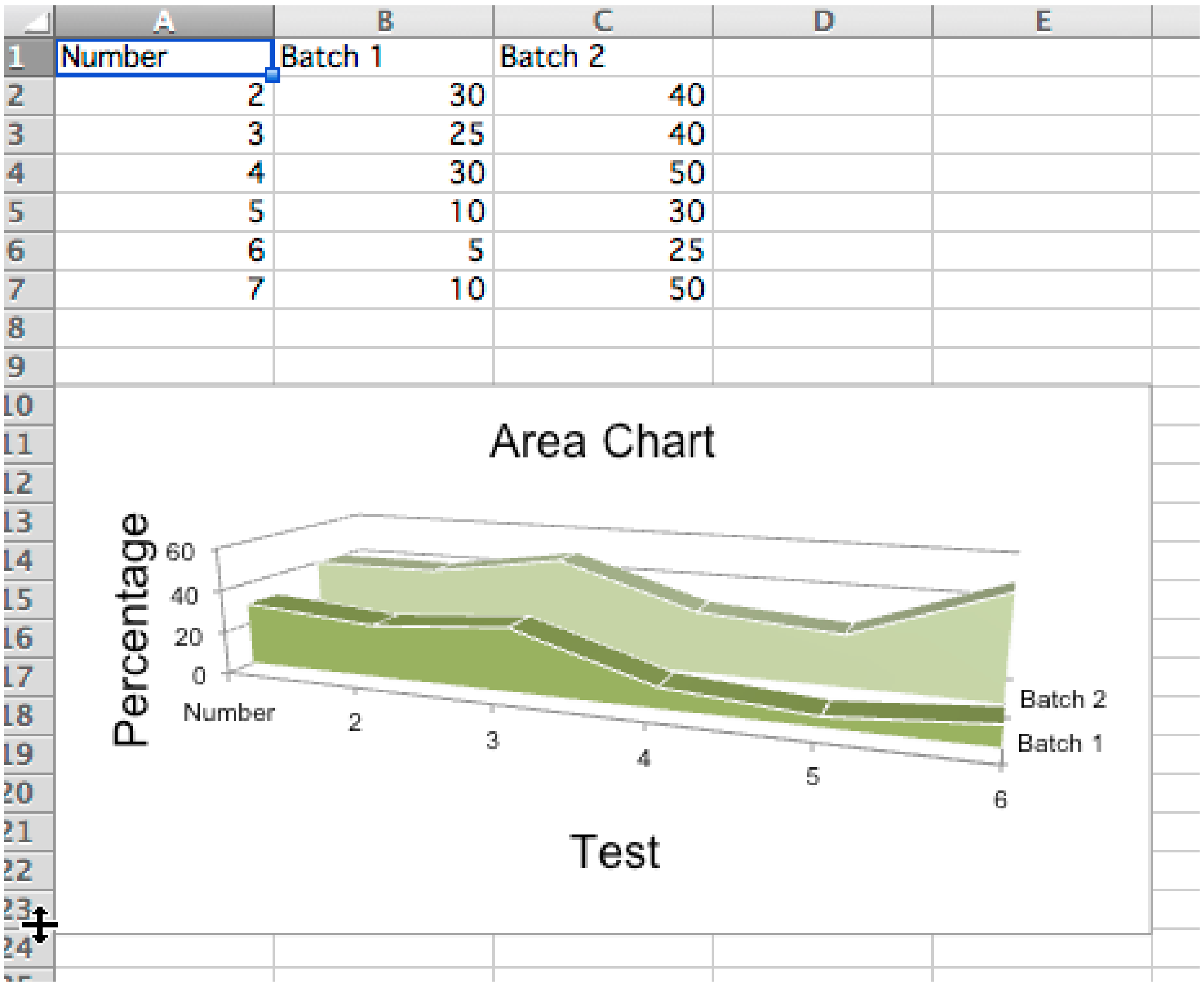


	A	B	C	D	E
1	Number	Batch 1	Batch 2		
2	2	40	30		
3	3	40	25		
4	4	50	30		
5	5	30	10		
6	6	25	5		
7	7	50	10		

3D Area Charts You can also create 3D area charts

```python
from openpyxl import Workbook
from openpyxl.chart import (
    AreaChart3D,
    Reference,
    Series,
)

wb = Workbook()
ws = wb.active

rows = [
    ['Number', 'Batch 1', 'Batch 2'],
    [2, 30, 40],
    [3, 25, 40],
    [4 ,30, 50],
    [5 ,10, 30],
    [6,  5, 25],
    [7 ,10, 50],
]

for row in rows:
    ws.append(row)

chart = AreaChart3D()
chart.title = "Area Chart"
chart.style = 13
chart.x_axis.title = 'Test'
chart.y_axis.title = 'Percentage'
chart.legend = None

cats = Reference(ws, min_col=1, min_row=1, max_row=7)
data = Reference(ws, min_col=2, min_row=1, max_col=3, max_row=7)
chart.add_data(data, titles_from_data=True)
chart.set_categories(cats)

ws.add_chart(chart, "A10")

wb.save("area3D.xlsx")
```

This produces a simple 3D area chart where third axis can be used to replace the legend:



	A	B	C	D	E
1	Number	Batch 1	Batch 2		
2	2	30	40		
3	3	25	40		
4	4	30	50		
5	5	10	30		
6	6	5	25		
7	7	10	50		
8					
9					

Bar and Column Charts

In bar charts values are plotted as either horizontal bars or vertical columns.

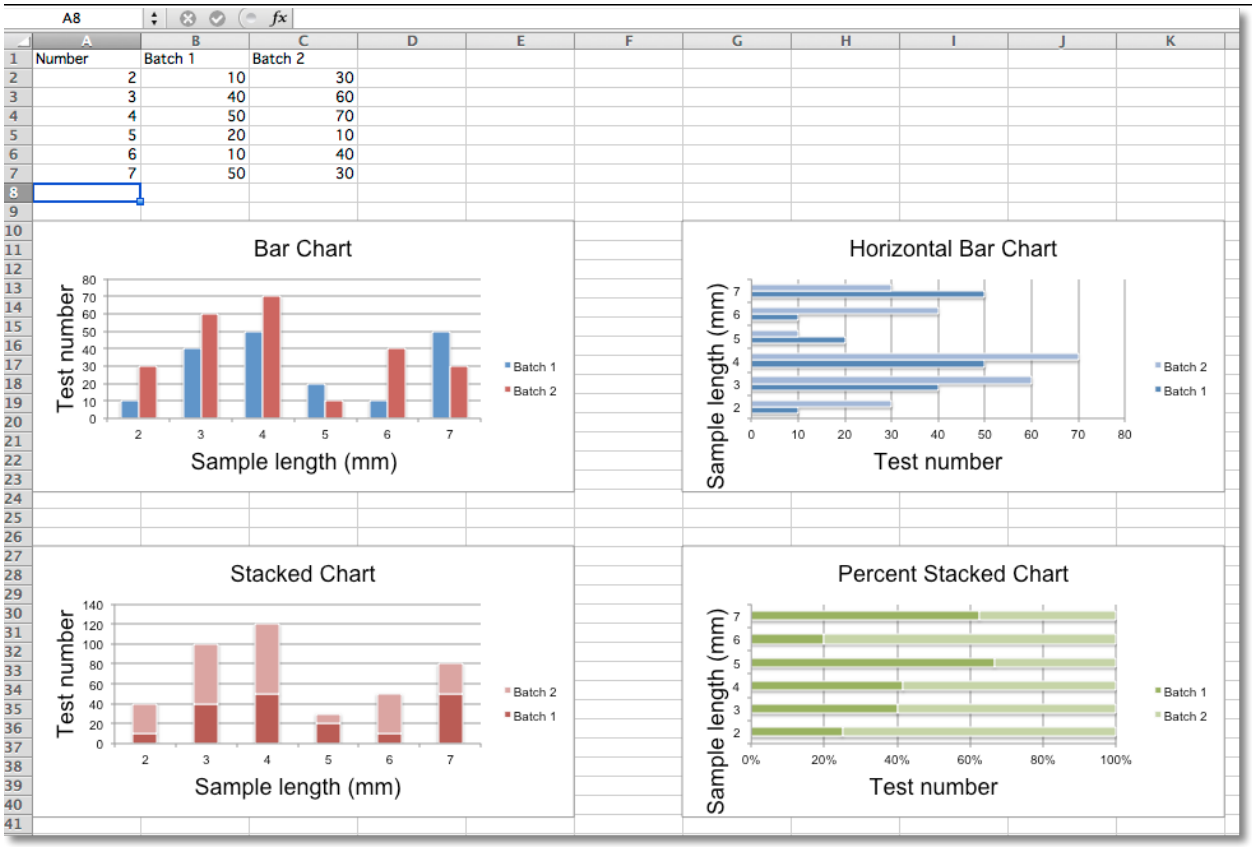
Vertical, Horizontal and Stacked Bar Charts

Note: The following settings affect the different chart types.

Switch between vertical and horizontal bar charts by setting *type* to *col* or *bar* respectively.

When using stacked charts the *overlap* needs to be set to 100.

If bars are horizontal, x and y axes are revesed.



Number	Batch 1	Batch 2
2	10	30
3	40	60
4	50	70
5	20	10
6	10	40
7	50	30

```python
from openpyxl import Workbook
from openpyxl.chart import BarChart, Series, Reference

wb = Workbook(write_only=True)
ws = wb.create_sheet()

rows = [
    ('Number', 'Batch 1', 'Batch 2'),
    (2, 10, 30),
    (3, 40, 60),
    (4, 50, 70),
    (5, 20, 10),
    (6, 10, 40),
    (7, 50, 30),
]
```

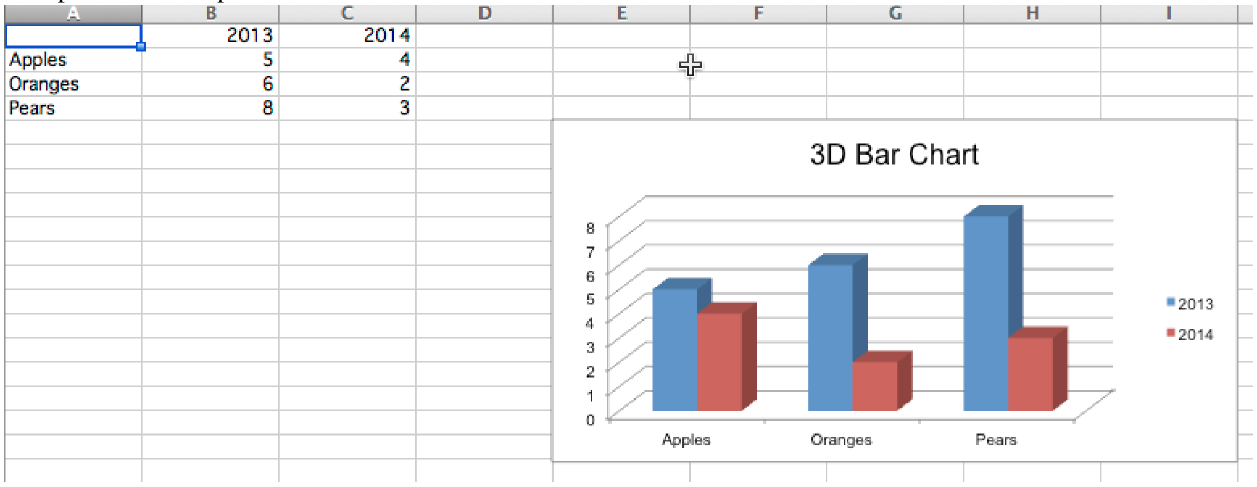
```
for row in rows:
    ws.append(row)


chart1 = BarChart()
chart1.type = "col"
chart1.style = 10
chart1.title = "Bar Chart"
chart1.y_axis.title = 'Test number'
chart1.x_axis.title = 'Sample length (mm)'

data = Reference(ws, min_col=2, min_row=1, max_row=7, max_col=3)
cats = Reference(ws, min_col=1, min_row=2, max_row=7)
chart1.add_data(data, titles_from_data=True)
chart1.set_categories(cats)
chart1.shape = 4
ws.add_chart(chart1, "A10")

from copy import deepcopy

chart2 = deepcopy(chart1)
chart2.style = 11
chart2.type = "bar"
chart2.title = "Horizontal Bar Chart"

ws.add_chart(chart2, "G10")


chart3 = deepcopy(chart1)
chart3.type = "col"
chart3.style = 12
chart3.grouping = "stacked"
chart3.overlap = 100
chart3.title = 'Stacked Chart'

ws.add_chart(chart3, "A27")


chart4 = deepcopy(chart1)
chart4.type = "bar"
chart4.style = 13
chart4.grouping = "percentStacked"
chart4.overlap = 100
chart4.title = 'Percent Stacked Chart'

ws.add_chart(chart4, "G27")

wb.save("bar.xlsx")
```

This will produce four charts illustrating the various possibilities.

3D Bar Charts You can also create 3D bar charts

```
from openpyxl import Workbook
from openpyxl.chart import (
    Reference,
    Series,
    BarChart3D,
)

wb = Workbook()
ws = wb.active

rows = [
    (None, 2013, 2014),
    ("Apples", 5, 4),
    ("Oranges", 6, 2),
    ("Pears", 8, 3)
]

for row in rows:
    ws.append(row)

data = Reference(ws, min_col=2, min_row=1, max_col=3, max_row=4)
titles = Reference(ws, min_col=1, min_row=2, max_row=4)
chart = BarChart3D()
chart.title = "3D Bar Chart"
chart.add_data(data=data, titles_from_data=True)
chart.set_categories(titles)

ws.add_chart(chart, "E5")
wb.save("bar3d.xlsx")
```

This produces a simple 3D bar chart



A	B	C
	2013	2014
Apples	5	4
Oranges	6	2
Pears	8	3

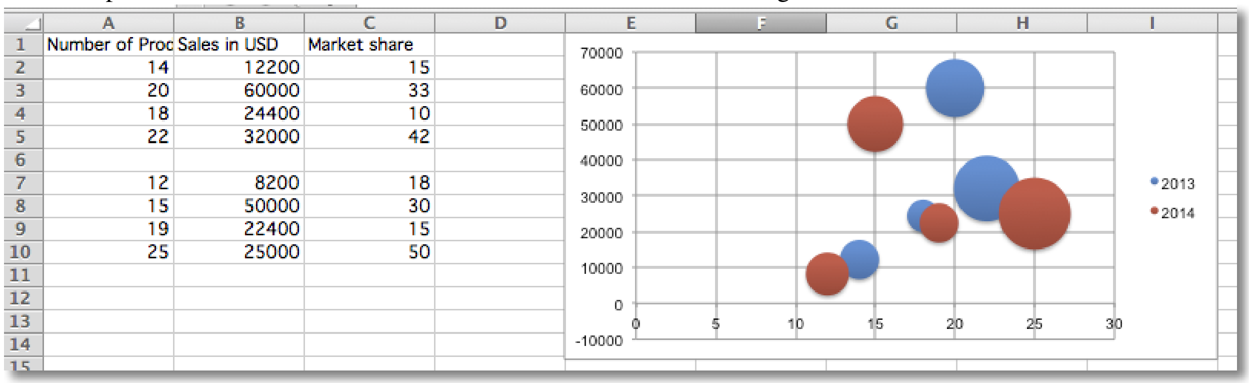
Bubble Charts

Bubble charts are similar to scatter charts but use a third dimension to determine the size of the bubbles. Charts can include multiple series.

```
"""
Sample bubble chart
"""

from openpyxl import Workbook
from openpyxl.chart import Series, Reference, BubbleChart

wb = Workbook()
```

```
ws = wb.active

rows = [
    ("Number of Products", "Sales in USD", "Market share"),
    (14, 12200, 15),
    (20, 60000, 33),
    (18, 24400, 10),
    (22, 32000, 42),
    (),
    (12, 8200, 18),
    (15, 50000, 30),
    (19, 22400, 15),
    (25, 25000, 50),
]

for row in rows:
    ws.append(row)

chart = BubbleChart()
chart.style = 18 # use a preset style

# add the first series of data
xvalues = Reference(ws, min_col=1, min_row=2, max_row=5)
yvalues = Reference(ws, min_col=2, min_row=2, max_row=5)
size = Reference(ws, min_col=3, min_row=2, max_row=5)
series = Series(values=yvalues, xvalues=xvalues, zvalues=size, title="2013")
chart.series.append(series)

# add the second
xvalues = Reference(ws, min_col=1, min_row=7, max_row=10)
yvalues = Reference(ws, min_col=2, min_row=7, max_row=10)
size = Reference(ws, min_col=3, min_row=7, max_row=10)
series = Series(values=yvalues, xvalues=xvalues, zvalues=size, title="2014")
chart.series.append(series)

# place the chart starting in cell E1
ws.add_chart(chart, "E1")
wb.save("bubble.xlsx")
```

This will produce bubble chart with two series and should look something like this



	A	B	C
1	Number of Proc	Sales in USD	Market share
2	14	12200	15
3	20	60000	33
4	18	24400	10
5	22	32000	42
6			
7	12	8200	18
8	15	50000	30
9	19	22400	15
10	25	25000	50

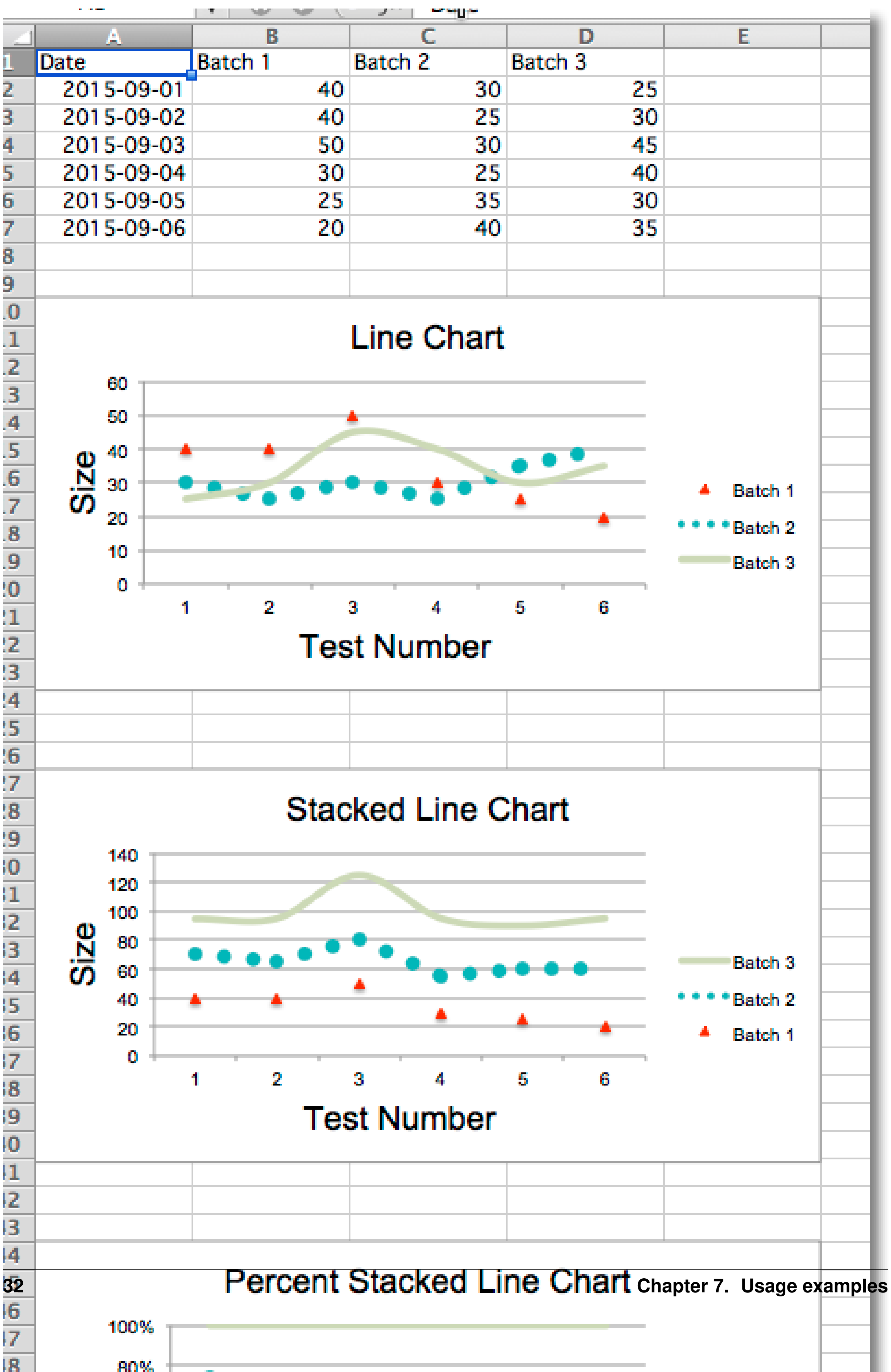
Line Charts

Line Charts Line charts allow data to be plotted against a fixed axis. They are similar to scatter charts, the main difference is that with line charts each data series is plotted against the same values. Different kinds of axes can be used for the secondary axes.

Similar to bar charts there are three kinds of line charts: standard, stacked and percentStacked.

```python
from datetime import date

from openpyxl import Workbook
from openpyxl.chart import (
    LineChart,
    Reference,
)
from openpyxl.chart.axis import DateAxis

wb = Workbook()
ws = wb.active

rows = [
    ['Date', 'Batch 1', 'Batch 2', 'Batch 3'],
    [date(2015,9, 1), 40, 30, 25],
    [date(2015,9, 2), 40, 25, 30],
    [date(2015,9, 3), 50, 30, 45],
    [date(2015,9, 4), 30, 25, 40],
    [date(2015,9, 5), 25, 35, 30],
    [date(2015,9, 6), 20, 40, 35],
]

for row in rows:
    ws.append(row)

c1 = LineChart()
c1.title = "Line Chart"
c1.style = 13
c1.y_axis.title = 'Size'
c1.x_axis.title = 'Test Number'

data = Reference(ws, min_col=2, min_row=1, max_col=4, max_row=7)
c1.add_data(data, titles_from_data=True)

# Style the lines
s1 = c1.series[0]
s1.marker.symbol = "triangle"
s1.marker.graphicalProperties.solidFill = "FF0000" # Marker filling
s1.marker.graphicalProperties.line.solidFill = "FF0000" # Marker outline

s1.graphicalProperties.line.noFill = True

s2 = c1.series[1]
s2.graphicalProperties.line.solidFill = "00AAAA"
s2.graphicalProperties.line.dashStyle = "sysDot"
s2.graphicalProperties.line.width = 100050 # width in EMUs

s2 = c1.series[2]
s2.smooth = True # Make the line smooth

ws.add_chart(c1, "A10")

from copy import deepcopy
```

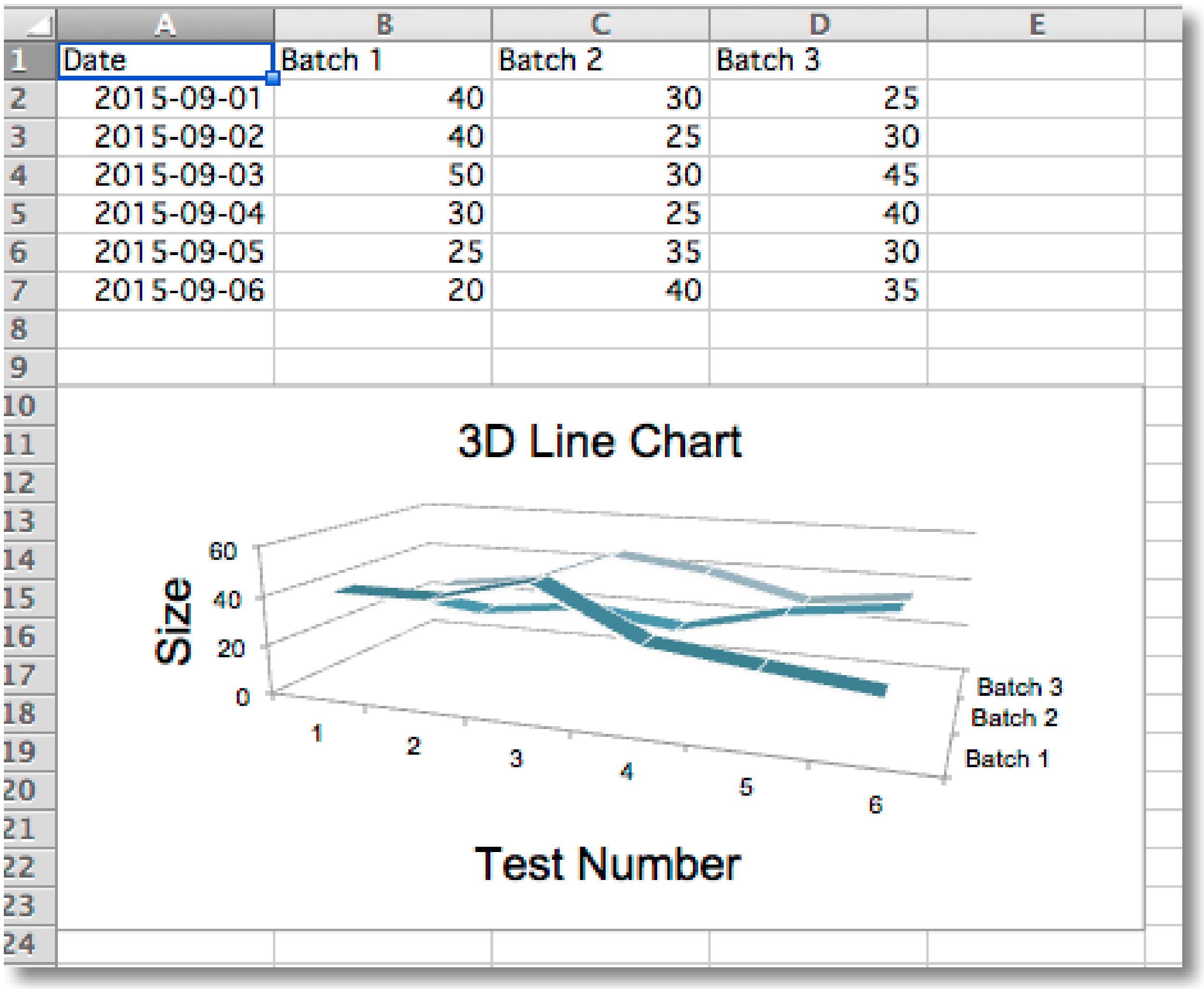
```
stacked = deepcopy(c1)
stacked.grouping = "stacked"
stacked.title = "Stacked Line Chart"
ws.add_chart(stacked, "A27")

percent_stacked = deepcopy(c1)
percent_stacked.grouping = "percentStacked"
percent_stacked.title = "Percent Stacked Line Chart"
ws.add_chart(percent_stacked, "A44")

# Chart with date axis
c2 = LineChart()
c2.title = "Date Axis"
c2.style = 12
c2.y_axis.title = "Size"
c2.y_axis.crossAx = 500
c2.x_axis = DateAxis(crossAx=100)
c2.x_axis.number_format = 'd-mmm'
c2.x_axis.majorTimeUnit = "days"
c2.x_axis.title = "Date"

c2.add_data(data, titles_from_data=True)
dates = Reference(ws, min_col=1, min_row=2, max_row=7)
c2.set_categories(dates)

ws.add_chart(c2, "A61")

wb.save("line.xlsx")
```



Date	Batch 1	Batch 2	Batch 3
2015-09-01	40	30	25
2015-09-02	40	25	30
2015-09-03	50	30	45
2015-09-04	30	25	40
2015-09-05	25	35	30
2015-09-06	20	40	35

3D Line Charts In 3D line charts the third axis is the same as the legend for the series.

```python
from datetime import date

from openpyxl import Workbook
from openpyxl.chart import (
    LineChart3D,
    Reference,
)
from openpyxl.chart.axis import DateAxis

wb = Workbook()
ws = wb.active

rows = [
    ['Date', 'Batch 1', 'Batch 2', 'Batch 3'],
    [date(2015,9, 1), 40, 30, 25],
    [date(2015,9, 2), 40, 25, 30],
    [date(2015,9, 3), 50, 30, 45],
    [date(2015,9, 4), 30, 25, 40],
    [date(2015,9, 5), 25, 35, 30],
    [date(2015,9, 6), 20, 40, 35],
]

for row in rows:
    ws.append(row)

c1 = LineChart3D()
c1.title = "3D Line Chart"
c1.legend = None
c1.style = 15
c1.y_axis.title = 'Size'
c1.x_axis.title = 'Test Number'

data = Reference(ws, min_col=2, min_row=1, max_col=4, max_row=7)
c1.add_data(data, titles_from_data=True)

ws.add_chart(c1, "A10")

wb.save("line3D.xlsx")
```

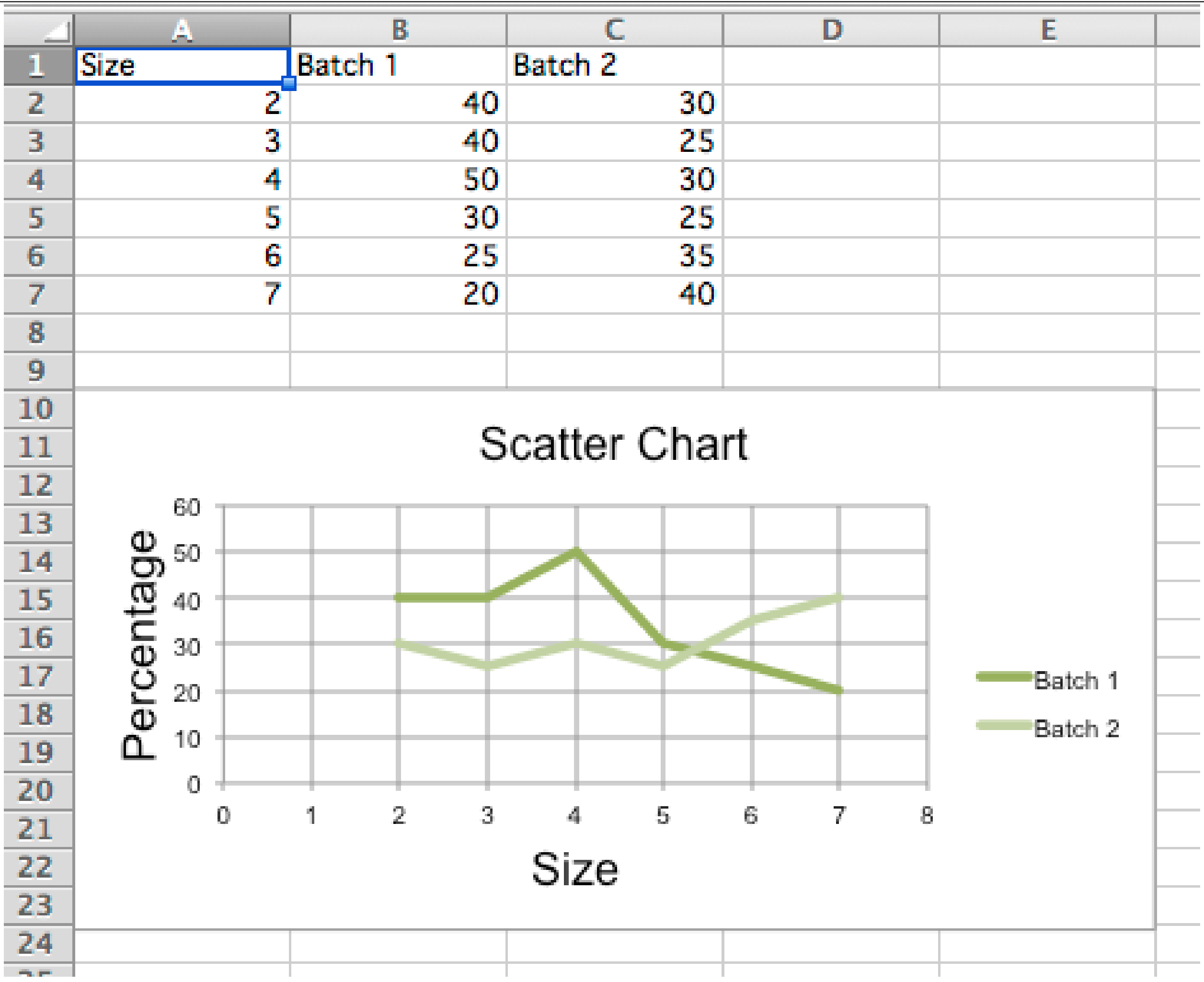


	A	B	C	D	E
1	Date	Batch 1	Batch 2	Batch 3	
2	2015-09-01	40	30	25	
3	2015-09-02	40	25	30	
4	2015-09-03	50	30	45	
5	2015-09-04	30	25	40	
6	2015-09-05	25	35	30	
7	2015-09-06	20	40	35	

Scatter Charts

Scatter, or xy, charts are similar to some line charts. The main difference is that one series of values is plotted against another. This is useful where values are unordered.

```
from openpyxl import Workbook
from openpyxl.chart import (
    ScatterChart,
    Reference,
    Series,
)

wb = Workbook()
ws = wb.active

rows = [
    ['Size', 'Batch 1', 'Batch 2'],
    [2, 40, 30],
    [3, 40, 25],
    [4, 50, 30],
    [5, 30, 25],
    [6, 25, 35],
    [7, 20, 40],
]

for row in rows:
    ws.append(row)

chart = ScatterChart()
chart.title = "Scatter Chart"
chart.style = 13
chart.x_axis.title = 'Size'
chart.y_axis.title = 'Percentage'

xvalues = Reference(ws, min_col=1, min_row=2, max_row=7)
for i in range(2, 4):
    values = Reference(ws, min_col=i, min_row=1, max_row=7)
    series = Series(values, xvalues, title_from_data=True)
    chart.series.append(series)

ws.add_chart(chart, "A10")

wb.save("scatter.xlsx")
```



	A	B	C	D	E
1	Size	Batch 1	Batch 2		
2	2	40	30		
3	3	40	25		
4	4	50	30		
5	5	30	25		
6	6	25	35		
7	7	20	40		

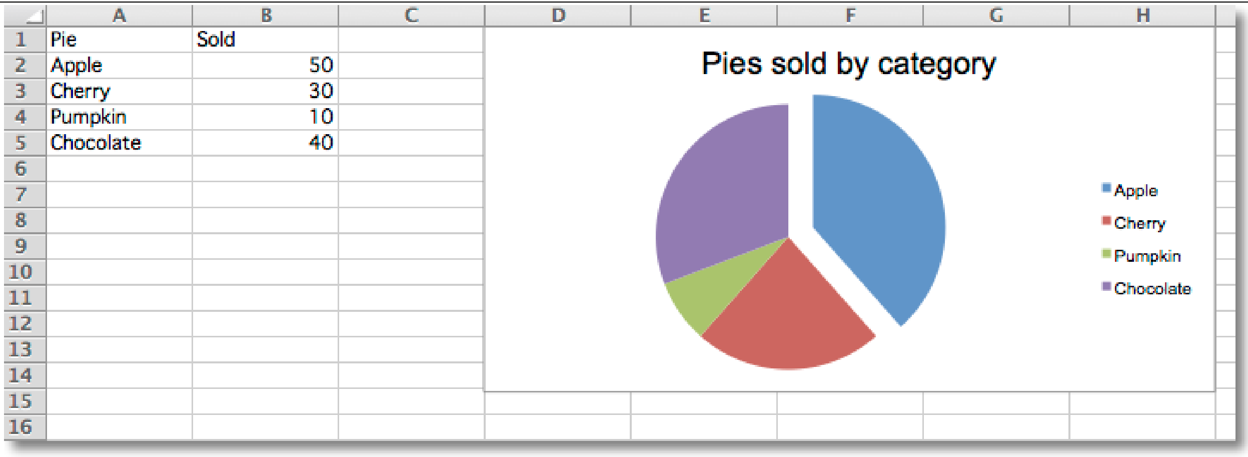
Note: The specification says that there are the following types of scatter charts: ‘line’, ‘lineMarker’, ‘marker’, ‘smooth’, ‘smoothMarker’. However, at least in Microsoft Excel, this is just a shortcut for other settings that otherwise no effect. For consistency with line charts, the style for each series should be set manually.

Pie Charts

Pie Charts Pie charts plot data as slices of a circle with each slice representing the percentage of the whole. Slices are plotted in a clockwise direction with 0° being at the top of the circle. Pie charts can only take a single series of data. The title of the chart will default to being the title of the series.

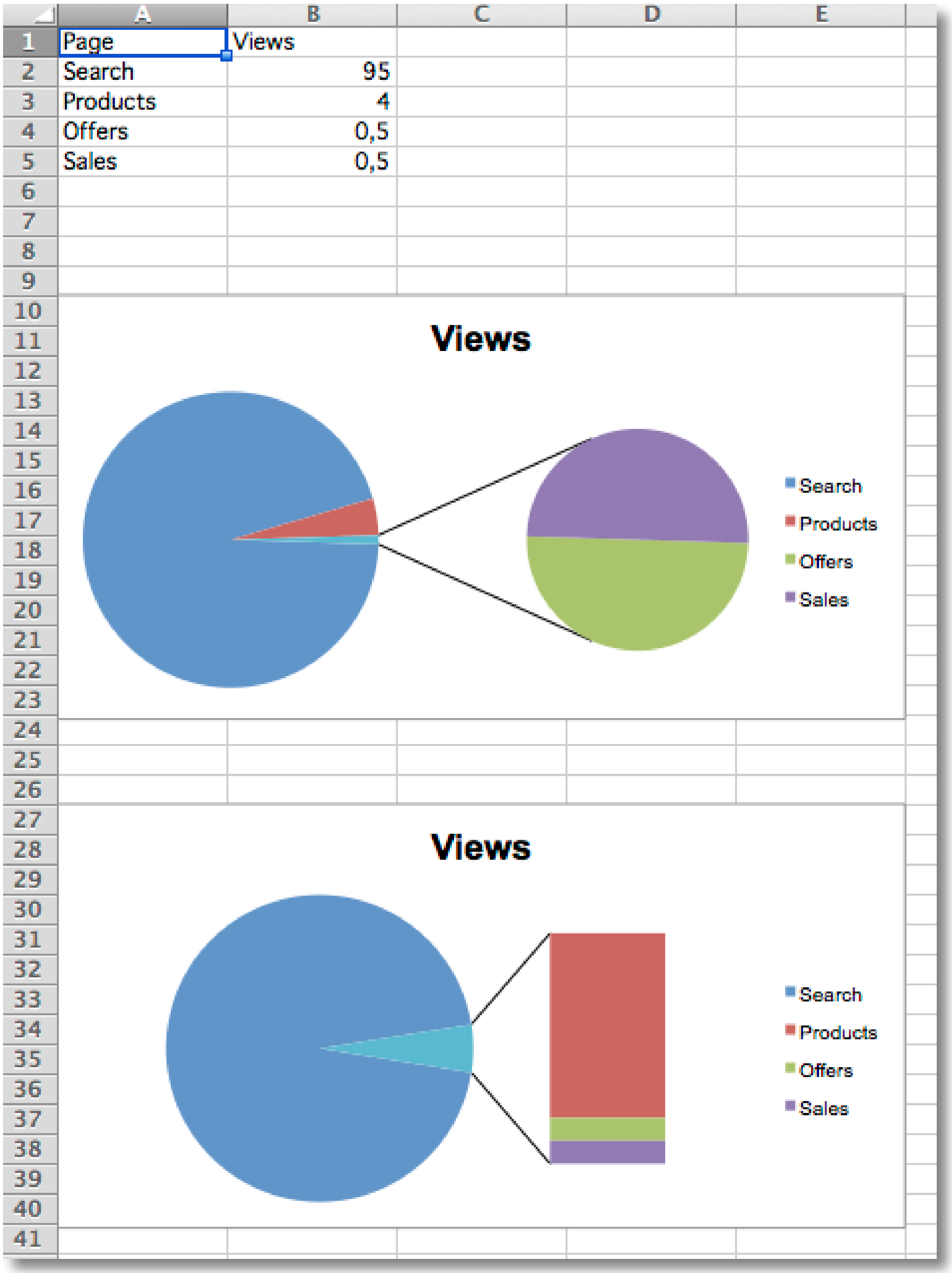
```
from openpyxl import Workbook

from openpyxl.chart import (
    PieChart,
    ProjectedPieChart,
    Reference
)
from openpyxl.chart.series import DataPoint

data = [
    ['Pie', 'Sold'],
    ['Apple', 50],
    ['Cherry', 30],
    ['Pumpkin', 10],
    ['Chocolate', 40],
]

wb = Workbook()
ws = wb.active

for row in data:
    ws.append(row)

pie = PieChart()
labels = Reference(ws, min_col=1, min_row=2, max_row=5)
data = Reference(ws, min_col=2, min_row=1, max_row=5)
pie.add_data(data, titles_from_data=True)
pie.set_categories(labels)
pie.title = "Pies sold by category"

# Cut the first slice out of the pie
slice = DataPoint(idx=0, explosion=20)
pie.series[0].data_points = [slice]

ws.add_chart(pie, "D1")


ws = wb.create_sheet(title="Projection")

data = [
    ['Page', 'Views'],
    ['Search', 95],
    ['Products', 4],
    ['Offers', 0.5],
    ['Sales', 0.5],
]
```

```
for row in data:
    ws.append(row)

projected_pie = ProjectedPieChart()
projected_pie.type = "pie"
projected_pie.splitType = "val" # split by value
labels = Reference(ws, min_col=1, min_row=2, max_row=5)
data = Reference(ws, min_col=2, min_row=1, max_row=5)
projected_pie.add_data(data, titles_from_data=True)
projected_pie.set_categories(labels)

ws.add_chart(projected_pie, "A10")

from copy import deepcopy
projected_bar = deepcopy(projected_pie)
projected_bar.type = "bar"
projected_bar.splitType = 'pos' # split by position

ws.add_chart(projected_bar, "A27")

wb.save("pie.xlsx")
```



	A	B
1	Pie	Sold
2	Apple	50
3	Cherry	30
4	Pumpkin	10
5	Chocolate	40

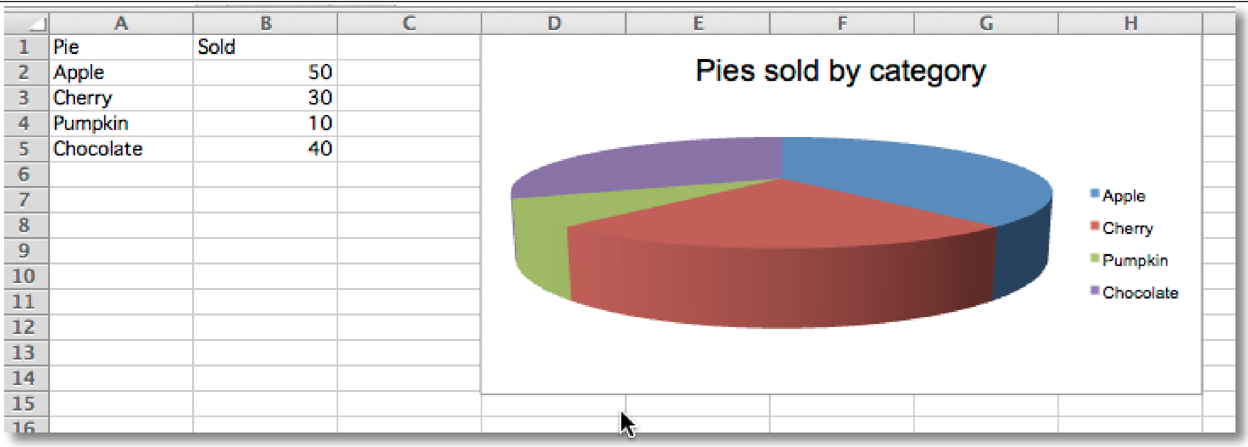
Projected Pie Charts Projected pie charts extract some slices from a pie chart and project them into a second pie or bar chart. This is useful when there are several smaller items in the data series. The chart can be split according percent, val(ue) or pos(ition). If nothing is set then the application decides which to use. In addition custom splits can be defined.



Page	Views
Search	95
Products	4
Offers	0,5
Sales	0,5

3D Pie Charts Pie charts can also be created with a 3D effect.

```
from openpyxl import Workbook

from openpyxl.chart import (
    PieChart3D,
    Reference
)

data = [
    ['Pie', 'Sold'],
    ['Apple', 50],
    ['Cherry', 30],
    ['Pumpkin', 10],
    ['Chocolate', 40],
]

wb = Workbook()
ws = wb.active

for row in data:
    ws.append(row)

pie = PieChart3D()
labels = Reference(ws, min_col=1, min_row=2, max_row=5)
data = Reference(ws, min_col=2, min_row=1, max_row=5)
pie.add_data(data, titles_from_data=True)
pie.set_categories(labels)
pie.title = "Pies sold by category"


ws.add_chart(pie, "D1")

wb.save("pie3D.xlsx")
```

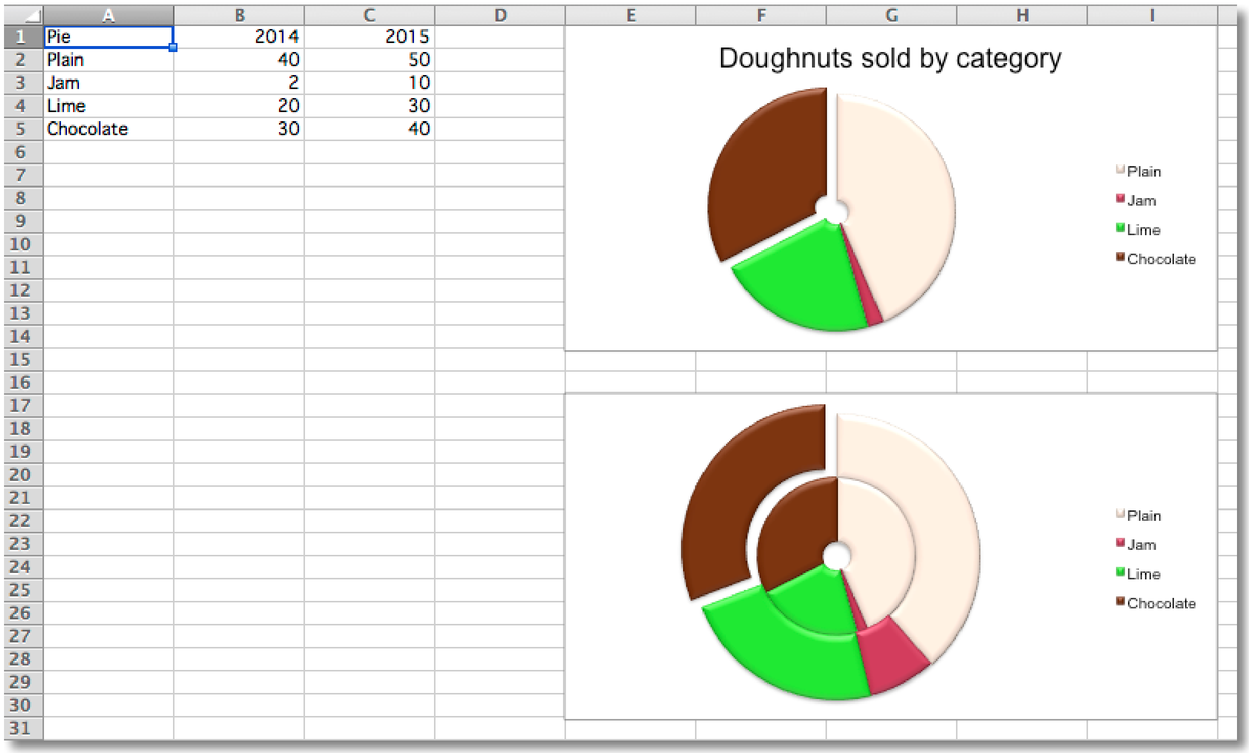


	A	B
1	Pie	Sold
2	Apple	50
3	Cherry	30
4	Pumpkin	10
5	Chocolate	40

Doughnut Charts

Doughnut charts are similar to pie charts except that they use a ring instead of a circle. They can also plot several series of data as concentric rings.

```
from openpyxl import Workbook
from openpyxl.chart import (
    DoughnutChart,
    Reference,
    Series,
)
from openpyxl.chart.series import DataPoint

data = [
    ['Pie', 2014, 2015],
    ['Plain', 40, 50],
    ['Jam', 2, 10],
    ['Lime', 20, 30],
    ['Chocolate', 30, 40],
]

wb = Workbook()
ws = wb.active

for row in data:
    ws.append(row)

chart = DoughnutChart()
labels = Reference(ws, min_col=1, min_row=2, max_row=5)
data = Reference(ws, min_col=2, min_row=1, max_row=5)
chart.add_data(data, titles_from_data=True)
chart.set_categories(labels)
chart.title = "Doughnuts sold by category"
chart.style = 26

# Cut the first slice out of the doughnut
slices = [DataPoint(idx=i) for i in range(4)]
plain, jam, lime, chocolate = slices
chart.series[0].data_points = slices
plain.graphicalProperties.solidFill = "FAE1D0"
jam.graphicalProperties.solidFill = "BB2244"
lime.graphicalProperties.solidFill = "22DD22"
chocolate.graphicalProperties.solidFill = "61210B"
chocolate.explosion = 10

ws.add_chart(chart, "E1")

from copy import deepcopy

chart2 = deepcopy(chart)
chart2.title = None
data = Reference(ws, min_col=3, min_row=1, max_row=5)
series2 = Series(data, title_from_data=True)
series2.data_points = slices
chart2.series.append(series2)

ws.add_chart(chart2, "E17")

wb.save("doughnut.xlsx")
```



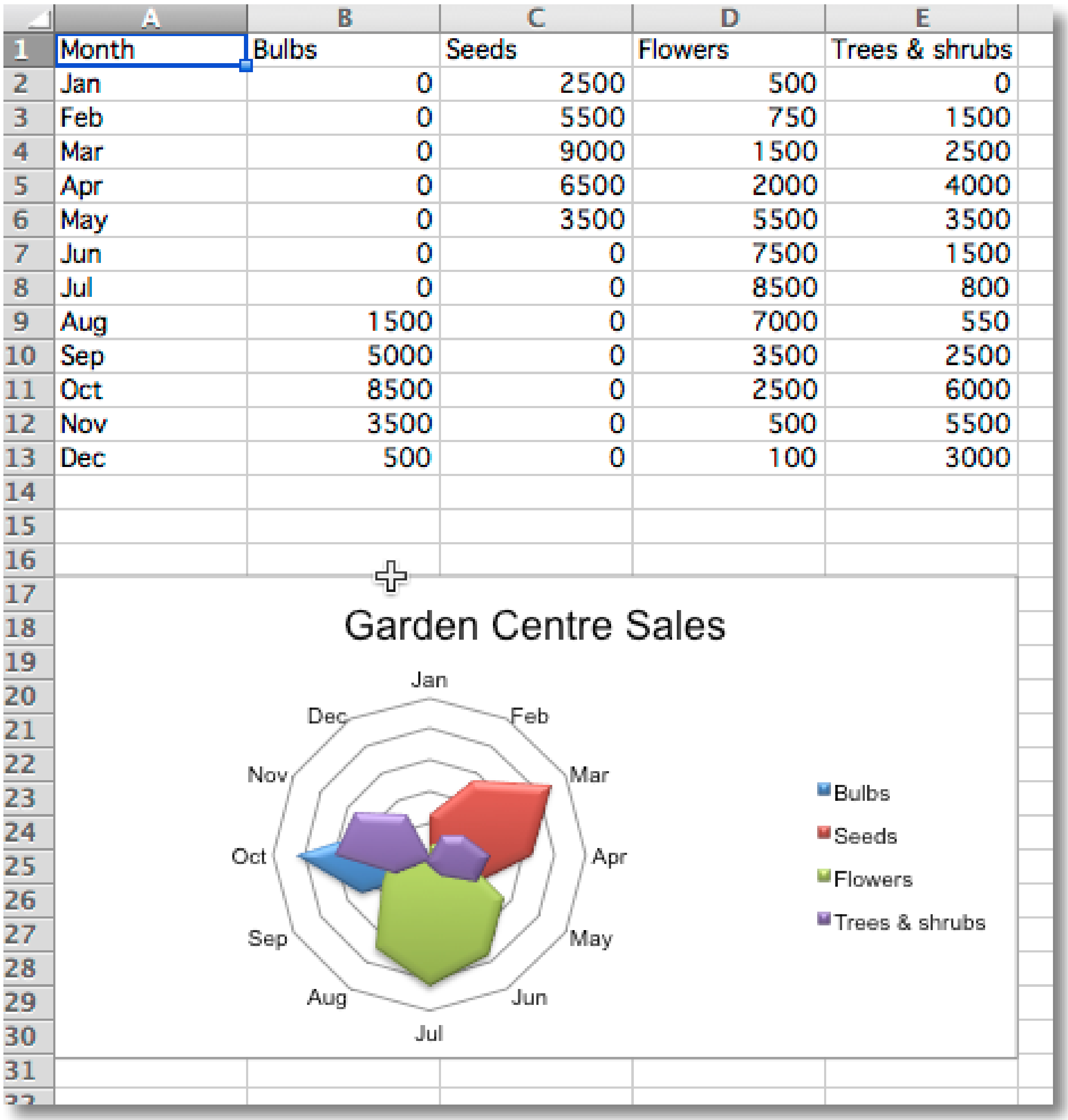
	A	B	C
1	Pie	2014	2015
2	Plain	40	50
3	Jam	2	10
4	Lime	20	30
5	Chocolate	30	40

Radar Charts

Data that is arranged in columns or rows on a worksheet can be plotted in a radar chart. Radar charts compare the aggregate values of multiple data series. It is effectively a projection of an area chart on a circular x-axis.

There are two types of radar chart: standard, where the area is marked with a line; and filled where the where the whole area is filled. The additional type "marker" has no effect. If markers are desired these can be set for the relevant series.

```
from openpyxl import Workbook
from openpyxl.chart import (
    RadarChart,
    Reference,
)

wb = Workbook()
ws = wb.active

rows = [
    ['Month', "Bulbs", "Seeds", "Flowers", "Trees & shrubs"],
    ['Jan', 0, 2500, 500, 0,],
    ['Feb', 0, 5500, 750, 1500],
    ['Mar', 0, 9000, 1500, 2500],
    ['Apr', 0, 6500, 2000, 4000],
    ['May', 0, 3500, 5500, 3500],
    ['Jun', 0, 0, 7500, 1500],
    ['Jul', 0, 0, 8500, 800],
    ['Aug', 1500, 0, 7000, 550],
    ['Sep', 5000, 0, 3500, 2500],
    ['Oct', 8500, 0, 2500, 6000],
    ['Nov', 3500, 0, 500, 5500],
    ['Dec', 500, 0, 100, 3000 ],
]

for row in rows:
    ws.append(row)

chart = RadarChart()
chart.type = "filled"
labels = Reference(ws, min_col=1, min_row=2, max_row=13)
data = Reference(ws, min_col=2, max_col=5, min_row=1, max_row=13)
chart.add_data(data, titles_from_data=True)
chart.set_categories(labels)
chart.style = 26
chart.title = "Garden Centre Sales"
chart.y_axis.delete = True

ws.add_chart(chart, "A17")

wb.save("radar.xlsx")
```



	A	B	C	D	E
1	Month	Bulbs	Seeds	Flowers	Trees & shrubs
2	Jan	0	2500	500	0
3	Feb	0	5500	750	1500
4	Mar	0	9000	1500	2500
5	Apr	0	6500	2000	4000
6	May	0	3500	5500	3500
7	Jun	0	0	7500	1500
8	Jul	0	0	8500	800
9	Aug	1500	0	7000	550
10	Sep	5000	0	3500	2500
11	Oct	8500	0	2500	6000
12	Nov	3500	0	500	5500
13	Dec	500	0	100	3000

Stock Charts

Data that is arranged in columns or rows in a specific order on a worksheet can be plotted in a stock chart. As its name implies, a stock chart is most often used to illustrate the fluctuation of stock prices. However, this chart may also be used for scientific data. For example, you could use a stock chart to indicate the fluctuation of daily or annual temperatures. You must organize your data in the correct order to create stock charts.

The way stock chart data is organized in the worksheet is very important. For example, to create a simple high-low-close stock chart, you should arrange your data with High, Low, and Close entered as column headings, in that order.

Although stock charts are a distinct type, the various types are just shortcuts for particular formatting options:

- high-low-close is essentially a line chart with no lines and the marker set to XYZ. It also sets hiLoLines to True
- open-high-low-close is the as a high-low-close chart with the marker for each data point set to XZZ and upDownLines.

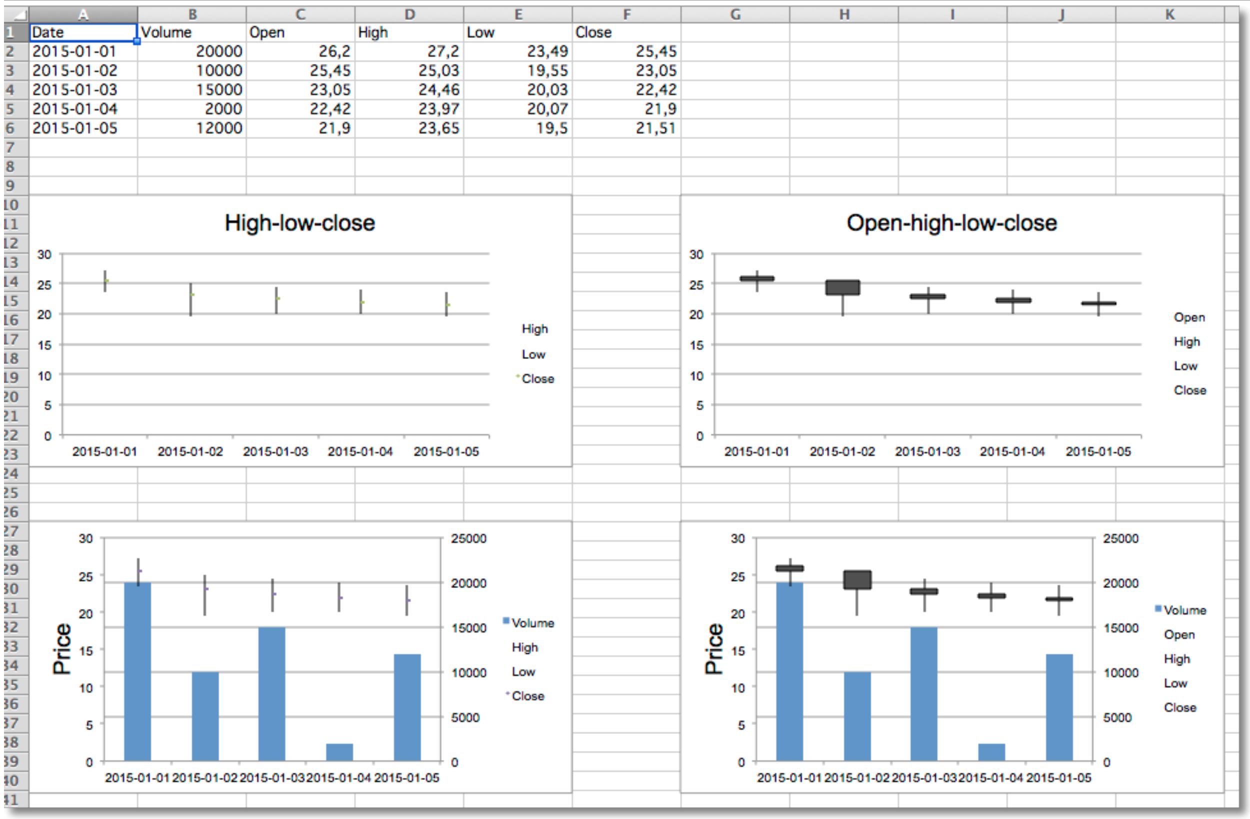
Volume can be added by combining the stock chart with a bar chart for the volume.

```
from datetime import date

from openpyxl import Workbook

from openpyxl.chart import (
    BarChart,
    StockChart,
    Reference,
    Series,
)
from openpyxl.chart.axis import DateAxis, ChartLines
from openpyxl.chart.updown_bars import UpDownBars

wb = Workbook()
ws = wb.active

rows = [
   ['Date',      'Volume','Open', 'High', 'Low', 'Close'],
   ['2015-01-01', 20000,    26.2, 27.20, 23.49, 25.45,  ],
   ['2015-01-02', 10000,    25.45, 25.03, 19.55, 23.05, ],
   ['2015-01-03', 15000,    23.05, 24.46, 20.03, 22.42, ],
   ['2015-01-04', 2000,     22.42, 23.97, 20.07, 21.90, ],
   ['2015-01-05', 12000,    21.9, 23.65, 19.50, 21.51,  ],
]

for row in rows:
    ws.append(row)

# High-low-close
c1 = StockChart()
labels = Reference(ws, min_col=1, min_row=2, max_row=6)
data = Reference(ws, min_col=4, max_col=6, min_row=1, max_row=6)
c1.add_data(data, titles_from_data=True)
c1.set_categories(labels)
for s in c1.series:
    s.graphicalProperties.line.noFill = True
# marker for close
s.marker.symbol = "dot"
s.marker.size = 5
c1.title = "High-low-close"
c1.hiLowLines = ChartLines()

# Excel is broken and needs a cache of values in order to display hiLoLines :-/
from openpyxl.chart.data_source import NumData, NumVal
pts = [NumVal(idx=i) for i in range(len(data) - 1)]
cache = NumData(pt=pts)
c1.series[-1].val.numRef.numCache = cache

ws.add_chart(c1, "A10")

# Open-high-low-close
c2 = StockChart()
```

```python
data = Reference(ws, min_col=3, max_col=6, min_row=1, max_row=6)
c2.add_data(data, titles_from_data=True)
c2.set_categories(labels)
for s in c2.series:
    s.graphicalProperties.line.noFill = True
c2.hiLowLines = ChartLines()
c2.upDownBars = UpDownBars()
c2.title = "Open-high-low-close"

# add dummy cache
c2.series[-1].val.numRef.numCache = cache

ws.add_chart(c2, "G10")

# Create bar chart for volume

bar = BarChart()
data =  Reference(ws, min_col=2, min_row=1, max_row=6)
bar.add_data(data, titles_from_data=True)
bar.set_categories(labels)

from copy import deepcopy

# Volume-high-low-close
b1 = deepcopy(bar)
c3 = deepcopy(c1)
c3.y_axis.majorGridlines = None
c3.y_axis.title = "Price"
b1.y_axis.axId = 20
b1.z_axis = c3.y_axis
b1.y_axis.crosses = "max"
b1 += c3

c3.title = "High low close volume"

ws.add_chart(b1, "A27")

## Volume-open-high-low-close
b2 = deepcopy(bar)
c4 = deepcopy(c2)
c4.y_axis.majorGridlines = None
c4.y_axis.title = "Price"
b2.y_axis.axId = 20
b2.z_axis = c4.y_axis
b2.y_axis.crosses = "max"
b2 += c4

ws.add_chart(b2, "G27")

wb.save("stock.xlsx")
```

Warning: Due to a bug in Excel high-low lines will only be shown if at least one of the data series has some dummy values. This can be done with the following hack:

```
from openpyxl.chart.data_source import NumData, NumVal
pts = [NumVal(idx=i) for i in range(len(data) - 1)]
cache = NumData(pt=pts)
c1.series[-1].val.numRef.numCache = cache
```



Date	Volume	Open	High	Low	Close
2015-01-01	20000	26,2	27,2	23,49	25,45
2015-01-02	10000	25,45	25,03	19,55	23,05
2015-01-03	15000	23,05	24,46	20,03	22,42
2015-01-04	2000	22,42	23,97	20,07	21,9
2015-01-05	12000	21,9	23,65	19,5	21,51

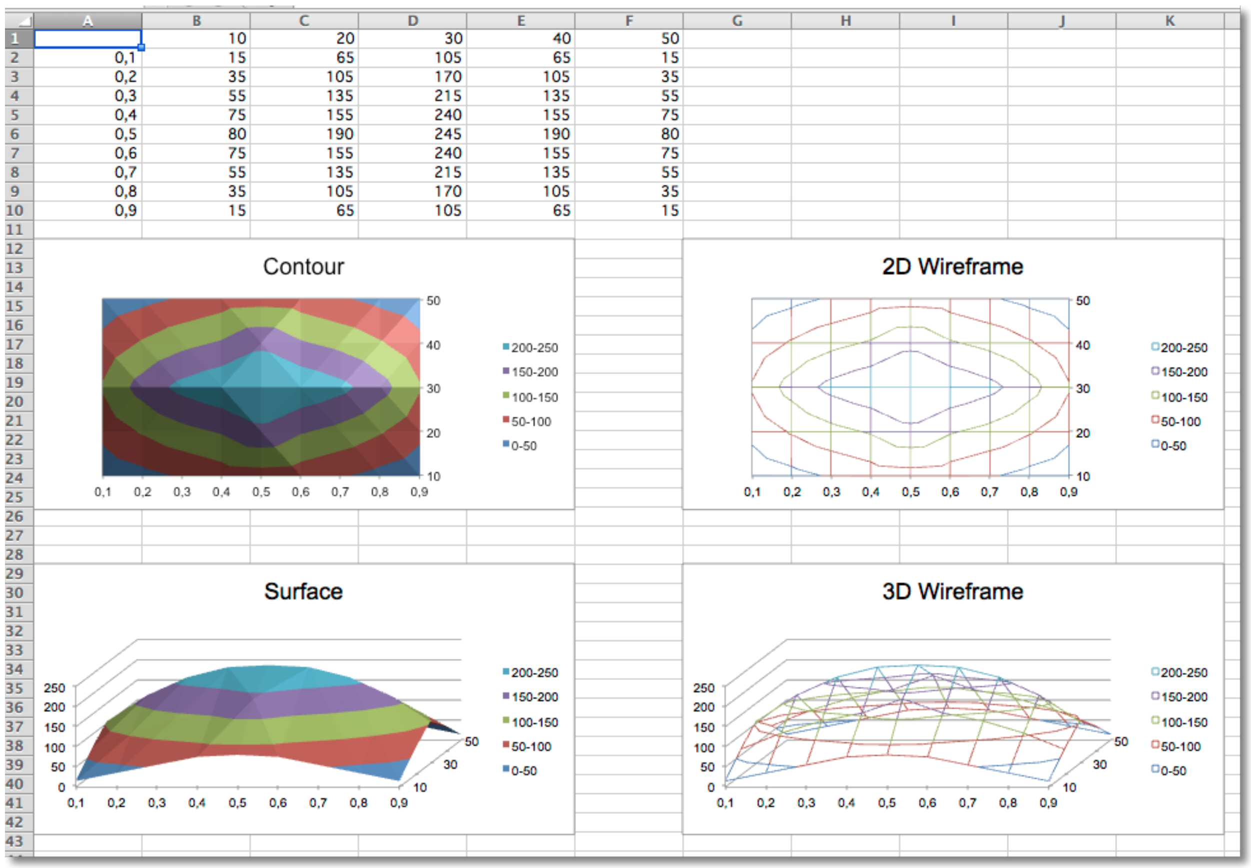
Surface charts

Data that is arranged in columns or rows on a worksheet can be plotted in a surface chart. A surface chart is useful when you want to find optimum combinations between two sets of data. As in a topographic map, colors and patterns indicate areas that are in the same range of values.

By default all surface charts are 3D. 2D wireframe and contour charts are created by setting the rotation and perspective.

```
from openpyxl import Workbook
from openpyxl.chart import (
    SurfaceChart,
    SurfaceChart3D,
    Reference,
    Series,
)
from openpyxl.chart.axis import SeriesAxis

wb = Workbook()
ws = wb.active
```

```
data = [
    [None, 10, 20, 30, 40, 50,],
    [0.1, 15, 65, 105, 65, 15,],
    [0.2, 35, 105, 170, 105, 35,],
    [0.3, 55, 135, 215, 135, 55,],
    [0.4, 75, 155, 240, 155, 75,],
    [0.5, 80, 190, 245, 190, 80,],
    [0.6, 75, 155, 240, 155, 75,],
    [0.7, 55, 135, 215, 135, 55,],
    [0.8, 35, 105, 170, 105, 35,],
    [0.9, 15, 65, 105, 65, 15],
]

for row in data:
    ws.append(row)


c1 = SurfaceChart()
ref = Reference(ws, min_col=2, max_col=6, min_row=1, max_row=10)
labels = Reference(ws, min_col=1, min_row=2, max_row=10)
c1.add_data(ref, titles_from_data=True)
c1.set_categories(labels)
c1.title = "Contour"

ws.add_chart(c1, "A12")

from copy import deepcopy

# wireframe
c2 = deepcopy(c1)
c2.wireframe = True
c2.title = "2D Wireframe"

ws.add_chart(c2, "G12")

# 3D Surface
c3 = SurfaceChart3D()
c3.add_data(ref, titles_from_data=True)
c3.set_categories(labels)
c3.title = "Surface"

ws.add_chart(c3, "A29")

c4 = deepcopy(c3)
c4.wireframe = True
c4.title = "3D Wireframe"

ws.add_chart(c4, "G29")

wb.save("surface.xlsx")
```



	A	B	C	D	E	F
1		10	20	30	40	50
2	0,1	15	65	105	65	15
3	0,2	35	105	170	105	35
4	0,3	55	135	215	135	55
5	0,4	75	155	240	155	75
6	0,5	80	190	245	190	80
7	0,6	75	155	240	155	75
8	0,7	55	135	215	135	55
9	0,8	35	105	170	105	35
10	0,9	15	65	105	65	15

Creating a chart

Charts are composed of at least one series of one or more data points. Series themselves are comprised of references to cell ranges.

```
>>> from openpyxl import Workbook
>>> wb = Workbook()
>>> ws = wb.active
>>> for i in range(10):
...     ws.append([i])
>>>
>>> from openpyxl.chart import BarChart, Reference, Series
>>> values = Reference(ws, min_col=1, min_row=1, max_col=1, max_row=10)
>>> chart = BarChart()
>>> chart.add_data(values)
>>> ws.add_chart(chart)
>>> wb.save("SampleChart.xlsx")
```

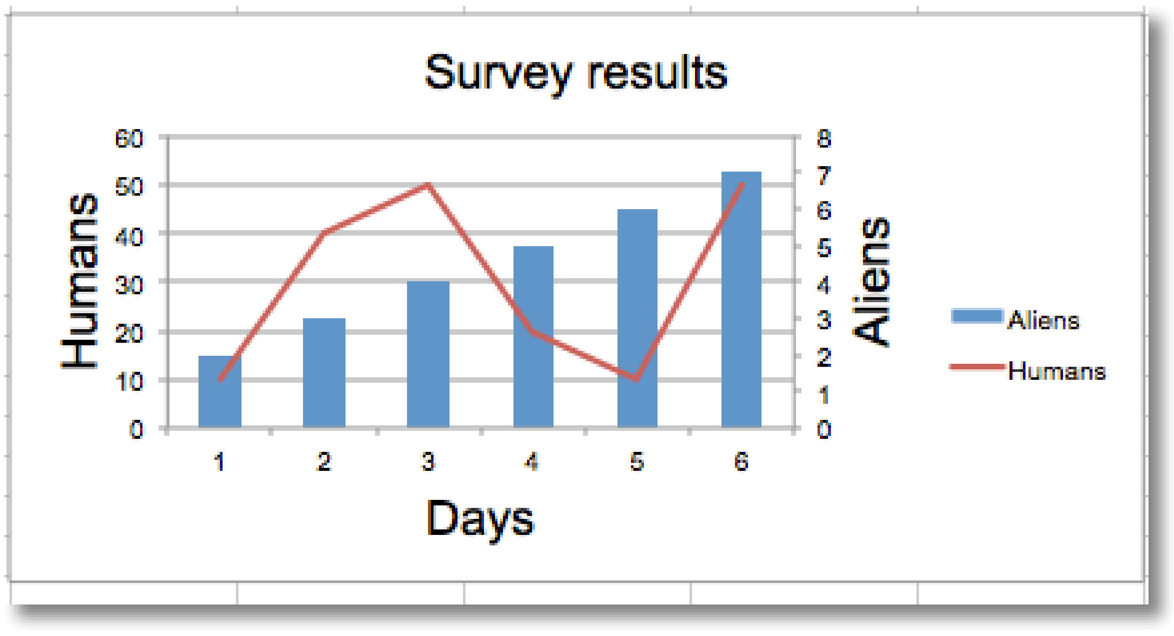
Working with axes

Adding a second axis

Adding a second axis actually involves creating a second chart that shares a common x-axis with the first chart but has a separate y-axis.

```
from openpyxl import Workbook
from openpyxl.chart import (
    LineChart,
    BarChart,
    Reference,
    Series,
)

wb = Workbook()
ws = wb.active

rows = [
    ['Aliens', 2, 3, 4, 5, 6, 7],
    ['Humans', 10, 40, 50, 20, 10, 50],
]

for row in rows:
    ws.append(row)

c1 = BarChart()
v1 = Reference(ws, min_col=1, min_row=1, max_col=7)
c1.add_data(v1, titles_from_data=True, from_rows=True)

c1.x_axis.title = 'Days'
c1.y_axis.title = 'Aliens'
c1.y_axis.majorGridlines = None
c1.title = 'Survey results'


# Create a second chart
c2 = LineChart()
v2 = Reference(ws, min_col=1, min_row=2, max_col=7)
c2.add_data(v2, titles_from_data=True, from_rows=True)
c2.y_axis.axId = 200
c2.y_axis.title = "Humans"

# Display y-axis of the second chart on the right by setting it to cross the x-axis at its maximum
c1.y_axis.crosses = "max"
c1 += c2

ws.add_chart(c1, "D4")

wb.save("secondary.xlsx")
```

This produces a combined line and bar chart looking something like this:



Change the chart layout

Changing the layout of plot area and legend

The layout of the chart within the canvas can be set by using the layout property an instance of a layout class.

Chart layout

Size and position The chart can be positioned within its container. `x` and `y` adjust position, `w` and `h` adjust the size . The units are proportions of the container. A chart cannot be positioned outside of its container and the width and height are the dominant constraints: if x + w > 1, then x = 1 - w.

x is the horizontal position from the left y is the vertical position the top h is the height of the chart relative to its container w is the width of the box

Mode In addition to the size and position the mode for the relevant attribute can also be set to either *factor* or *edge*. Factor is the default:

```
layout.xMode = edge
```

Target The layoutTarget can be set to `outer` or `inner`. The default is `outer`:

```
layout.layoutTarget = inner
```

Legend layout The position of the legend can be controlled either by setting its position: `r`, `l`, `t`, `b`, and `tr`, for right, left, top, bottom and top right respectively. The default is `r`.

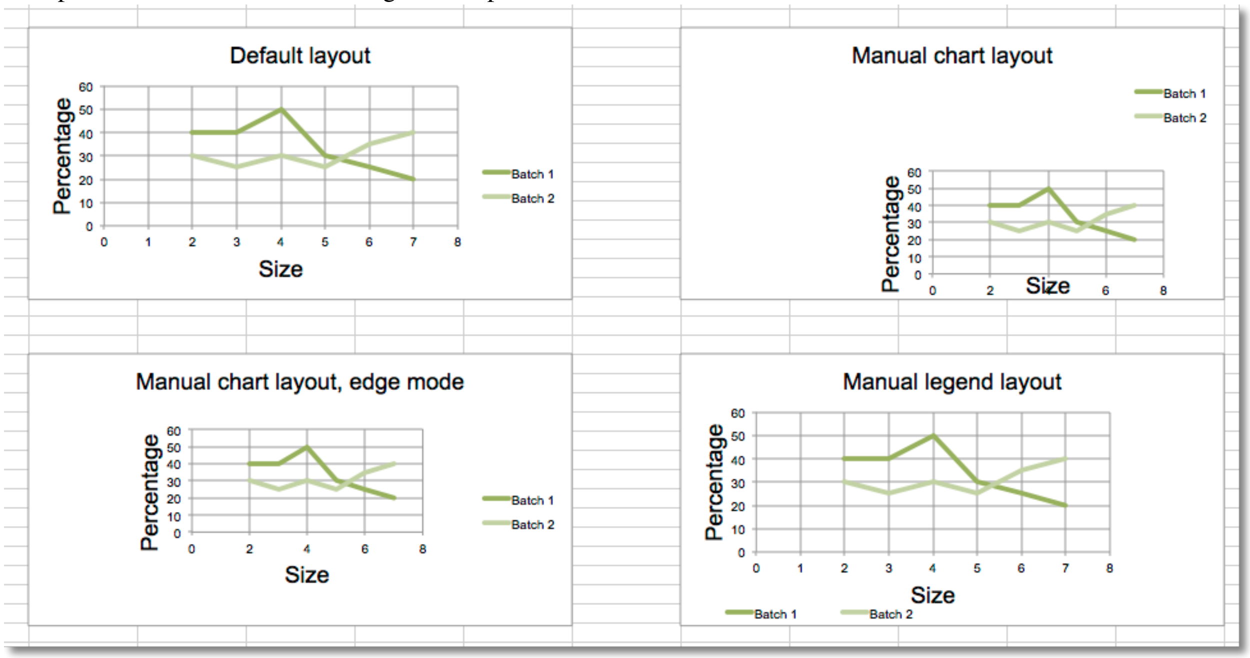
```
legend.position = 'tr'
```

or applying a manual layout:

```
legend.layout = ManualLayout()
```

```
from openpyxl import Workbook, load_workbook
from openpyxl.chart import ScatterChart, Series, Reference
from openpyxl.chart.layout import Layout, ManualLayout

wb = Workbook()
ws = wb.active

rows = [
    ['Size', 'Batch 1', 'Batch 2'],
    [2, 40, 30],
    [3, 40, 25],
    [4, 50, 30],
    [5, 30, 25],
    [6, 25, 35],
    [7, 20, 40],
]

for row in rows:
    ws.append(row)

ch1 = ScatterChart()
xvalues = Reference(ws, min_col=1, min_row=2, max_row=7)
for i in range(2, 4):
    values = Reference(ws, min_col=i, min_row=1, max_row=7)
    series = Series(values, xvalues, title_from_data=True)
    ch1.series.append(series)


ch1.title = "Default layout"
ch1.style = 13
ch1.x_axis.title = 'Size'
ch1.y_axis.title = 'Percentage'
ch1.legend.position = 'r'

ws.add_chart(ch1, "B10")

from copy import deepcopy

# Half-size chart, bottom right
ch2 = deepcopy(ch1)
ch2.title = "Manual chart layout"
ch2.legend.position = "tr"
ch2.layout=Layout(
    manualLayout=ManualLayout(
        x=0.25, y=0.25,
        h=0.5, w=0.5,
    )
)
ws.add_chart(ch2, "H10")

# Half-size chart, centred
ch3 = deepcopy(ch1)
ch3.layout = Layout(
    ManualLayout(
    x=0.25, y=0.25,
    h=0.5, w=0.5,
    xMode="edge",
    yMode="edge",
    )
)
ch3.title = "Manual chart layout, edge mode"
ws.add_chart(ch3, "B27")

# Manually position the legend bottom left
ch4 = deepcopy(ch1)
ch4.title = "Manual legend layout"
ch4.legend.layout = Layout(
    manualLayout=ManualLayout(
        yMode='edge',
        xMode='edge',
        x=0, y=0.9,
        h=0.1, w=0.5
    )
)

ws.add_chart(ch4, "H27")

wb.save("chart_layout.xlsx")
```

This produces four charts illustrating various possibilities:

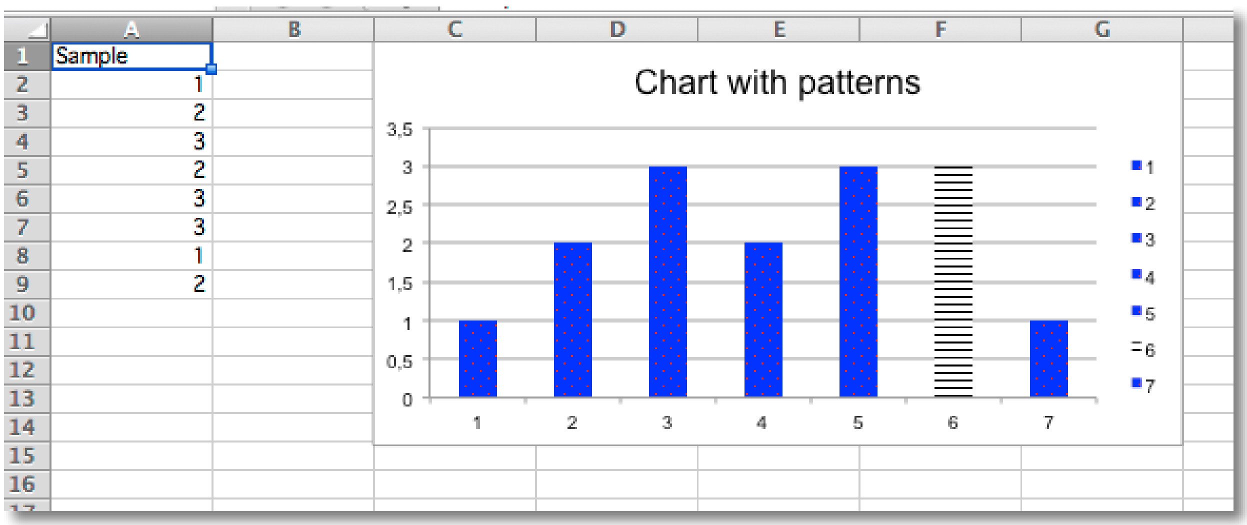


Styling charts

Adding Patterns

Whole data series and individual data points can be extensively styled through the *graphicalProperties*. Getting things just right may take some time.

```
from openpyxl import Workbook
from openpyxl.chart import BarChart, Reference
from openpyxl.chart.marker import DataPoint

from openpyxl.drawing.fill import PatternFillProperties, ColorChoice

wb = Workbook()
ws = wb.active

rows = [
    ("Sample",),
    (1,),
    (2,),
    (3,),
    (2,),
    (3,),
    (3,),
    (1,),
    (2,),
]

for r in rows:
    ws.append(r)


c = BarChart()
data = Reference(ws, min_col=1, min_row=1, max_row=8)
c.add_data(data, titles_from_data=True)
c.title = "Chart with patterns"

# set a pattern for the whole series
series = c.series[0]
fill =  PatternFillProperties(prst="pct5")
fill.foreground = ColorChoice(prstClr="red")
fill.background = ColorChoice(prstClr="blue")
series.graphicalProperties.pattFill = fill

# set a pattern for a 6th data point (0-indexed)
pt = DataPoint(idx=5)
pt.graphicalProperties.pattFill = PatternFillProperties(prst="ltHorz")
series.dPt.append(pt)

ws.add_chart(c, "C1")

wb.save("pattern.xlsx")
```



Advanced charts

Charts can be combined to create new charts:

Gauge Charts

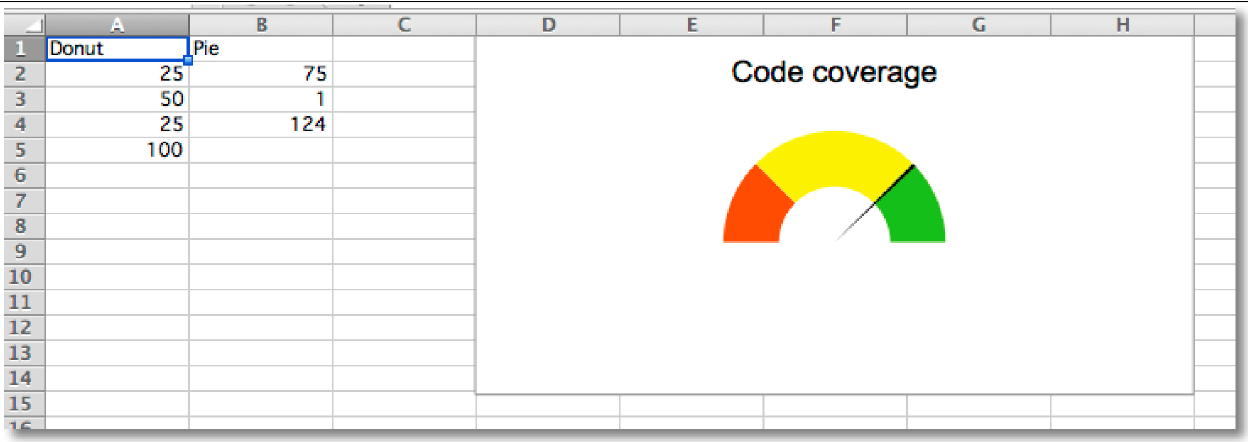
Gauge charts combine a pie chart and a doughnut chart to create a “gauge”. The first chart is a doughnut chart with four slices. The first three slices correspond to the colours of the gauge; the fourth slice, which is half of the doughnut, is made invisible.

A pie chart containing three slices is added. The first and third slice are invisible so that the second slice can act as the needle on the gauge.

The effects are done using the graphical properties of individual data points in a data series.

```
from openpyxl import Workbook

from openpyxl.chart import PieChart, DoughnutChart, Series, Reference
from openpyxl.chart.series import DataPoint


data = [
    ["Donut", "Pie"],
    [25, 75],
    [50, 1],
    [25, 124],
    [100],
]

# based on http://www.excel-easy.com/examples/gauge-chart.html

wb = Workbook()
ws = wb.active
for row in data:
    ws.append(row)

# First chart is a doughnut chart
c1 = DoughnutChart(firstSliceAng=270, holeSize=50)
```

```
c1.title = "Code coverage"
c1.legend = None

ref = Reference(ws, min_col=1, min_row=2, max_row=5)
s1 = Series(ref, title_from_data=False)

slices = [DataPoint(idx=i) for i in range(4)]
slices[0].graphicalProperties.solidFill = "FF3300" # red
slices[1].graphicalProperties.solidFill = "FCF305" # yellow
slices[2].graphicalProperties.solidFill = "1FB714" # green
slices[3].graphicalProperties.noFill = True # invisible

s1.data_points = slices
c1.series = [s1]

# Second chart is a pie chart
c2 = PieChart(firstSliceAng=270)
c2.legend = None

ref = Reference(ws, min_col=2, min_row=2, max_col=2, max_row=4)
s2 = Series(ref, title_from_data=False)

slices = [DataPoint(idx=i) for i in range(3)]
slices[0].graphicalProperties.noFill = True # invisible
slices[1].graphicalProperties.solidFill = "000000" # black needle
slices[2].graphicalProperties.noFill = True # invisible
s2.data_points = slices
c2.series = [s2]

c1 += c2 # combine charts

ws.add_chart(c1, "D1")

wb.save("gauge.xlsx")
```



	A	B
1	Donut	Pie
2	25	75
3	50	1
4	25	124
5	100	

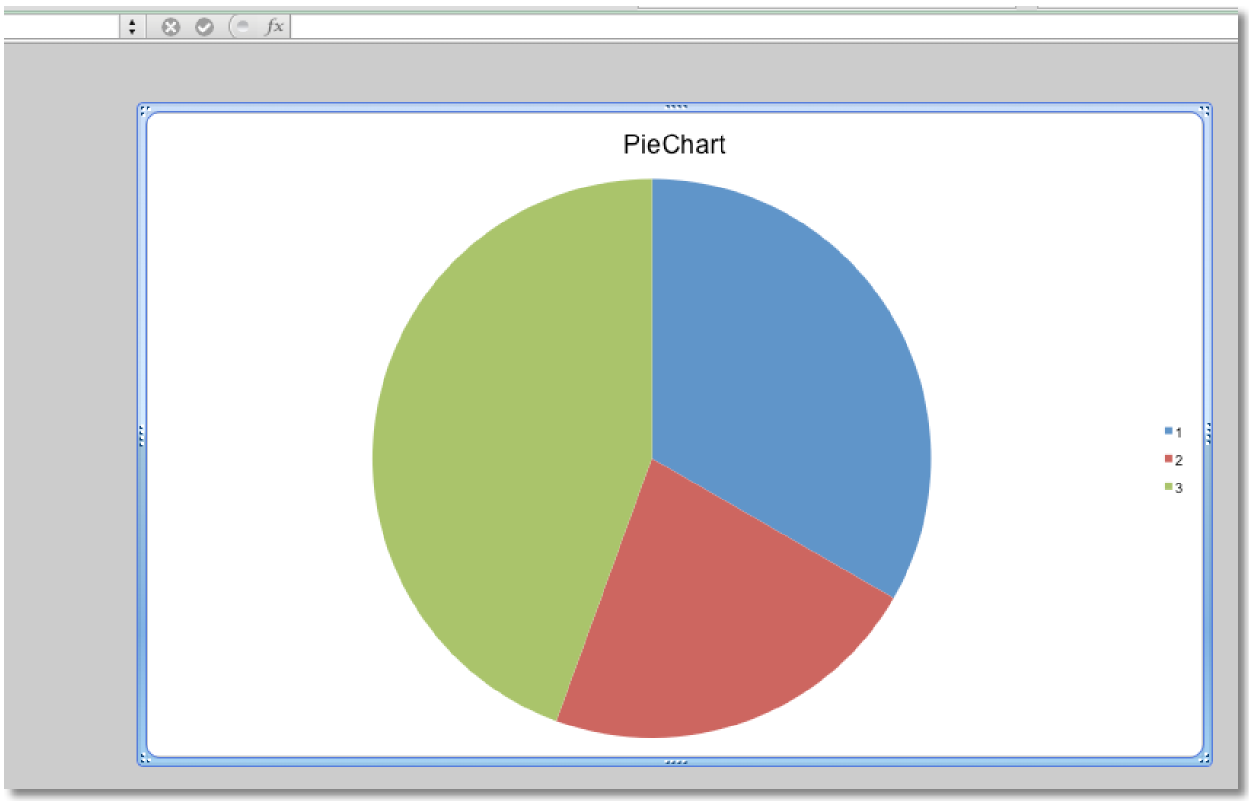
Using chartsheets

Charts can be added to special worksheets called chartsheets:

Chartsheets

Chartsheets are special worksheets which only contain charts. All the data for the chart must be on a different worksheet.

```python
from openpyxl import Workbook

from openpyxl.chart import PieChart, Reference, Series

wb = Workbook()
ws = wb.active
cs = wb.create_chartsheet()

rows = [
    ["Bob", 3],
    ["Harry", 2],
    ["James", 4],
]

for row in rows:
    ws.append(row)


chart = PieChart()
labels = Reference(ws, min_col=1, min_row=1, max_row=3)
data = Reference(ws, min_col=2, min_row=1, max_row=3)
chart.series = (Series(data),)
chart.title = "PieChart"

cs.add_chart(chart)

wb.save("demo.xlsx")
```



7.4 Comments

7.4.1 Comments

> **Warning:** Openpyxl currently supports the reading and writing of comment text only. Formatting information is lost. Comments are not currently supported if *use_iterators=True* is used.

Adding a comment to a cell

Comments have a text attribute and an author attribute, which must both be set

```
>>> from openpyxl import Workbook
>>> from openpyxl.comments import Comment
>>> wb = Workbook()
>>> ws = wb.active
>>> comment = ws["A1"].comment
>>> comment = Comment('This is the comment text', 'Comment Author')
>>> comment.text
'This is the comment text'
>>> comment.author
'Comment Author'
```

You cannot assign the same Comment object to two different cells. Doing so raises an AttributeError.

```
>>> from openpyxl import Workbook
>>> from openpyxl.comments import Comment
>>> wb=Workbook()
>>> ws=wb.active
>>> comment = Comment("Text", "Author")
>>> ws["A1"].comment = comment
>>> ws["B2"].comment = comment
Traceback (most recent call last):
AttributeError: Comment already assigned to A1 in worksheet Sheet. Cannot
assign a comment to more than one cell
```

Loading and saving comments

Comments present in a workbook when loaded are stored in the comment attribute of their respective cells automatically. Formatting information such as font size, bold and italics are lost, as are the original dimensions and position of the comment's container box.

Comments remaining in a workbook when it is saved are automatically saved to the workbook file.

7.5 Read/write large files

7.5.1 Read-only mode

Sometimes, you will need to open or write extremely large XLSX files, and the common routines in openpyxl won't be able to handle that load. Fortunately, there are two modes that enable you to read and write unlimited amounts of data with (near) constant memory consumption.

Introducing *openpyxl.worksheet.read_only.ReadOnlyWorksheet*:

```
from openpyxl import load_workbook
wb = load_workbook(filename='large_file.xlsx', read_only=True)
ws = wb['big_data'] # ws is now an IterableWorksheet

for row in ws.rows:
    for cell in row:
        print(cell.value)
```

Warning:
- *openpyxl.worksheet.read_only.ReadOnlyWorksheet* is read-only

Cells returned are not regular *openpyxl.cell.cell.Cell* but *openpyxl.cell.read_only.ReadOnlyCell*.

7.5.2 Write-only mode

Here again, the regular *openpyxl.worksheet.worksheet.Worksheet* has been replaced by a faster alternative, the *openpyxl.writer.write_only.WriteOnlyWorksheet*. When you want to dump large amounts of data, you might find optimized writer helpful.

```
>>> from openpyxl import Workbook
>>> wb = Workbook(write_only=True)
>>> ws = wb.create_sheet()
>>>
```

```
>>> # now we'll fill it with 100 rows x 200 columns
>>>
>>> for irow in range(100):
...     ws.append(['%d' % i for i in range(200)])
>>> # save the file
>>> wb.save('new_big_file.xlsx')
```

If you want to have cells with styles or comments then use a `openpyxl.writer.write_only.WriteOnlyCell()`

```
>>> from openpyxl import Workbook
>>> wb = Workbook(write_only=True)
>>> ws = wb.create_sheet()
>>> from openpyxl.writer.write_only import WriteOnlyCell
>>> from openpyxl.comments import Comment
>>> from openpyxl.styles import Style, Font
>>> cell = WriteOnlyCell(ws, value="hello world")
>>> cell.font = Font(name='Courrier', size=36)
>>> cell.comment = Comment(text="A comment", author="Author's Name")
```

This will append one new row with 3 cells, one text cell with custom font and font size, a float and an empty cell that will be discarded anyway.

Warning:

- Those worksheet only have an append() method, it's not possible to access independent cells directly (through cell() or range()). They are write-only.
- It is able to export unlimited amount of data (even more than Excel can handle actually), while keeping memory usage under 10Mb.
- A workbook using the optimized writer can only be saved once. After that, every attempt to save the workbook or append() to an existing worksheet will raise an `openpyxl.utils.exceptions.WorkbookAlreadySaved` exception.

7.6 Working with styles

7.6.1 Working with styles

Introduction

Styles are used to change the look of your data while displayed on screen. They are also used to determine the number format being used for a given cell or range of cells.

Styles can be applied to the following aspects:

- font to set font size, color, underlining, etc.
- fill to set a pattern or color gradient
- border to set borders on a cell
- cell alignment
- protection

The following are the default values

```
>>> from openpyxl.styles import PatternFill, Border, Side, Alignment, Protection, Font
>>> font = Font(name='Calibri',
...                     size=11,
...                     bold=False,
...                     italic=False,
...                     vertAlign=None,
...                     underline='none',
...                     strike=False,
...                     color='FF000000')
>>> fill = PatternFill(fill_type=None,
...                     start_color='FFFFFFFF',
...                     end_color='FF000000')
>>> border = Border(left=Side(border_style=None,
...                               color='FF000000'),
...                     right=Side(border_style=None,
...                                color='FF000000'),
...                     top=Side(border_style=None,
...                              color='FF000000'),
...                     bottom=Side(border_style=None,
...                                 color='FF000000'),
...                     diagonal=Side(border_style=None,
...                                   color='FF000000'),
...                     diagonal_direction=0,
...                     outline=Side(border_style=None,
...                                  color='FF000000'),
...                     vertical=Side(border_style=None,
...                                   color='FF000000'),
...                     horizontal=Side(border_style=None,
...                                    color='FF000000')
...                    )
>>> alignment=Alignment(horizontal='general',
...                         vertical='bottom',
...                         text_rotation=0,
...                         wrap_text=False,
...                         shrink_to_fit=False,
...                         indent=0)
>>> number_format = 'General'
>>> protection = Protection(locked=True,
...                             hidden=False)
>>>
```

Styles are shared between objects and once they have been assigned they cannot be changed. This stops unwanted side-effects such as changing the style for lots of cells when instead of only one.

```
>>> from openpyxl.styles import colors
>>> from openpyxl.styles import Font, Color
>>> from openpyxl.styles import colors
>>> from openpyxl import Workbook
>>> wb = Workbook()
>>> ws = wb.active
>>>
>>> a1 = ws['A1']
>>> d4 = ws['D4']
>>> ft = Font(color=colors.RED)
>>> a1.font = ft
>>> d4.font = ft
>>>
>>> a1.font.italic = True # is not allowed
>>>
>>> # If you want to change the color of a Font, you need to reassign it::
```

```
>>>
>>> a1.font = Font(color=colors.RED, italic=True) # the change only affects A1
```

Copying styles

Styles can also be copied

```
>>> from openpyxl.styles import Font
>>>
>>> ft1 = Font(name='Arial', size=14)
>>> ft2 = ft1.copy(name="Tahoma")
>>> ft1.name
'Arial'
>>> ft2.name
'Tahoma'
>>> ft2.size # copied from the
14.0
```

Basic Font Colors

Colors are usually RGB or aRGB hexvalues. The *colors* module contains some constants

```
>>> from openpyxl.styles import Font
>>> from openpyxl.styles.colors import RED
>>> font = Font(color=RED)
>>> font = Font(color="FFBB00")
```

There is also support for legacy indexed colors as well as themes and tints

```
>>> from openpyxl.styles.colors import Color
>>> c = Color(indexed=32)
>>> c = Color(theme=6, tint=0.5)
```

Applying Styles

Styles are applied directly to cells

```
>>> from openpyxl.workbook import Workbook
>>> from openpyxl.styles import Font, Fill
>>> wb = Workbook()
>>> ws = wb.active
>>> c = ws['A1']
>>> c.font = Font(size=12)
```

Styles can also applied to columns and rows but note that this applies only to cells created (in Excel) after the file is closed. If you want to apply styles to entire rows and columns then you must apply the style to each cell yourself. This is a restriction of the file format:

```
>>> col = ws.column_dimensions['A']
>>> col.font = Font(bold=True)
>>> row = ws.row_dimensions[1]
>>> row.font = Font(underline="single")
```

Edit Page Setup

```
>>> from openpyxl.workbook import Workbook
>>>
>>> wb = Workbook()
>>> ws = wb.active
>>>
>>> ws.page_setup.orientation = ws.ORIENTATION_LANDSCAPE
>>> ws.page_setup.paperSize = ws.PAPERSIZE_TABLOID
>>> ws.page_setup.fitToHeight = 0
>>> ws.page_setup.fitToWidth = 1
```

Edit Print Options

```
>>> from openpyxl.workbook import Workbook
>>>
>>> wb = Workbook()
>>> ws = wb.active
>>>
>>> ws.print_options.horizontalCentered = True
>>> ws.print_options.verticalCentered = True
```

Header / Footer

Headers and footers use their own formatting language. This is fully supported when writing them but, due to the complexity and the possibility of nesting, only partially when reading them.

```
>>> from openpyxl.workbook import Workbook
>>>
>>> wb = Workbook()
>>> ws = wb.worksheets[0]
>>>
>>> ws.header_footer.center_header.text = 'My Excel Page'
>>> ws.header_footer.center_header.font_size = 14
>>> ws.header_footer.center_header.font_name = "Tahoma,Bold"
>>> ws.header_footer.center_header.font_color = "CC3366"
```

# Or just >>> ws.header_footer.right_footer.text = 'My Right Footer'

Worksheet Additional Properties

These are advanced properties for particular behaviours, the most used ones are the "fitTopage" page setup property and the tabColor that define the background color of the worksheet tab.

Available properties for worksheet: "codeName", "enableFormatConditionsCalculation", "filterMode", "published", "syncHorizontal", "syncRef", "syncVertical", "transitionEvaluation", "transitionEntry", "tabColor". Available fields for page setup properties: "autoPageBreaks", "fitToPage". Available fields for outline properties: "applyStyles", "summaryBelow", "summaryRight", "showOutlineSymbols".

see http://msdn.microsoft.com/en-us/library/documentformat.openxml.spreadsheet.sheetproperties%28v=office.14%29.aspx_ for details.

..note:: By default, outline properties are intitialized so you can directly modify each of their 4 attributes, while page setup properties don't. If you want modify the latter, you should first initialize a PageSetupPr object with the required parameters. Once done, they can be directly modified by the routine later if needed.

```
>>> from openpyxl.workbook import Workbook
>>> from openpyxl.worksheet.properties import WorksheetProperties, PageSetupProperties
>>>
>>> wb = Workbook()
>>> ws = wb.active
>>>
>>> wsprops = ws.sheet_properties
>>> wsprops.tabColor = "1072BA"
>>> wsprops.filterMode = False
>>> wsprops.PageSetupProperties = PageSetupProperties(fitToPage=True, autoPageBreaks=False)
>>> wsprops.outlinePr.summaryBelow = False
>>> wsprops.outlinePr.applyStyles = True
>>> wsprops.PageSetupProperties.autoPageBreaks = True
```

7.7 Conditional Formatting

7.7.1 Conditional Formatting

Excel supports three different types of conditional formatting: builtins, standard and custom. Builtins combine specific rules with predefined styles. Standard conditional formats combine specific rules with custom formatting. In additional it is possible to define custom formulae for applying custom formats using differential styles.

Note: The syntax for the different rules varies so much that it is not possible for openpyxl to know whether a rule makes sense or not.

The basic syntax for creating a formatting rule is:

```
>>> from openpyxl.formatting import Rule
>>> from openpyxl.styles import Font, PatternFill, Border
>>> from openpyxl.styles.differential import DifferentialStyle
>>> dxf = DifferentialStyle(font=Font(bold=True), fill=PatternFill(start_color='FFEE1111', end_color=
>>> rule = Rule(type='cellIs', dxf=dxf, formula=["10"])
```

Because the signatures for some rules can be quite verbose there are also some convenience factories for creating them.

Builtin formats

The builtins conditional formats are:

- ColorScale
- IconSet
- DataBar

Builtin formats contain a sequence of formatting settings which combine a type with an integer for comparison. Possible types are: *'num'*, *'percent'*, *'max'*, *'min'*, *'formula'*, *'percentile'*.

ColorScale

You can have color scales with 2 or 3 colors. 2 color scales produce a gradient from one color to another; 3 color scales use an additional color for 2 gradients.

The full syntax for creating a ColorScale rule is:

```
>>> from openpyxl.formatting.rule import ColorScale, FormatObject
>>> from openpyxl.styles import Color
>>> first = FormatObject(type='min')
>>> last = FormatObject(type='max')
>>> # colors match the format objects:
>>> colors = [Color('FFAA0000'), Color('FF00AA00')]
>>> cs2 = ColorScale(cfvo=[first, last], color=colors)
>>> # a three color scale would extend the sequences
>>> mid = FormatObject(type='num', val=40)
>>> colors.insert(1, Color('FF00AA00'))
>>> cs3 = ColorScale(cfvo=[first, mid, last], color=colors)
>>> # create a rule with the color scale
>>> from openpyxl.formatting.rule import Rule
>>> rule = Rule(type='colorScale', colorScale=cs3)
```

There is a convenience function for creating ColorScale rules

```
>>> from openpyxl.formatting.rule import ColorScaleRule
>>> rule = ColorScaleRule(start_type='percentile', start_value=10, start_color='FFAA0000',
...                       mid_type='percentile', mid_value=50, mid_color='FF0000AA',
...                       end_type='percentile', end_value=90, end_color='FF00AA00')
```

IconSet

Choose from the following set of icons: *'3Arrows'*, *'3ArrowsGray'*, *'3Flags'*, *'3TrafficLights1'*, *'3TrafficLights2'*, *'3Signs'*, *'3Symbols'*, *'3Symbols2'*, *'4Arrows'*, *'4ArrowsGray'*, *'4RedToBlack'*, *'4Rating'*, *'4TrafficLights'*, *'5Arrows'*, *'5ArrowsGray'*, *'5Rating'*, *'5Quarters'*

The full syntax for creating an IconSet rule is:

```
>>> from openpyxl.formatting.rule import IconSet, FormatObject
>>> first = FormatObject(type='percent', val=0)
>>> second = FormatObject(type='percent', val=33)
>>> third = FormatObject(type='percent', val=67)
>>> iconset = IconSet(iconSet='3TrafficLights1', cfvo=[first, second, third], showValue=None, percent
>>> # assign the icon set to a rule
>>> from openpyxl.formatting.rule import Rule
>>> rule = Rule(type='iconSet', iconSet=iconset)
```

There is a convenience function for creating IconSet rules:

```
>>> from openpyxl.formatting.rule import IconSetRule
>>> rule = IconSetRule('5Arrows', 'percent', [10, 20, 30, 40, 50], showValue=None, percent=None, reve
```

DataBar

Currently, openpyxl supports the DataBars as defined in the original specification. Borders and directions were added in a later extension.

The full syntax for creating a DataBar rule is:

```
>>> from openpyxl.formatting.rule import DataBar, FormatObject
>>> first = FormatObject(type='min')
>>> second = FormatObject(type='max')
>>> data_bar = DataBar(cfvo=[first, second], color="FF638EC6", showValue=None, minLength=None, maxLen
>>> # assign the data bar to a rule
>>> from openpyxl.formatting.rule import Rule
>>> rule = Rule(type='dataBar', dataBar=data_bar)
```

There is a convenience function for creating DataBar rules:

```
>>> from openpyxl.formatting.rule import DataBarRule
>>> rule = DataBarRule(start_type='percentile', start_value=10, end_type='percentile', end_value='90
...                    color="FF638EC6", showValue="None", minLength=None, maxLength=None)
```

Standard conditional formats

The standard conditional formats are:

- Average
- Percent
- Unique or duplicate
- Value
- Rank

```
>>> from openpyxl import Workbook
>>> from openpyxl.styles import Color, PatternFill, Font, Border
>>> from openpyxl.formatting.rule import ColorScaleRule, CellIsRule, FormulaRule
>>>
>>> wb = Workbook()
>>> ws = wb.active
>>>
>>> # Create fill
>>> redFill = PatternFill(start_color='FFEE1111',
...                end_color='FFEE1111',
...                fill_type='solid')
>>>
>>> # Add a two-color scale
>>> # add2ColorScale(range_string, start_type, start_value, start_color, end_type, end_value, end_co
>>> # Takes colors in excel 'FFRRGGBB' style.
>>> ws.conditional_formatting.add('A1:A10',
...             ColorScaleRule(start_type='min', start_color='FFAA0000',
...                           end_type='max', end_color='FF00AA00')
...                           )
>>>
>>> # Add a three-color scale
>>> ws.conditional_formatting.add('B1:B10',
...                ColorScaleRule(start_type='percentile', start_value=10, start_color='FFAA0000',
...                            mid_type='percentile', mid_value=50, mid_color='FF0000AA',
...                            end_type='percentile', end_value=90, end_color='FF00AA00')
...                              )
>>>
>>> # Add a conditional formatting based on a cell comparison
>>> # addCellIs(range_string, operator, formula, stopIfTrue, wb, font, border, fill)
>>> # Format if cell is less than 'formula'
>>> ws.conditional_formatting.add('C2:C10',
...             CellIsRule(operator='lessThan', formula=['C$1'], stopIfTrue=True, fill=redFill))
>>>
>>> # Format if cell is between 'formula'
>>> ws.conditional_formatting.add('D2:D10',
...             CellIsRule(operator='between', formula=['1','5'], stopIfTrue=True, fill=redFill))
```

```
>>>
>>> # Format using a formula
>>> ws.conditional_formatting.add('E1:E10',
...             FormulaRule(formula=['ISBLANK(E1)'], stopIfTrue=True, fill=redFill))
>>>
>>> # Aside from the 2-color and 3-color scales, format rules take fonts, borders and fills for styl
>>> myFont = Font()
>>> myBorder = Border()
>>> ws.conditional_formatting.add('E1:E10',
...             FormulaRule(formula=['E1=0'], font=myFont, border=myBorder, fill=redFill))
>>>
>>> wb.save("test.xlsx")
```

7.8 Data Validation

7.8.1 Validating cells

You can add data validation to a workbook but currently cannot read existing data validation.

Examples

```
>>> from openpyxl import Workbook
>>> from openpyxl.worksheet.datavalidation import DataValidation
>>>
>>> # Create the workbook and worksheet we'll be working with
>>> wb = Workbook()
>>> ws = wb.active
>>>
>>> # Create a data-validation object with list validation
>>> dv = DataValidation(type="list", formula1='"Dog,Cat,Bat"', allow_blank=True)
>>>
>>> # Optionally set a custom error message
>>> dv.error ='Your entry is not in the list'
>>> dv.errorTitle = 'Invalid Entry'
>>>
>>> # Optionally set a custom prompt message
>>> dv.prompt = 'Please select from the list'
>>> dv.promptTitle = 'List Selection'
>>>
>>> # Add the data-validation object to the worksheet
>>> ws.add_data_validation(dv)
```

```
>>> # Create some cells, and add them to the data-validation object
>>> c1 = ws["A1"]
>>> c1.value = "Dog"
>>> dv.add(c1)
>>> c2 = ws["A2"]
>>> c2.value = "An invalid value"
>>> dv.add(c2)
>>>
>>> # Or, apply the validation to a range of cells
>>> dv.ranges.append('B1:B1048576')
>>>
>>> # Write the sheet out.  If you now open the sheet in Excel, you'll find that
>>> # the cells have data-validation applied.
>>> wb.save("test.xlsx")
```

Other validation examples

Any whole number:

```
dv = DataValidation(type="whole")
```

Any whole number above 100:

```
dv = DataValidation(type="whole",
                    operator="greaterThan",
                    formula1=100)
```

Any decimal number:

```
dv = DataValidation(type="decimal")
```

Any decimal number between 0 and 1:

```
dv = DataValidation(type="decimal",
                    operator="between",
                    formula1=0,
                    formula2=1)
```

Any date:

```
dv = DataValidation(type="date")
```

or time:

```
dv = DataValidation(type="time")
```

Any string at most 15 characters:

```
dv = DataValidation(type="textLength",
                    operator="lessThanOrEqual"),
                    formula1=15)
```

Custom rule:

```
dv = DataValidation(type="custom",
                    formula1"=SOMEFORMULA")
```

Note: See http://www.contextures.com/xlDataVal07.html for custom rules

7.9 Parsing Formulas

7.9.1 Parsing Formulas

openpyxl supports limited parsing of formulas embedded in cells. The *openpyxl.formula* package contains a *Tokenizer* class to break formulas into their consitutuent tokens. Usage is as follows:

```
>>> from openpyxl.formula import Tokenizer
>>> tok = Tokenizer("""=IF($A$1,"then True",MAX(DEFAULT_VAL,'Sheet 2'!B1))""")
>>> tok.parse()
>>> print("\n".join("%12s%11s%9s" % (t.value, t.type, t.subtype) for t in tok.items))
         IF(       FUNC     OPEN
        $A$1    OPERAND    RANGE
           ,        SEP      ARG
 "then True"    OPERAND     TEXT
           ,        SEP      ARG
        MAX(       FUNC     OPEN
 DEFAULT_VAL    OPERAND    RANGE
           ,        SEP      ARG
'Sheet 2'!B1    OPERAND    RANGE
           )       FUNC    CLOSE
           )       FUNC    CLOSE
```

As shown above, tokens have three attributes of interest:

- `.value`: The substring of the formula that produced this token
- `.type`: The type of token this represents. Can be one of
  - `Token.LITERAL`: If the cell does not contain a formula, its value is represented by a single `LITERAL` token.
  - `Token.OPERAND`: A generic term for any value in the Excel formula. (See `.subtype` below for more details).
  - `Token.FUNC`: Function calls are broken up into tokens for the opener (e.g., `SUM(`), followed by the arguments, followed by the closer (i.e., `)`). The function name and opening parenthesis together form one `FUNC` token, and the matching parenthesis forms another `FUNC` token.
  - `Token.ARRAY`: Array literals (enclosed between curly braces) get two `ARRAY` tokens each, one for the opening `{` and one for the closing `}`.
  - `Token.PAREN`: When used for grouping subexpressions (and not to denote function calls), parentheses are tokenized as `PAREN` tokens (one per character).
  - `Token.SEP`: These tokens are created from either commas (`,`) or semicolons (`;`). Commas create `SEP` tokens when they are used to separate function arguments (e.g., `SUM(a,b)`) or when they are used to separate array elements (e.g., `{a,b}`). (They have another use as an infix operator for joining ranges). Semicolons are always used to separate rows in an array literal, so always create `SEP` tokens.
  - `Token.OP_PRE`: Designates a prefix unary operator. Its value is always `+` or `-`
  - `Token.OP_IN`: Designates an infix binary operator. Possible values are `>=`, `<=`, `<>`, `=`, `>`, `<`, `*`, `/`, `+`, `-`, `^`, or `&`.
  - `Token.OP_POST`: Designates a postfix unary operator. Its value is always `%`.
  - `Token.WSPACE`: Created for any whitespace encountered. Its value is always a single space, regardless of how much whitespace is found.
- `.subtype`: Some of the token types above use the subtype to provide additional information about the token. Possible subtypes are:
  - `Token.TEXT`, `Token.NUMBER`, `Token.LOGICAL`, `Token.ERROR`, `Token.RANGE`: these subtypes describe the various forms of `OPERAND` found in formulae. `LOGICAL` is either `TRUE` or `FALSE`, `RANGE` is either a named range or a direct reference to another range. `TEXT`, `NUMBER`, and `ERROR` all refer to literal values in the formula

- `Token.OPEN` and `Token.CLOSE`: these two subtypes are used by `PAREN`, `FUNC`, and `ARRAY`, to describe whether the token is opening a new subexpression or closing it.
- `Token.ARG` and `Token.ROW`: are used by the `SEP` tokens, to distinguish between the comma and semicolon. Commas produce tokens of subtype `ARG` whereas semicolons produce tokens of subtype `ROW`

CHAPTER 8

Information for Developers

8.1 Development

With the ongoing development of openpyxl, there is occasional information useful to assist developers.

8.1.1 What is suppoprted

The primary aim of openpyxl is to support reading and writing Microsoft Excel 2010 files. Where possible support for files generated by other libraries or programs is available but this is not guaranteed.

8.1.2 Supporting different Python versions

We have a small library of utility functions to support development for Python 2 and 3. This is openpyxl.compat for Python and openpyxl.xml for XML functions.

8.1.3 Coding style

Use PEP-8 except when implementing attributes for roundtripping but always use Python data conventions (boolean, None, etc.) Note exceptions in docstrings.

8.1.4 Getting the source

The source code is hosted on bitbucket.org. You can get it using a Mercurial client and the following URL.

```
$ hg clone https://bitbucket.org/openpyxl/openpyxl
$ hg up 2.4
$ virtualenv openpyxl
$ cd openpyxl
$ source bin/activate
$ pip install -U -r requirements.txt
$ python setup.py develop
```

8.1.5 Testing

Contributions without tests will **not** be accepted.

We use pytest as the test runner with pytest-cov for coverage information and pytest-flakes for static code analysis.

Coverage

The goal is 100 % coverage for unit tests - data types and utility functions. Coverage information can be obtained using

```
py.test --cov openpyxl
```

Organisation

Tests should be preferably at package / module level e.g openpyxl/cell. This makes testing and getting statistics for code under development easier:

```
py.test --cov openpyxl/cell openpyxl/cell
```

Checking XML

Use the `openpyxl.tests.helper.compare_xml` function to compare generated and expected fragments of XML.

Schema validation

When working on code to generate XML it is possible to validate that the generated XML conforms to the published specification. Note, this won't necessarily guarantee that everything is fine but is preferable to reverse engineering!

Microsoft Tools

Along with the SDK, Microsoft also has a "Productivity Tool" for working with Office OpenXML.

This allows you to quickly inspect or compare whole Excel files. Unfortunately, validation errors contain many false positives.

Please see Testing on Windows for additional information on setting up and testing on Windows.

8.1.6 Contributing

Contributions in the form of pull requests are always welcome. Don't forget to add yourself to the list of authors!

8.1.7 Branch naming convention

We use a "major.minor.patch" numbering system, ie. 2.4.0. Development branches are named after "major.minor" releases. In general, API change will only happen major releases but there will be exceptions. Always communicate API changes to the mailing list before making them. If you are changing an API try and an implement a fallback (with deprecation warning) for the old behaviour.

The "default branch" is used for releases and always has changes from a development branch merged in. It should never be the target for a pull request.

8.1.8 Pull Requests

Pull requests should be submitted to the current, unreleased development branch. Eg. if the current release is 2.4.0, pull requests should be made to the 2.4 branch. Exceptions are bug fixes to released versions which should be made to the relevant release branch and merged upstream into development.

Please use tox to test code for different submissions **before** making a pull request. This is especially important for picking up problems across Python versions.

Documentation

Remember to update the documentation when adding or changing features. Check that documentation is syntactically correct.

```
tox -e doc
```

8.1.9 Benchmarking

Benchmarking and profiling are ongoing tasks. Contributions to these are very welcome as we know there is a lot to do.

Memory Use

There is a tox profile for long-running memory benchmarks using the *memory_utils* package.

```
tox -e memory
```

Pympler

As openpyxl does not include any internal memory benchmarking tools, the python *pympler* package was used during the testing of styles to profile the memory usage in `openpyxl.reader.excel.read_style_table()`:

```
# in openpyxl/reader/style.py
from pympler import muppy, summary

def read_style_table(xml_source):
  ...
  if cell_xfs is not None:  # ~ line 47
      initialState = summary.summarize(muppy.get_objects())  # Capture the initial state
      for index, cell_xfs_node in enumerate(cell_xfs_nodes):
         ...
         table[index] = new_style
      finalState = summary.summarize(muppy.get_objects())  # Capture the final state
      diff = summary.get_diff(initialState, finalState)  # Compare
      summary.print_(diff)
```

`pympler.summary.print_()` prints to the console a report of object memory usage, allowing the comparison of different methods and examination of memory usage. A useful future development would be to construct a benchmarking package to measure the performance of different components.

8.2 Testing on Windows

Although openpyxl itself is pure Python and should run on any Python, we do use some libraries that require compiling for tests and documentation. The setup for testing on Windows is somewhat different.

8.2.1 Getting started

Once you have installed the versions of Python (2.6, 2.7, 3.3, 3.4) you should setup a development environment for testing so that you do not adversely affect the system install.

8.2.2 Setting up a development environment

First of all you should checkout a copy of the repository. Atlassian provides a nice GUI client SourceTree that allows you to do this with a single-click from the browser.

By default the repository will be installed under your user folder. eg. c:UsersYOURUSERopenpyxl

Switch to the branch you want to work on by double-clicking it. The default branch should never be used for development work.

Creating a virtual environment

You will need to manually install virtualenv. This is best done by first installing pip. open a command line and download the script "get_pip.py" to your preferred Python folder:

```
bitsadmin /transfer pip http://bootstrap.pypa.io/get-pip.py c:\python27\get-pip.py # change the path
```

Install pip (it needs to be at least pip 6.0):

```
python get_pip.py
```

Now you can install virtualenv:

```
Scripts\pip install virtualenv
Scripts\virtualenv c:\Users\YOURUSER\openpyxl
```

8.2.3 lxml

openpyxl needs *lxml* in order to run the tests. Unfortunately, automatic installation of lxml on Windows is tricky as pip defaults to try and compile it. This can be avoided by using pre-compiled versions of the library.

1. In the command line switch to your repository folder:

```
cd c:\Users\YOURUSER\openpyxl
```

2. Activate the virtualenv:

```
Scripts\activate
```

3. Install a development version of openpyxl:

```
python setup.py develop
```

4. Download all the relevant lxml Windows wheels

5. Move all these files to a folder called "downloads" in your openpyxl checkout
6. Install the project requirements:

```
    pip install --download downloads -r requirements.txt
    pip install --no-index --find-links downloads -r requirements.txt
```

To run tests for the virtualenv:

```
py.test -xrf openpyxl # the flag will stop testing at the first error
```

8.2.4 tox

We use *tox* to run the tests on different Python versions and configurations. Using it is as simple as:

```
set PIP_FIND_LINKS=downloads
tox openpyxl
```

CHAPTER 9

API Documentation

9.1 openpyxl package

9.1.1 Subpackages

openpyxl.cell package

Submodules

openpyxl.cell.cell module

class `openpyxl.cell.cell.`**`Cell`**(*worksheet*, *column=None*, *row=None*, *value=None*, *col_idx=None*, *style_array=None*)

Bases: `openpyxl.styles.styleable.StyleableObject`

Describes cell associated properties.

Properties of interest include style, type, value, and address.

`ERROR_CODES` = **(‘#NULL!’, ‘#DIV/0!’, ‘#VALUE!’, ‘#REF!’, ‘#NAME?’, ‘#NUM!’, ‘#N/A’)**

`TYPE_BOOL` = **‘b’**

`TYPE_ERROR` = **‘e’**

`TYPE_FORMULA` = **‘f’**

`TYPE_FORMULA_CACHE_STRING` = **‘str’**

`TYPE_INLINE` = **‘inlineStr’**

`TYPE_NULL` = **‘n’**

`TYPE_NUMERIC` = **‘n’**

`TYPE_STRING` = **‘s’**

`VALID_TYPES` = **(‘s’, ‘f’, ‘n’, ‘b’, ‘n’, ‘inlineStr’, ‘e’, ‘str’)**

`anchor`

returns the expected position of a cell in pixels from the top-left of the sheet. For example, A1 anchor should be (0,0).

Return type tuple(int, int)

`base_date`

check_error(*value*)
: Tries to convert Error" else N/A

check_string(*value*)
: Check string coding, length, and line break character

col_idx

column

comment
: Returns the comment associated with this cell

    Return type `openpyxl.comments.Comment`

coordinate

data_type

encoding

guess_types

hyperlink
: Return the hyperlink target or an empty string

internal_value
: Always returns the value for excel.

is_date
: Whether the value is formatted as a date

    Return type bool

offset(*row=0*, *column=0*)
: Returns a cell location relative to this cell.

    Parameters

    - **row** (*int*) – number of rows to offset
    - **column** (*int*) – number of columns to offset

    Return type `openpyxl.cell.Cell`

parent

row

set_explicit_value(*value=None*, *data_type='s'*)
: Coerce values according to their explicit type

value
: Get or set the value held in the cell. ':rtype: depends on the value (string, float, int or ' '`datetime.datetime`)'

openpyxl.cell.interface module

class `openpyxl.cell.interface.`**AbstractCell**(*value=None*)
: Bases: `abc.ABC`

base_date

comment

coordinate

encoding

guess_types

internal_value

is_date

number_format

offset (*row=0*, *column=0*)

style

value

openpyxl.cell.read_only module

class openpyxl.cell.read_only.**ReadOnlyCell** (*sheet*, *row*, *column*, *value*, *data_type='n'*, *style_id=0*)

Bases: object

alignment

base_date

border

column

coordinate

data_type

fill

font

internal_value

is_date

number_format

parent

protection

row

shared_strings

style

style_array

value

openpyxl.cell.text module

class openpyxl.cell.text.**InlineFont** (*rFont=None*, *charset=None*, *family=None*, *b=None*, *i=None*, *strike=None*, *outline=None*, *shadow=None*, *condense=None*, *extend=None*, *color=None*, *sz=None*, *u=None*, *vertAlign=None*, *scheme=None*)

Bases: *openpyxl.styles.fonts.Font*

Font for inline text because, yes what you need are different objects with the same elements but different constraints.

b
Values must be of type <class 'bool'>

charset
Values must be of type <class 'int'>

color
Values must be of type <class 'openpyxl.styles.colors.Color'>

condense
Values must be of type <class 'bool'>

extend
Values must be of type <class 'bool'>

family
Values must be of type <class 'float'>

i
Values must be of type <class 'bool'>

outline
Values must be of type <class 'bool'>

rFont
Values must be of type <class 'str'>

scheme
Value must be one of {'minor', 'major'}

shadow
Values must be of type <class 'bool'>

strike
Values must be of type <class 'bool'>

sz
Values must be of type <class 'float'>

tagname = 'RPrElt'

u
Value must be one of {'single', 'doubleAccounting', 'double', 'singleAccounting'}

vertAlign
Value must be one of {'superscript', 'subscript', 'baseline'}

class `openpyxl.cell.text.`**`PhoneticProperties`**(*fontId=None*, *type=None*, *alignment=None*)
Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

alignment
Value must be one of {'noControl', 'center', 'distributed', 'left'}

fontId
Values must be of type <class 'int'>

type
Value must be one of {'halfwidthKatakana', 'noConversion', 'fullwidthKatakana', 'Hiragana'}

class `openpyxl.cell.text.`**`PhoneticText`**(*sb=None*, *eb=None*, *t=None*)
Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

eb
Values must be of type <class 'int'>

sb
Values must be of type <class 'int'>

t
Values must be of type Values must be of type <class 'str'>

class `openpyxl.cell.text.`**`RichText`** (*rPr=None*, *t=None*)
Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

rPr
Values must be of type <class 'openpyxl.cell.text.InlineFont'>

t
Values must be of type <class 'str'>

tagname = 'RElt'

class `openpyxl.cell.text.`**`Text`** (*t=None*, *r=()*, *rPh=()*, *phoneticPr=None*)
Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

content
Text stripped of all formatting

phoneticPr
Values must be of type <class 'openpyxl.cell.text.PhoneticProperties'>

r
A sequence (list or tuple) that may only contain objects of the declared type

rPh
A sequence (list or tuple) that may only contain objects of the declared type

t
Values must be of type <class 'str'>

tagname = 'text'

openpyxl.chart package

Submodules

openpyxl.chart.area_chart module

class `openpyxl.chart.area_chart.`**`AreaChart`** (*axId=None*, *extLst=None*, ***kw*)
Bases: `openpyxl.chart.area_chart._AreaChartBase`

dLbls
Values must be of type <class 'openpyxl.chart.label.DataLabelList'>

dropLines
Values must be of type <class 'openpyxl.chart.axis.ChartLines'>

extLst
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

grouping
Value must be one of {'stacked', 'standard', 'percentStacked'}

ser
A sequence (list or tuple) that may only contain objects of the declared type

tagname = 'areaChart'

varyColors
Values must be of type <class 'bool'>

x_axis
Values must be of type <class 'openpyxl.chart.axis.TextAxis'>

y_axis
Values must be of type <class 'openpyxl.chart.axis.NumericAxis'>

class openpyxl.chart.area_chart.**AreaChart3D**(*gapDepth=None*, ***kw*)
Bases: *openpyxl.chart.area_chart.AreaChart*

dLbls
Values must be of type <class 'openpyxl.chart.label.DataLabelList'>

dropLines
Values must be of type <class 'openpyxl.chart.axis.ChartLines'>

gapDepth
Values must be of type <class 'float'>

grouping
Value must be one of {'stacked', 'standard', 'percentStacked'}

ser
A sequence (list or tuple) that may only contain objects of the declared type

tagname = 'area3DChart'

varyColors
Values must be of type <class 'bool'>

x_axis
Values must be of type <class 'openpyxl.chart.axis.TextAxis'>

y_axis
Values must be of type <class 'openpyxl.chart.axis.NumericAxis'>

z_axis
Values must be of type <class 'openpyxl.chart.axis.SeriesAxis'>

openpyxl.chart.axis module

class openpyxl.chart.axis.**ChartLines**(*spPr=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

spPr
Values must be of type <class 'openpyxl.chart.shapes.GraphicalProperties'>

tagname = 'chartLines'

class openpyxl.chart.axis.**DateAxis**(*auto=None*, *lblOffset=None*, *baseTimeUnit=None*, *majorUnit=1*, *majorTimeUnit=None*, *minorUnit=None*, *minorTimeUnit=None*, *extLst=None*, ***kw*)
Bases: openpyxl.chart.axis._BaseAxis

auto
Values must be of type <class 'bool'>

axId
Values must be of type <class 'int'>

axPos
Value must be one of {'b', 'r', 'l', 't'}

baseTimeUnit
Value must be one of {'years', 'days', 'months'}

crossAx
Values must be of type <class 'int'>

crosses
Value must be one of {'max', 'min', 'autoZero'}

crossesAt
Values must be of type <class 'float'>

delete
Values must be of type <class 'bool'>

extLst
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

lblOffset
Values must be of type <class 'int'>

majorGridlines
Values must be of type <class 'openpyxl.chart.axis.ChartLines'>

majorTickMark
Value must be one of {'in', 'out', 'cross'}

majorTimeUnit
Value must be one of {'years', 'days', 'months'}

majorUnit
Values must be of type <class 'float'>

minorGridlines
Values must be of type <class 'openpyxl.chart.axis.ChartLines'>

minorTickMark
Value must be one of {'in', 'out', 'cross'}

minorTimeUnit
Value must be one of {'years', 'days', 'months'}

minorUnit
Values must be of type <class 'float'>

numFmt
Values must be of type <class 'openpyxl.chart.data_source.NumFmt'>

scaling
Values must be of type <class 'openpyxl.chart.axis.Scaling'>

spPr
Values must be of type <class 'openpyxl.chart.shapes.GraphicalProperties'>

tagname = 'dateAx'

tickLblPos
Value must be one of {'low', 'nextTo', 'high'}

title
Values must be of type <class 'openpyxl.chart.title.Title'>

txPr
Values must be of type <class 'openpyxl.chart.text.RichText'>

class `openpyxl.chart.axis.`**`DisplayUnitsLabel`**(*layout=None*, *tx=None*, *spPr=None*, *txPr=None*)

Bases: `openpyxl.descriptors.serialisable.Serialisable`

`layout`
Values must be of type <class 'openpyxl.chart.layout.Layout'>

`spPr`
Values must be of type <class 'openpyxl.chart.shapes.GraphicalProperties'>

`tagname` = 'dispUnitsLbl'

`tx`
Values must be of type <class 'openpyxl.chart.text.Text'>

`txPr`
Values must be of type <class 'openpyxl.chart.text.RichText'>

class `openpyxl.chart.axis.`**`DisplayUnitsLabelList`**(*custUnit=None*, *builtInUnit=None*, *dispUnitsLbl=None*, *extLst=None*)

Bases: `openpyxl.descriptors.serialisable.Serialisable`

`builtInUnit`
Value must be one of {'tenMillions', 'thousands', 'hundredMillions', 'trillions', 'hundreds', 'billions', 'hundredThousands', 'tenThousands', 'millions'}

`custUnit`
Values must be of type <class 'float'>

`dispUnitsLbl`
Values must be of type <class 'openpyxl.chart.axis.DisplayUnitsLabel'>

`extLst`
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

`tagname` = 'dispUnits'

class `openpyxl.chart.axis.`**`NumericAxis`**(*crossBetween=None*, *majorUnit=None*, *minorUnit=None*, *dispUnits=None*, *extLst=None*, ***kw*)

Bases: `openpyxl.chart.axis._BaseAxis`

`axId`
Values must be of type <class 'int'>

`axPos`
Value must be one of {'b', 'r', 'l', 't'}

`crossAx`
Values must be of type <class 'int'>

`crossBetween`
Value must be one of {'midCat', 'between'}

`crosses`
Value must be one of {'max', 'min', 'autoZero'}

`crossesAt`
Values must be of type <class 'float'>

`delete`
Values must be of type <class 'bool'>

`dispUnits`
Values must be of type <class 'openpyxl.chart.axis.DisplayUnitsLabelList'>

extLst
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

majorGridlines
Values must be of type <class 'openpyxl.chart.axis.ChartLines'>

majorTickMark
Value must be one of {'in', 'out', 'cross'}

majorUnit
Values must be of type <class 'float'>

minorGridlines
Values must be of type <class 'openpyxl.chart.axis.ChartLines'>

minorTickMark
Value must be one of {'in', 'out', 'cross'}

minorUnit
Values must be of type <class 'float'>

numFmt
Values must be of type <class 'openpyxl.chart.data_source.NumFmt'>

scaling
Values must be of type <class 'openpyxl.chart.axis.Scaling'>

spPr
Values must be of type <class 'openpyxl.chart.shapes.GraphicalProperties'>

tagname = 'valAx'

tickLblPos
Value must be one of {'low', 'nextTo', 'high'}

title
Values must be of type <class 'openpyxl.chart.title.Title'>

txPr
Values must be of type <class 'openpyxl.chart.text.RichText'>

class `openpyxl.chart.axis.`**`Scaling`**(*logBase=None*, *orientation='minMax'*, *max=None*, *min=None*, *extLst=None*)
Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

extLst
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

logBase
Values must be of type <class 'float'>

max
Values must be of type <class 'float'>

min
Values must be of type <class 'float'>

orientation
Value must be one of {'maxMin', 'minMax'}

tagname = 'scaling'

class `openpyxl.chart.axis.`**`SeriesAxis`**(*tickLblSkip=None*, *tickMarkSkip=None*, *extLst=None*, ***kw*)
Bases: `openpyxl.chart.axis._BaseAxis`

axId
Values must be of type <class 'int'>

axPos
Value must be one of {'b', 'r', 'l', 't'}

crossAx
Values must be of type <class 'int'>

crosses
Value must be one of {'max', 'min', 'autoZero'}

crossesAt
Values must be of type <class 'float'>

delete
Values must be of type <class 'bool'>

extLst
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

majorGridlines
Values must be of type <class 'openpyxl.chart.axis.ChartLines'>

majorTickMark
Value must be one of {'in', 'out', 'cross'}

minorGridlines
Values must be of type <class 'openpyxl.chart.axis.ChartLines'>

minorTickMark
Value must be one of {'in', 'out', 'cross'}

numFmt
Values must be of type <class 'openpyxl.chart.data_source.NumFmt'>

scaling
Values must be of type <class 'openpyxl.chart.axis.Scaling'>

spPr
Values must be of type <class 'openpyxl.chart.shapes.GraphicalProperties'>

tagname = 'serAx'

tickLblPos
Value must be one of {'low', 'nextTo', 'high'}

tickLblSkip
Values must be of type <class 'int'>

tickMarkSkip
Values must be of type <class 'int'>

title
Values must be of type <class 'openpyxl.chart.title.Title'>

txPr
Values must be of type <class 'openpyxl.chart.text.RichText'>

class openpyxl.chart.axis.**TextAxis**(*auto=None*, *lblAlgn=None*, *lblOffset=100*, *tickLblSkip=None*, *tickMarkSkip=None*, *noMultiLvlLbl=None*, *extLst=None*, ***kw*)
Bases: openpyxl.chart.axis._BaseAxis

`auto`
Values must be of type <class 'bool'>

`axId`
Values must be of type <class 'int'>

`axPos`
Value must be one of {'b', 'r', 'l', 't'}

`crossAx`
Values must be of type <class 'int'>

`crosses`
Value must be one of {'max', 'min', 'autoZero'}

`crossesAt`
Values must be of type <class 'float'>

`delete`
Values must be of type <class 'bool'>

`extLst`
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

`lblAlgn`
Value must be one of {'ctr', 'r', 'l'}

`lblOffset`
Values must be of type <class 'float'>

`majorGridlines`
Values must be of type <class 'openpyxl.chart.axis.ChartLines'>

`majorTickMark`
Value must be one of {'in', 'out', 'cross'}

`minorGridlines`
Values must be of type <class 'openpyxl.chart.axis.ChartLines'>

`minorTickMark`
Value must be one of {'in', 'out', 'cross'}

`noMultiLvlLbl`
Values must be of type <class 'bool'>

`numFmt`
Values must be of type <class 'openpyxl.chart.data_source.NumFmt'>

`scaling`
Values must be of type <class 'openpyxl.chart.axis.Scaling'>

`spPr`
Values must be of type <class 'openpyxl.chart.shapes.GraphicalProperties'>

`tagname` = 'catAx'

`tickLblPos`
Value must be one of {'low', 'nextTo', 'high'}

`tickLblSkip`
Values must be of type <class 'int'>

`tickMarkSkip`
Values must be of type <class 'int'>

title
Values must be of type <class 'openpyxl.chart.title.Title'>

txPr
Values must be of type <class 'openpyxl.chart.text.RichText'>

openpyxl.chart.bar_chart module

class `openpyxl.chart.bar_chart.`**`BarChart`**(*gapWidth=150*, *overlap=None*, *serLines=None*, *axId=None*, *extLst=None*, ***kw*)
Bases: `openpyxl.chart.bar_chart._BarChartBase`

barDir
Value must be one of {'col', 'bar'}

dLbls
Values must be of type <class 'openpyxl.chart.label.DataLabelList'>

extLst
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

gapWidth
Values must be of type <class 'float'>

grouping
Value must be one of {'stacked', 'standard', 'clustered', 'percentStacked'}

overlap
Values must be of type <class 'float'>

ser
A sequence (list or tuple) that may only contain objects of the declared type

serLines
Values must be of type <class 'openpyxl.chart.axis.ChartLines'>

tagname = 'barChart'

varyColors
Values must be of type <class 'bool'>

x_axis
Values must be of type <class 'openpyxl.chart.axis.TextAxis'>

y_axis
Values must be of type <class 'openpyxl.chart.axis.NumericAxis'>

class `openpyxl.chart.bar_chart.`**`BarChart3D`**(*gapWidth=150*, *gapDepth=150*, *shape=None*, *serLines=None*, *axId=None*, *extLst=None*, ***kw*)
Bases: `openpyxl.chart.bar_chart._BarChartBase`, `openpyxl.chart._3d._3DBase`

backWall
Values must be of type <class 'openpyxl.chart._3d.Surface'>

barDir
Value must be one of {'col', 'bar'}

dLbls
Values must be of type <class 'openpyxl.chart.label.DataLabelList'>

extLst
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

floor
Values must be of type <class 'openpyxl.chart._3d.Surface'>

gapDepth
Values must be of type <class 'float'>

gapWidth
Values must be of type <class 'float'>

grouping
Value must be one of {'stacked', 'standard', 'clustered', 'percentStacked'}

ser
A sequence (list or tuple) that may only contain objects of the declared type

serLines
Values must be of type <class 'openpyxl.chart.axis.ChartLines'>

shape
Value must be one of {'coneToMax', 'pyramid', 'pyramidToMax', 'cylinder', 'box', 'cone'}

sideWall
Values must be of type <class 'openpyxl.chart._3d.Surface'>

tagname = 'bar3DChart'

varyColors
Values must be of type <class 'bool'>

view3D
Values must be of type <class 'openpyxl.chart._3d.View3D'>

x_axis
Values must be of type <class 'openpyxl.chart.axis.TextAxis'>

y_axis
Values must be of type <class 'openpyxl.chart.axis.NumericAxis'>

z_axis
Values must be of type <class 'openpyxl.chart.axis.SeriesAxis'>

openpyxl.chart.bubble_chart module

class `openpyxl.chart.bubble_chart.`**BubbleChart**(*varyColors=None*, *ser=()*, *dLbls=None*, *bubble3D=None*, *bubbleScale=None*, *showNegBubbles=None*, *sizeRepresents=None*, *axId=None*, *extLst=None*)

Bases: `openpyxl.chart._chart.ChartBase`

bubble3D
Values must be of type <class 'bool'>

bubbleScale
Values must be of type <class 'float'>

dLbls
Values must be of type <class 'openpyxl.chart.label.DataLabelList'>

extLst
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

ser
A sequence (list or tuple) that may only contain objects of the declared type

showNegBubbles
Values must be of type <class 'bool'>

sizeRepresents
Value must be one of {'area', 'w'}

tagname = 'bubbleChart'

varyColors
Values must be of type <class 'bool'>

x_axis
Values must be of type <class 'openpyxl.chart.axis.NumericAxis'>

y_axis
Values must be of type <class 'openpyxl.chart.axis.NumericAxis'>

openpyxl.chart.chartspace module

class openpyxl.chart.chartspace.**ChartContainer**(*title=None*, *autoTitleDeleted=None*, *pivotFmts=None*, *view3D=None*, *floor=None*, *sideWall=None*, *backWall=None*, *plotArea=None*, *legend=None*, *plotVisOnly=None*, *dispBlanksAs='gap'*, *showDLblsOverMax=None*, *extLst=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

autoTitleDeleted
Values must be of type <class 'bool'>

backWall
Values must be of type <class 'openpyxl.chart._3d.Surface'>

dispBlanksAs
Value must be one of {'zero', 'span', 'gap'}

extLst
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

floor
Values must be of type <class 'openpyxl.chart._3d.Surface'>

legend
Values must be of type <class 'openpyxl.chart.legend.Legend'>

pivotFmts
Values must be of type <class 'openpyxl.chart.chartspace.PivotFormatList'>

plotArea
Values must be of type <class 'openpyxl.chart.chartspace.PlotArea'>

plotVisOnly
Values must be of type <class 'bool'>

showDLblsOverMax
Values must be of type <class 'bool'>

sideWall
Values must be of type <class 'openpyxl.chart._3d.Surface'>

tagname = 'chart'

title
Values must be of type <class 'openpyxl.chart.title.Title'>

view3D
Values must be of type <class 'openpyxl.chart._3d.View3D'>

class `openpyxl.chart.chartspace.`**`ChartSpace`**(*date1904=None*, *lang=None*, *roundedCorners=None*, *style=None*, *clrMapOvr=None*, *pivotSource=None*, *protection=None*, *chart=None*, *spPr=None*, *txPr=None*, *externalData=None*, *printSettings=None*, *userShapes=None*, *extLst=None*)

Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

`chart`
Values must be of type <class 'openpyxl.chart.chartspace.ChartContainer'>

`clrMapOvr`
Values must be of type <class 'openpyxl.drawing.colors.ColorMapping'>

`date1904`
Values must be of type <class 'bool'>

`extLst`
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

`externalData`
Values must be of type <class 'openpyxl.chart.chartspace.ExternalData'>

`lang`
Values must be of type <class 'str'>

`pivotSource`
Values must be of type <class 'openpyxl.chart.chartspace.PivotSource'>

`printSettings`
Values must be of type <class 'openpyxl.chart.chartspace.PrintSettings'>

`protection`
Values must be of type <class 'openpyxl.chart.chartspace.Protection'>

`roundedCorners`
Values must be of type <class 'bool'>

`spPr`
Values must be of type <class 'openpyxl.chart.shapes.GraphicalProperties'>

`style`
Values must be of type <class 'int'>

`tagname` **= 'chartSpace'**

`txPr`
Values must be of type <class 'openpyxl.chart.text.RichText'>

`userShapes`
Values must be of type <class 'openpyxl.chart.chartspace.RelId'>

class `openpyxl.chart.chartspace.`**`DataTable`**(*showHorzBorder=None*, *showVertBorder=None*, *showOutline=None*, *showKeys=None*, *spPr=None*, *txPr=None*, *extLst=None*)

Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

`extLst`
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

`showHorzBorder`
Values must be of type <class 'bool'>

showKeys
Values must be of type <class 'bool'>

showOutline
Values must be of type <class 'bool'>

showVertBorder
Values must be of type <class 'bool'>

spPr
Values must be of type <class 'openpyxl.chart.shapes.GraphicalProperties'>

tagname = 'dTable'

txPr
Values must be of type <class 'openpyxl.chart.text.RichText'>

class openpyxl.chart.chartspace.**ExternalData**(*autoUpdate=None*, *id=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

autoUpdate
Values must be of type <class 'bool'>

id
Values must be of type <class 'str'>

tagname = 'externalData'

class openpyxl.chart.chartspace.**PivotFormat**(*idx=0*, *spPr=None*, *txPr=None*, *marker=None*, *dLbl=None*, *extLst=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

dLbl
Values must be of type <class 'openpyxl.chart.label.DataLabel'>

extLst
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

idx
Values must be of type <class 'int'>

marker
Values must be of type <class 'openpyxl.chart.marker.Marker'>

spPr
Values must be of type <class 'openpyxl.chart.shapes.GraphicalProperties'>

tagname = 'pivotFmt'

txPr
Values must be of type <class 'openpyxl.chart.text.RichText'>

class openpyxl.chart.chartspace.**PivotFormatList**(*pivotFmt=()*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

pivotFmt
A sequence (list or tuple) that may only contain objects of the declared type

tagname = 'pivotFmts'

class openpyxl.chart.chartspace.**PivotSource**(*name=None*, *fmtId=None*, *extLst=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

extLst
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

fmtId
Values must be of type <class 'int'>

name
Values must be of type <class 'str'>

tagname = 'pivotSource'

class openpyxl.chart.chartspace.**PlotArea**(*layout=None, dTable=None, spPr=None, areaChart=None, area3DChart=None, lineChart=None, line3DChart=None, stockChart=None, radarChart=None, scatterChart=None, pieChart=None, pie3DChart=None, doughnutChart=None, barChart=None, bar3DChart=None, ofPieChart=None, surfaceChart=None, surface3DChart=None, bubbleChart=None, valAx=(), catAx=(), serAx=(), dateAx=(), extLst=None*)

Bases: *openpyxl.descriptors.serialisable.Serialisable*

area3DChart
Values must be of type <class 'openpyxl.chart.area_chart.AreaChart3D'>

areaChart
Values must be of type <class 'openpyxl.chart.area_chart.AreaChart'>

bar3DChart
Values must be of type <class 'openpyxl.chart.bar_chart.BarChart3D'>

barChart
Values must be of type <class 'openpyxl.chart.bar_chart.BarChart'>

bubbleChart
Values must be of type <class 'openpyxl.chart.bubble_chart.BubbleChart'>

catAx
A sequence (list or tuple) that may only contain objects of the declared type

dTable
Values must be of type <class 'openpyxl.chart.chartspace.DataTable'>

dateAx
A sequence (list or tuple) that may only contain objects of the declared type

doughnutChart
Values must be of type <class 'openpyxl.chart.pie_chart.DoughnutChart'>

extLst
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

layout
Values must be of type <class 'openpyxl.chart.layout.Layout'>

line3DChart
Values must be of type <class 'openpyxl.chart.line_chart.LineChart3D'>

lineChart
Values must be of type <class 'openpyxl.chart.line_chart.LineChart'>

ofPieChart
Values must be of type <class 'openpyxl.chart.pie_chart.ProjectedPieChart'>

pie3DChart
Values must be of type <class 'openpyxl.chart.pie_chart.PieChart3D'>

pieChart
Values must be of type <class 'openpyxl.chart.pie_chart.PieChart'>

radarChart
Values must be of type <class 'openpyxl.chart.radar_chart.RadarChart'>

scatterChart
Values must be of type <class 'openpyxl.chart.scatter_chart.ScatterChart'>

serAx
A sequence (list or tuple) that may only contain objects of the declared type

spPr
Values must be of type <class 'openpyxl.chart.shapes.GraphicalProperties'>

stockChart
Values must be of type <class 'openpyxl.chart.stock_chart.StockChart'>

surface3DChart
Values must be of type <class 'openpyxl.chart.surface_chart.SurfaceChart3D'>

surfaceChart
Values must be of type <class 'openpyxl.chart.surface_chart.SurfaceChart'>

tagname = 'plotArea'

to_tree(*tagname=None*, *idx=None*)

valAx
A sequence (list or tuple) that may only contain objects of the declared type

class openpyxl.chart.chartspace.**PrintSettings**(*headerFooter=None*, *pageMargins=None*, *pageSetup=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

headerFooter
Values must be of type <class 'openpyxl.worksheet.header_footer.HeaderFooter'>

pageMargins
Values must be of type <class 'openpyxl.worksheet.page.PageMargins'>

pageSetup
Values must be of type <class 'openpyxl.worksheet.page.PrintPageSetup'>

tagname = 'printSettings'

class openpyxl.chart.chartspace.**Protection**(*chartObject=None*, *data=None*, *formatting=None*, *selection=None*, *userInterface=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

chartObject
Values must be of type <class 'bool'>

data
Values must be of type <class 'bool'>

formatting
Values must be of type <class 'bool'>

selection
Values must be of type <class 'bool'>

tagname = 'protection'

userInterface
Values must be of type <class 'bool'>

class openpyxl.chart.chartspace.**RelId**
Bases: *openpyxl.descriptors.serialisable.Serialisable*

openpyxl.chart.data_source module Collection of utility primitives for charts.

class openpyxl.chart.data_source.**AxDataSource** (*numRef=None*, *numLit=None*, *strRef=None*, *strLit=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

numLit
Values must be of type <class 'openpyxl.chart.data_source.NumData'>

numRef
Values must be of type <class 'openpyxl.chart.data_source.NumRef'>

strLit
Values must be of type <class 'openpyxl.chart.data_source.StrData'>

strRef
Values must be of type <class 'openpyxl.chart.data_source.StrRef'>

class openpyxl.chart.data_source.**NumData** (*formatCode=None*, *ptCount=None*, *pt=()*, *extLst=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

extLst
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

formatCode
Values must be of type <class 'str'>

pt
A sequence (list or tuple) that may only contain objects of the declared type

ptCount
Values must be of type <class 'int'>

class openpyxl.chart.data_source.**NumDataSource** (*numRef=None*, *numLit=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

numLit
Values must be of type <class 'openpyxl.chart.data_source.NumData'>

numRef
Values must be of type <class 'openpyxl.chart.data_source.NumRef'>

class openpyxl.chart.data_source.**NumFmt** (*formatCode=None*, *sourceLinked=False*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

formatCode
Values must be of type <class 'str'>

sourceLinked
Values must be of type <class 'bool'>

class openpyxl.chart.data_source.**NumRef** (*f=None*, *numCache=None*, *extLst=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

extLst
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

f
Values must be of type <class 'str'>

numCache
Values must be of type <class 'openpyxl.chart.data_source.NumData'>

class openpyxl.chart.data_source.**NumVal**(*idx=None*, *formatCode=None*, *v=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

formatCode
Values must be of type <class 'str'>

idx
Values must be of type <class 'int'>

v
Values must be of type <class 'float'>

class openpyxl.chart.data_source.**StrData**(*ptCount=None*, *pt=None*, *extLst=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

extLst
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

pt
Values must be of type <class 'openpyxl.chart.data_source.StrVal'>

ptCount
Values must be of type <class 'int'>

tagname = 'strData'

class openpyxl.chart.data_source.**StrRef**(*f=None*, *strCache=None*, *extLst=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

extLst
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

f
Values must be of type <class 'str'>

strCache
Values must be of type <class 'openpyxl.chart.data_source.StrData'>

tagname = 'strRef'

class openpyxl.chart.data_source.**StrVal**(*idx=0*, *v=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

idx
Values must be of type <class 'int'>

tagname = 'strVal'

v
Values must be of type <class 'str'>

openpyxl.chart.descriptors module

class openpyxl.chart.descriptors.**NestedGapAmount**(***kw*)
Bases: *openpyxl.descriptors.nested.NestedMinMax*

allow_none = True

max = 500

min = 0

class openpyxl.chart.descriptors.**NestedOverlap**(***kw*)
Bases: *openpyxl.descriptors.nested.NestedMinMax*

allow_none = True

max = 100

min = -100

class openpyxl.chart.descriptors.**NumberFormatDescriptor**(**args*, ***kw*)
Bases: *openpyxl.descriptors.base.Typed*

Allow direct assignment of format code

allow_none = True

expected_type
alias of NumFmt

openpyxl.chart.error_bar module

class openpyxl.chart.error_bar.**ErrorBars**(*errDir=None*, *errBarType='both'*, *errValType='fixedVal'*, *noEndCap=None*, *plus=None*, *minus=None*, *val=None*, *spPr=None*, *extLst=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

errBarType
Value must be one of {'plus', 'both', 'minus'}

errDir
Value must be one of {'y', 'x'}

errValType
Value must be one of {'percentage', 'cust', 'fixedVal', 'stdDev', 'stdErr'}

extLst
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

minus
Values must be of type <class 'openpyxl.chart.data_source.NumDataSource'>

noEndCap
Values must be of type <class 'bool'>

plus
Values must be of type <class 'openpyxl.chart.data_source.NumDataSource'>

spPr
Values must be of type <class 'openpyxl.chart.shapes.GraphicalProperties'>

tagname = 'errBars'

val
Values must be of type <class 'float'>

openpyxl.chart.label module

class openpyxl.chart.label.**DataLabel**(*idx=0*, ***kw*)
Bases: openpyxl.chart.label._DataLabelBase

dLblPos
Value must be one of {'bestFit', 'inEnd', 'r', 'ctr', 'l', 'b', 'inBase', 'outEnd', 't'}

extLst
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

idx
Values must be of type <class 'int'>

numFmt
Values must be of type <class 'str'>

separator
Values must be of type <class 'str'>

showBubbleSize
Values must be of type <class 'bool'>

showCatName
Values must be of type <class 'bool'>

showLeaderLines
Values must be of type <class 'bool'>

showLegendKey
Values must be of type <class 'bool'>

showPercent
Values must be of type <class 'bool'>

showSerName
Values must be of type <class 'bool'>

showVal
Values must be of type <class 'bool'>

spPr
Values must be of type <class 'openpyxl.chart.shapes.GraphicalProperties'>

tagname = 'dLbl'

txPr
Values must be of type <class 'openpyxl.chart.text.RichText'>

class openpyxl.chart.label.**DataLabelList**(*dLbl=()*, ***kw*)
Bases: openpyxl.chart.label._DataLabelBase

dLbl
A sequence (list or tuple) that may only contain objects of the declared type

dLblPos
Value must be one of {'bestFit', 'inEnd', 'r', 'ctr', 'l', 'b', 'inBase', 'outEnd', 't'}

extLst
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

numFmt
Values must be of type <class 'str'>

separator
Values must be of type <class 'str'>

showBubbleSize
Values must be of type <class 'bool'>

showCatName
Values must be of type <class 'bool'>

showLeaderLines
Values must be of type <class 'bool'>

showLegendKey
Values must be of type <class 'bool'>

showPercent
Values must be of type <class 'bool'>

showSerName
Values must be of type <class 'bool'>

showVal
Values must be of type <class 'bool'>

spPr
Values must be of type <class 'openpyxl.chart.shapes.GraphicalProperties'>

tagname = 'dLbls'

txPr
Values must be of type <class 'openpyxl.chart.text.RichText'>

openpyxl.chart.layout module

class openpyxl.chart.layout.**Layout**(*manualLayout=None*, *extLst=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

extLst
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

manualLayout
Values must be of type <class 'openpyxl.chart.layout.ManualLayout'>

tagname = 'layout'

class openpyxl.chart.layout.**ManualLayout**(*layoutTarget=None*, *xMode=None*, *yMode=None*, *wMode=None*, *hMode=None*, *x=None*, *y=None*, *w=None*, *h=None*, *extLst=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

extLst
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

h
Values must be of type <class 'float'>

hMode
Value must be one of {'edge', 'factor'}

layoutTarget
Value must be one of {'inner', 'outer'}

tagname = 'manualLayout'

w
Values must be of type <class 'float'>

wMode
Value must be one of {'edge', 'factor'}

x
Values must be of type <class 'float'>

xMode
Value must be one of {'edge', 'factor'}

y
Values must be of type <class 'float'>

yMode
Value must be one of {'edge', 'factor'}

openpyxl.chart.legend module

class `openpyxl.chart.legend.`**`Legend`**(*legendPos='r'*, *legendEntry=None*, *layout=None*, *overlay=None*, *spPr=None*, *txPr=None*, *extLst=None*)
Bases: `openpyxl.descriptors.serialisable.Serialisable`

extLst
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

layout
Values must be of type <class 'openpyxl.chart.layout.Layout'>

legendEntry
Values must be of type <class 'openpyxl.chart.legend.LegendEntry'>

legendPos
Value must be one of {'b', 'r', 'l', 'tr', 't'}

overlay
Values must be of type <class 'bool'>

spPr
Values must be of type <class 'openpyxl.chart.shapes.GraphicalProperties'>

tagname = 'legend'

txPr
Values must be of type <class 'openpyxl.chart.text.RichText'>

class `openpyxl.chart.legend.`**`LegendEntry`**(*idx=0*, *delete=False*, *txPr=None*, *extLst=None*)
Bases: `openpyxl.descriptors.serialisable.Serialisable`

delete
Values must be of type <class 'bool'>

extLst
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

idx
Values must be of type <class 'int'>

tagname = 'legendEntry'

txPr
Values must be of type <class 'openpyxl.chart.text.RichText'>

openpyxl.chart.line_chart module

class `openpyxl.chart.line_chart.`**`LineChart`**(*hiLowLines=None*, *upDownBars=None*, *marker=None*, *smooth=None*, *axId=None*, *extLst=None*, ***kw*)
Bases: `openpyxl.chart.line_chart._LineChartBase`

dLbls
Values must be of type <class 'openpyxl.chart.label.DataLabelList'>

dropLines
Values must be of type <class 'openpyxl.chart.axis.ChartLines'>

extLst
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

grouping
Value must be one of {'stacked', 'standard', 'percentStacked'}

hiLowLines
Values must be of type <class 'openpyxl.chart.axis.ChartLines'>

marker
Values must be of type <class 'bool'>

ser
A sequence (list or tuple) that may only contain objects of the declared type

smooth
Values must be of type <class 'bool'>

tagname = 'lineChart'

upDownBars
Values must be of type <class 'openpyxl.chart.updown_bars.UpDownBars'>

varyColors
Values must be of type <class 'bool'>

x_axis
Values must be of type <class 'openpyxl.chart.axis._BaseAxis'>

y_axis
Values must be of type <class 'openpyxl.chart.axis.NumericAxis'>

class `openpyxl.chart.line_chart.`**`LineChart3D`**(*gapDepth=None*, *hiLowLines=None*, *upDownBars=None*, *marker=None*, *smooth=None*, *axId=None*, ***kw*)
Bases: `openpyxl.chart.line_chart._LineChartBase`

dLbls
Values must be of type <class 'openpyxl.chart.label.DataLabelList'>

dropLines
Values must be of type <class 'openpyxl.chart.axis.ChartLines'>

extLst
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

gapDepth
Values must be of type <class 'float'>

grouping
Value must be one of {'stacked', 'standard', 'percentStacked'}

hiLowLines
Values must be of type <class 'openpyxl.chart.axis.ChartLines'>

marker
Values must be of type <class 'bool'>

ser
A sequence (list or tuple) that may only contain objects of the declared type

smooth
Values must be of type <class 'bool'>

tagname = 'line3DChart'

upDownBars
Values must be of type <class 'openpyxl.chart.updown_bars.UpDownBars'>

varyColors
Values must be of type <class 'bool'>

x_axis
Values must be of type <class 'openpyxl.chart.axis.TextAxis'>

y_axis
Values must be of type <class 'openpyxl.chart.axis.NumericAxis'>

z_axis
Values must be of type <class 'openpyxl.chart.axis.SeriesAxis'>

openpyxl.chart.marker module

class `openpyxl.chart.marker.`**`DataPoint`**(*idx=None*, *invertIfNegative=None*, *marker=None*, *bubble3D=None*, *explosion=None*, *spPr=None*, *pictureOptions=None*, *extLst=None*)
Bases: `openpyxl.descriptors.serialisable.Serialisable`

bubble3D
Values must be of type <class 'bool'>

explosion
Values must be of type <class 'int'>

extLst
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

idx
Values must be of type <class 'int'>

invertIfNegative
Values must be of type <class 'bool'>

marker
Values must be of type <class 'openpyxl.chart.marker.Marker'>

pictureOptions
Values must be of type <class 'openpyxl.chart.picture.PictureOptions'>

spPr
Values must be of type <class 'openpyxl.chart.shapes.GraphicalProperties'>

tagname = 'dPt'

class `openpyxl.chart.marker.`**`Marker`**(*symbol=None*, *size=None*, *spPr=None*, *extLst=None*)
Bases: `openpyxl.descriptors.serialisable.Serialisable`

extLst
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

size
Values must be of type <class 'float'>

spPr
Values must be of type <class 'openpyxl.chart.shapes.GraphicalProperties'>

symbol
Value must be one of {'star', 'square', 'diamond', 'auto', 'triangle', 'picture', 'plus', 'circle', 'dash', 'dot', 'x'}

tagname = 'marker'

openpyxl.chart.picture module

class openpyxl.chart.picture.**PictureOptions**(*applyToFront=None*, *applyToSides=None*, *applyToEnd=None*, *pictureFormat=None*, *pictureStackUnit=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

applyToEnd
Values must be of type <class 'bool'>

applyToFront
Values must be of type <class 'bool'>

applyToSides
Values must be of type <class 'bool'>

pictureFormat
Value must be one of {'stretch', 'stack', 'stackScale'}

pictureStackUnit
Values must be of type <class 'float'>

tagname = 'pictureOptions'

openpyxl.chart.pie_chart module

class openpyxl.chart.pie_chart.**CustomSplit**(*secondPiePt=()*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

secondPiePt
A sequence of primitive types that are stored as a single attribute. "val" is the default attribute

tagname = 'custSplit'

class openpyxl.chart.pie_chart.**DoughnutChart**(*firstSliceAng=0*, *holeSize=10*, *extLst=None*, ***kw*)
Bases: openpyxl.chart.pie_chart._PieChartBase

dLbls
Values must be of type <class 'openpyxl.chart.label.DataLabelList'>

extLst
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

firstSliceAng
Values must be of type <class 'float'>

holeSize
Values must be of type <class 'float'>

ser
A sequence (list or tuple) that may only contain objects of the declared type

tagname = 'doughnutChart'

varyColors
Values must be of type <class 'bool'>

class openpyxl.chart.pie_chart.**PieChart** (*firstSliceAng=0*, *extLst=None*, ***kw*)
Bases: openpyxl.chart.pie_chart._PieChartBase

dLbls
Values must be of type <class 'openpyxl.chart.label.DataLabelList'>

extLst
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

firstSliceAng
Values must be of type <class 'float'>

ser
A sequence (list or tuple) that may only contain objects of the declared type

tagname = 'pieChart'

varyColors
Values must be of type <class 'bool'>

class openpyxl.chart.pie_chart.**PieChart3D** (*varyColors=True*, *ser=()*, *dLbls=None*)
Bases: openpyxl.chart.pie_chart._PieChartBase

dLbls
Values must be of type <class 'openpyxl.chart.label.DataLabelList'>

extLst
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

ser
A sequence (list or tuple) that may only contain objects of the declared type

tagname = 'pie3DChart'

varyColors
Values must be of type <class 'bool'>

class openpyxl.chart.pie_chart.**ProjectedPieChart** (*ofPieType='pie'*, *gapWidth=None*, *splitType='auto'*, *splitPos=None*, *custSplit=None*, *secondPieSize=75*, *serLines=None*, *extLst=None*, ***kw*)
Bases: openpyxl.chart.pie_chart._PieChartBase

From the spec 21.2.2.126

This element contains the pie of pie or bar of pie series on this chart. Only the first series shall be displayed. The splitType element shall determine whether the splitPos and custSplit elements apply.

custSplit
Values must be of type <class 'openpyxl.chart.pie_chart.CustomSplit'>

dLbls
Values must be of type <class 'openpyxl.chart.label.DataLabelList'>

extLst
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

gapWidth
Values must be of type <class 'float'>

ofPieType
Value must be one of {'bar', 'pie'}

secondPieSize
Values must be of type <class 'float'>

ser
A sequence (list or tuple) that may only contain objects of the declared type

serLines
Values must be of type <class 'openpyxl.chart.axis.ChartLines'>

splitPos
Values must be of type <class 'float'>

splitType
Value must be one of {'auto', 'pos', 'cust', 'percent', 'val'}

tagname = 'ofPieChart'

varyColors
Values must be of type <class 'bool'>

openpyxl.chart.radar_chart module

class `openpyxl.chart.radar_chart.`**`RadarChart`**(*radarStyle='standard', varyColors=None, ser=(), dLbls=None, axId=None, extLst=None*)
Bases: `openpyxl.chart._chart.ChartBase`

dLbls
Values must be of type <class 'openpyxl.chart.label.DataLabelList'>

extLst
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

radarStyle
Value must be one of {'filled', 'standard', 'marker'}

ser
A sequence (list or tuple) that may only contain objects of the declared type

tagname = 'radarChart'

varyColors
Values must be of type <class 'bool'>

x_axis
Values must be of type <class 'openpyxl.chart.axis.TextAxis'>

y_axis
Values must be of type <class 'openpyxl.chart.axis.NumericAxis'>

openpyxl.chart.reference module

class `openpyxl.chart.reference.`**`DummyWorksheet`**(*title*)
Bases: `object`

class `openpyxl.chart.reference.`**`Reference`**(*worksheet=None, min_col=None, min_row=None, max_col=None, max_row=None, range_string=None*)
Bases: *`openpyxl.descriptors.Strict`*

Normalise cell range references

cells
Return a flattened list of all cells (by column)

cols
Return all cells in range by row

max_col
Values must be of type <class 'int'>

max_row
Values must be of type <class 'int'>

min_col
Values must be of type <class 'int'>

min_row
Values must be of type <class 'int'>

pop()
Return and remove the first cell

range_string
Values must be of type <class 'str'>

rows
Return all cells in range by column

sheetname

openpyxl.chart.scatter_chart module

class openpyxl.chart.scatter_chart.**ScatterChart**(*scatterStyle=None*, *varyColors=None*, *ser=()*, *dLbls=None*, *axId=None*, *extLst=None*)
Bases: openpyxl.chart._chart.ChartBase

dLbls
Values must be of type <class 'openpyxl.chart.label.DataLabelList'>

extLst
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

scatterStyle
Value must be one of {'lineMarker', 'smooth', 'smoothMarker', 'line', 'marker'}

ser
A sequence (list or tuple) that may only contain objects of the declared type

tagname = 'scatterChart'

varyColors
Values must be of type <class 'bool'>

x_axis
Values must be of type <class 'openpyxl.chart.axis.NumericAxis'>

y_axis
Values must be of type <class 'openpyxl.chart.axis.NumericAxis'>

openpyxl.chart.series module

class `openpyxl.chart.series.`**`Series`**(*idx=0*, *order=0*, *tx=None*, *spPr=None*, *pictureOptions=None*, *dPt=()*, *dLbls=None*, *trendline=None*, *errBars=None*, *cat=None*, *val=None*, *invertIfNegative=None*, *shape=None*, *xVal=None*, *yVal=None*, *bubbleSize=None*, *bubble3D=None*, *marker=None*, *smooth=None*, *explosion=None*)

Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

Generic series object. Should not be instantiated directly. User the chart.Series factory instead.

`bubble3D`
Values must be of type <class 'bool'>

`bubbleSize`
Values must be of type <class 'openpyxl.chart.data_source.NumDataSource'>

`cat`
Values must be of type <class 'openpyxl.chart.data_source.AxDataSource'>

`dLbls`
Values must be of type <class 'openpyxl.chart.label.DataLabelList'>

`dPt`
A sequence (list or tuple) that may only contain objects of the declared type

`errBars`
Values must be of type <class 'openpyxl.chart.error_bar.ErrorBars'>

`explosion`
Values must be of type <class 'int'>

`extLst`
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

`idx`
Values must be of type <class 'int'>

`invertIfNegative`
Values must be of type <class 'bool'>

`marker`
Values must be of type <class 'openpyxl.chart.marker.Marker'>

`order`
Values must be of type <class 'int'>

`pictureOptions`
Values must be of type <class 'openpyxl.chart.picture.PictureOptions'>

`shape`
Value must be one of {'coneToMax', 'pyramid', 'pyramidToMax', 'cylinder', 'box', 'cone'}

`smooth`
Values must be of type <class 'bool'>

`spPr`
Values must be of type <class 'openpyxl.chart.shapes.GraphicalProperties'>

`tagname` = **'ser'**

`to_tree`(*tagname=None*, *idx=None*)

`trendline`
Values must be of type <class 'openpyxl.chart.trendline.Trendline'>

tx
Values must be of type <class 'openpyxl.chart.series.SeriesLabel'>

val
Values must be of type <class 'openpyxl.chart.data_source.NumDataSource'>

xVal
Values must be of type <class 'openpyxl.chart.data_source.AxDataSource'>

yVal
Values must be of type <class 'openpyxl.chart.data_source.NumDataSource'>

class `openpyxl.chart.series.`**`SeriesLabel`**(*strRef=None*, *v=None*)
Bases: `openpyxl.descriptors.serialisable.Serialisable`

strRef
Values must be of type <class 'openpyxl.chart.data_source.StrRef'>

tagname = 'tx'

v
Values must be of type <class 'str'>

class `openpyxl.chart.series.`**`XYSeries`**(*idx=0*, *order=0*, *tx=None*, *spPr=None*, *pictureOptions=None*, *dPt=()*, *dLbls=None*, *trendline=None*, *errBars=None*, *cat=None*, *val=None*, *invertIfNegative=None*, *shape=None*, *xVal=None*, *yVal=None*, *bubbleSize=None*, *bubble3D=None*, *marker=None*, *smooth=None*, *explosion=None*)
Bases: `openpyxl.chart.series.Series`

Dedicated series for charts that have x and y series

bubble3D
Values must be of type <class 'bool'>

bubbleSize
Values must be of type <class 'openpyxl.chart.data_source.NumDataSource'>

dLbls
Values must be of type <class 'openpyxl.chart.label.DataLabelList'>

dPt
A sequence (list or tuple) that may only contain objects of the declared type

errBars
Values must be of type <class 'openpyxl.chart.error_bar.ErrorBars'>

idx
Values must be of type <class 'int'>

invertIfNegative
Values must be of type <class 'bool'>

marker
Values must be of type <class 'openpyxl.chart.marker.Marker'>

order
Values must be of type <class 'int'>

smooth
Values must be of type <class 'bool'>

spPr
Values must be of type <class 'openpyxl.chart.shapes.GraphicalProperties'>

trendline
Values must be of type <class 'openpyxl.chart.trendline.Trendline'>

tx
Values must be of type <class 'openpyxl.chart.series.SeriesLabel'>

xVal
Values must be of type <class 'openpyxl.chart.data_source.AxDataSource'>

yVal
Values must be of type <class 'openpyxl.chart.data_source.NumDataSource'>

openpyxl.chart.series_factory module

openpyxl.chart.series_factory.**SeriesFactory**(*values*, *xvalues=None*, *zvalues=None*, *title=None*, *title_from_data=False*)
Convenience Factory for creating chart data series.

openpyxl.chart.shapes module

class openpyxl.chart.shapes.**GraphicalProperties**(*bwMode=None*, *xfrm=None*, *noFill=None*, *solidFill=None*, *gradFill=None*, *pattFill=None*, *ln=None*, *scene3d=None*, *custGeom=None*, *prstGeom=None*, *sp3d=None*, *extLst=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

Somewhat vaguely 21.2.2.197 says this:

This element specifies the formatting for the parent chart element. The custGeom, prstGeom, scene3d, and xfrm elements are not supported. The bwMode attribute is not supported.

This doesn't leave much. And the element is used in different places.

bwMode
Value must be one of {'gray', 'blackWhite', 'hidden', 'auto', 'grayWhite', 'ltGray', 'white', 'clr', 'invGray', 'blackGray', 'black'}

custGeom
Values must be of type <class 'openpyxl.drawing.shapes.CustomGeometry2D'>

extLst
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

gradFill
Values must be of type <class 'openpyxl.drawing.fill.GradientFillProperties'>

ln
Values must be of type <class 'openpyxl.drawing.line.LineProperties'>

noFill
Values must be of type <class 'bool'>

pattFill
Values must be of type <class 'openpyxl.drawing.fill.PatternFillProperties'>

prstGeom
Values must be of type <class 'openpyxl.drawing.shapes.PresetGeometry2D'>

scene3d
Values must be of type <class 'openpyxl.drawing.shapes.Scene3D'>

solidFill
Values must be of type <class 'openpyxl.drawing.colors.ColorChoice'>

sp3d
Values must be of type <class 'openpyxl.drawing.shapes.Shape3D'>

tagname = 'spPr'

xfrm
Values must be of type <class 'openpyxl.drawing.shapes.Transform2D'>

openpyxl.chart.stock_chart module

class `openpyxl.chart.stock_chart.`**StockChart**(*ser=()*, *dLbls=None*, *dropLines=None*, *hiLowLines=None*, *upDownBars=None*, *axId=None*, *extLst=None*)
Bases: `openpyxl.chart._chart.ChartBase`

dLbls
Values must be of type <class 'openpyxl.chart.label.DataLabelList'>

dropLines
Values must be of type <class 'openpyxl.chart.axis.ChartLines'>

extLst
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

hiLowLines
Values must be of type <class 'openpyxl.chart.axis.ChartLines'>

ser
A sequence (list or tuple) that may only contain objects of the declared type

tagname = 'stockChart'

upDownBars
Values must be of type <class 'openpyxl.chart.updown_bars.UpDownBars'>

x_axis
Values must be of type <class 'openpyxl.chart.axis.TextAxis'>

y_axis
Values must be of type <class 'openpyxl.chart.axis.NumericAxis'>

openpyxl.chart.surface_chart module

class `openpyxl.chart.surface_chart.`**BandFormat**(*idx=0*, *spPr=None*)
Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

idx
Values must be of type <class 'int'>

spPr
Values must be of type <class 'openpyxl.chart.shapes.GraphicalProperties'>

tagname = 'bandFmt'

class `openpyxl.chart.surface_chart.`**BandFormatList**(*bandFmt=()*)
Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

bandFmt
A sequence (list or tuple) that may only contain objects of the declared type

tagname = 'bandFmts'

class `openpyxl.chart.surface_chart.`**`SurfaceChart`**(***kw*)
  Bases: *`openpyxl.chart.surface_chart.SurfaceChart3D`*

  `bandFmts`
    Values must be of type <class 'openpyxl.chart.surface_chart.BandFormatList'>

  `extLst`
    Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

  `ser`
    A sequence (list or tuple) that may only contain objects of the declared type

  `tagname` **= 'surfaceChart'**

  `wireframe`
    Values must be of type <class 'bool'>

class `openpyxl.chart.surface_chart.`**`SurfaceChart3D`**(*axId=None*, ***kw*)
  Bases: `openpyxl.chart.surface_chart._SurfaceChartBase`, `openpyxl.chart._3d._3DBase`

  `bandFmts`
    Values must be of type <class 'openpyxl.chart.surface_chart.BandFormatList'>

  `extLst`
    Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

  `ser`
    A sequence (list or tuple) that may only contain objects of the declared type

  `tagname` **= 'surface3DChart'**

  `wireframe`
    Values must be of type <class 'bool'>

  `x_axis`
    Values must be of type <class 'openpyxl.chart.axis.TextAxis'>

  `y_axis`
    Values must be of type <class 'openpyxl.chart.axis.NumericAxis'>

  `z_axis`
    Values must be of type <class 'openpyxl.chart.axis.SeriesAxis'>

openpyxl.chart.text module

class `openpyxl.chart.text.`**`RichText`**(*bodyPr=None*, *lstStyle=None*, *p=None*)
  Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

  From the specification: 21.2.2.216

  This element specifies text formatting. The lstStyle element is not supported.

  `bodyPr`
    Values must be of type <class 'openpyxl.drawing.text.RichTextProperties'>

  `lstStyle`
    Values must be of type <class 'openpyxl.drawing.text.ListStyle'>

  `p`
    A sequence (list or tuple) that may only contain objects of the declared type

  `tagname` **= 'rich'**

class `openpyxl.chart.text.`**`Text`**(*strRef=None*, *rich=None*)

Bases: `openpyxl.descriptors.serialisable.Serialisable`

`rich`
Values must be of type <class 'openpyxl.chart.text.RichText'>

`strRef`
Values must be of type <class 'openpyxl.chart.data_source.StrRef'>

openpyxl.chart.title module

class `openpyxl.chart.title.`**`Title`**(*tx=None*, *layout=None*, *overlay=None*, *spPr=None*, *txPr=None*, *extLst=None*)

Bases: `openpyxl.descriptors.serialisable.Serialisable`

`extLst`
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

`layout`
Values must be of type <class 'openpyxl.chart.layout.Layout'>

`overlay`
Values must be of type <class 'bool'>

`spPr`
Values must be of type <class 'openpyxl.chart.shapes.GraphicalProperties'>

`tagname` = **'title'**

`tx`
Values must be of type <class 'openpyxl.chart.text.Text'>

`txPr`
Values must be of type <class 'openpyxl.drawing.text.RichTextProperties'>

class `openpyxl.chart.title.`**`TitleDescriptor`**(**args*, ***kw*)

Bases: `openpyxl.descriptors.base.Typed`

`allow_none` = **True**

`expected_type`
alias of `Title`

`openpyxl.chart.title.`**`title_maker`**(*text*)

openpyxl.chart.trendline module

class `openpyxl.chart.trendline.`**`Trendline`**(*name=None*, *spPr=None*, *trendlineType='linear'*, *order=None*, *period=None*, *forward=None*, *backward=None*, *intercept=None*, *dispRSqr=None*, *dispEq=None*, *trendlineLbl=None*, *extLst=None*)

Bases: `openpyxl.descriptors.serialisable.Serialisable`

`backward`
Values must be of type <class 'float'>

`dispEq`
Values must be of type <class 'bool'>

`dispRSqr`
Values must be of type <class 'bool'>

`extLst`
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

forward
Values must be of type <class 'float'>

intercept
Values must be of type <class 'float'>

name
Values must be of type <class 'str'>

order
Values must be of type <class 'int'>

period
Values must be of type <class 'int'>

spPr
Values must be of type <class 'openpyxl.chart.shapes.GraphicalProperties'>

tagname = 'trendline'

trendlineLbl
Values must be of type <class 'openpyxl.chart.trendline.TrendlineLabel'>

trendlineType
Value must be one of {'linear', 'power', 'poly', 'movingAvg', 'exp', 'log'}

class `openpyxl.chart.trendline.`**`TrendlineLabel`**(*layout=None*, *tx=None*, *numFmt=None*, *spPr=None*, *txPr=None*, *extLst=None*)
Bases: `openpyxl.descriptors.serialisable.Serialisable`

extLst
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

layout
Values must be of type <class 'openpyxl.chart.layout.Layout'>

numFmt
Values must be of type <class 'openpyxl.chart.data_source.NumFmt'>

spPr
Values must be of type <class 'openpyxl.chart.shapes.GraphicalProperties'>

tagname = 'trendlineLbl'

tx
Values must be of type <class 'openpyxl.chart.text.Text'>

txPr
Values must be of type <class 'openpyxl.chart.text.RichText'>

openpyxl.chart.updown_bars module

class `openpyxl.chart.updown_bars.`**`UpDownBars`**(*gapWidth=150*, *upBars=None*, *downBars=None*, *extLst=None*)
Bases: `openpyxl.descriptors.serialisable.Serialisable`

downBars
Values must be of type <class 'openpyxl.chart.axis.ChartLines'>

extLst
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

gapWidth
Values must be of type <class 'float'>

tagname = 'upbars'

upBars
Values must be of type <class 'openpyxl.chart.axis.ChartLines'>

openpyxl.chartsheet package

Subpackages

openpyxl.chartsheet.tests package

Submodules

openpyxl.chartsheet.tests.test_chartsheet module

`openpyxl.chartsheet.tests.test_chartsheet.`**`Chartsheet`**`()`

class `openpyxl.chartsheet.tests.test_chartsheet.`**`DummyWorkbook`**
Bases: `object`

class `openpyxl.chartsheet.tests.test_chartsheet.`**`TestChartsheet`**
Bases: `object`

`test_ctor`(*Chartsheet*)

`test_read`(*Chartsheet*)

`test_write`(*Chartsheet*)

`test_write_charts`(*Chartsheet*)

openpyxl.chartsheet.tests.test_custom module

`openpyxl.chartsheet.tests.test_custom.`**`CustomChartsheetView`**`()`

`openpyxl.chartsheet.tests.test_custom.`**`CustomChartsheetViews`**`()`

class `openpyxl.chartsheet.tests.test_custom.`**`TestCustomChartsheetView`**
Bases: `object`

`test_read`(*CustomChartsheetView*)

`test_write`(*CustomChartsheetView*)

class `openpyxl.chartsheet.tests.test_custom.`**`TestCustomChartsheetViews`**
Bases: `object`

`test_read`(*CustomChartsheetViews*)

`test_write`(*CustomChartsheetViews*)

openpyxl.chartsheet.tests.test_properties module

`openpyxl.chartsheet.tests.test_properties.`**`ChartsheetProperties`**`()`

class `openpyxl.chartsheet.tests.test_properties.`**`TestChartsheetPr`**
Bases: `object`

`test_read`(*ChartsheetProperties*)

`test_write`(*ChartsheetProperties*)

openpyxl.chartsheet.tests.test_protection module

openpyxl.chartsheet.tests.test_protection.**ChartsheetProtection**()

class openpyxl.chartsheet.tests.test_protection.**TestChartsheetProtection**

Bases: object

test_read(*ChartsheetProtection*)

test_write(*ChartsheetProtection*)

openpyxl.chartsheet.tests.test_publish module

class openpyxl.chartsheet.tests.test_publish.**TestWebPublishItems**

Bases: object

test_read(*WebPublishItems*)

test_write(*WebPublishItems*)

class openpyxl.chartsheet.tests.test_publish.**TestWebPulishItem**

Bases: object

test_read(*WebPublishItem*)

test_write(*WebPublishItem*)

openpyxl.chartsheet.tests.test_publish.**WebPublishItem**()

openpyxl.chartsheet.tests.test_publish.**WebPublishItems**()

openpyxl.chartsheet.tests.test_relation module

openpyxl.chartsheet.tests.test_relation.**DrawingHF**()

openpyxl.chartsheet.tests.test_relation.**SheetBackgroundPicture**()

class openpyxl.chartsheet.tests.test_relation.**TestDrawingHF**

Bases: object

test_read(*DrawingHF*)

test_write(*DrawingHF*)

class openpyxl.chartsheet.tests.test_relation.**TestSheetBackgroundPicture**

Bases: object

test_read(*SheetBackgroundPicture*)

test_write(*SheetBackgroundPicture*)

openpyxl.chartsheet.tests.test_views module

openpyxl.chartsheet.tests.test_views.**ChartsheetView**()

openpyxl.chartsheet.tests.test_views.**ChartsheetViewList**()

class openpyxl.chartsheet.tests.test_views.**TestChartsheetView**

Bases: object

test_read(*ChartsheetView*)

test_write(*ChartsheetView*)

class openpyxl.chartsheet.tests.test_views.**TestChartsheetViewList**

Bases: object

test_read(*ChartsheetViewList*)

test_write(*ChartsheetViewList*)

Submodules

openpyxl.chartsheet.chartsheet module

class `openpyxl.chartsheet.chartsheet.`**`Chartsheet`**(*sheetPr=None*, *sheetViews=None*, *sheetProtection=None*, *customSheetViews=None*, *pageMargins=None*, *pageSetup=None*, *headerFooter=None*, *drawing=None*, *drawingHF=None*, *picture=None*, *webPublishItems=None*, *extLst=None*, *parent=None*, *title=''*, *sheet_state='visible'*)

Bases: `openpyxl.workbook.child._WorkbookChild`, `openpyxl.descriptors.serialisable.Serialisa`

`add_chart`(*chart*)

`customSheetViews`
Values must be of type <class 'openpyxl.chartsheet.custom.CustomChartsheetViews'>

`drawing`
Values must be of type <class 'openpyxl.worksheet.drawing.Drawing'>

`drawingHF`
Values must be of type <class 'openpyxl.chartsheet.relation.DrawingHF'>

`extLst`
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

`headerFooter`
Values must be of type <class 'openpyxl.worksheet.header_footer.HeaderFooter'>

`pageMargins`
Values must be of type <class 'openpyxl.worksheet.page.PageMargins'>

`pageSetup`
Values must be of type <class 'openpyxl.worksheet.page.PrintPageSetup'>

`picture`
Values must be of type <class 'openpyxl.chartsheet.relation.SheetBackgroundPicture'>

`sheetPr`
Values must be of type <class 'openpyxl.chartsheet.properties.ChartsheetProperties'>

`sheetProtection`
Values must be of type <class 'openpyxl.chartsheet.protection.ChartsheetProtection'>

`sheetViews`
Values must be of type <class 'openpyxl.chartsheet.views.ChartsheetViewList'>

`sheet_state`
Value must be one of {'visible', 'veryHidden', 'hidden'}

`tagname` = **'chartsheet'**

`to_tree`()

`webPublishItems`
Values must be of type <class 'openpyxl.chartsheet.publish.WebPublishItems'>

openpyxl.chartsheet.custom module

class `openpyxl.chartsheet.custom.`**`CustomChartsheetView`**(*guid=None, scale=None, state='visible', zoomToFit=None, pageMargins=None, pageSetup=None, headerFooter=None*)

Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

`guid`

`headerFooter`
Values must be of type <class 'openpyxl.worksheet.header_footer.HeaderFooter'>

`pageMargins`
Values must be of type <class 'openpyxl.worksheet.page.PageMargins'>

`pageSetup`
Values must be of type <class 'openpyxl.worksheet.page.PrintPageSetup'>

`scale`
Values must be of type <class 'int'>

`state`
Value must be one of {'visible', 'veryHidden', 'hidden'}

`tagname` = 'customSheetView'

`zoomToFit`
Values must be of type <class 'bool'>

class `openpyxl.chartsheet.custom.`**`CustomChartsheetViews`**(*customSheetView=None*)

Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

`customSheetView`
A sequence (list or tuple) that may only contain objects of the declared type

`tagname` = 'customSheetViews'

openpyxl.chartsheet.properties module

class `openpyxl.chartsheet.properties.`**`ChartsheetProperties`**(*published=None, codeName=None, tabColor=None*)

Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

`codeName`
Values must be of type <class 'str'>

`published`
Values must be of type <class 'bool'>

`tabColor`
Values must be of type <class 'openpyxl.styles.colors.Color'>

`tagname` = 'sheetPr'

openpyxl.chartsheet.protection module

class `openpyxl.chartsheet.protection.`**`ChartsheetProtection`**(*content=None, objects=None, hashValue=None, spinCount=None, saltValue=None, algorithmName=None, password=None*)

Bases: *openpyxl.descriptors.serialisable.Serialisable*, openpyxl.worksheet.protection._Protected

algorithmName
Values must be of type <class 'str'>

content
Values must be of type <class 'bool'>

hashValue

hash_password(*password*)

objects
Values must be of type <class 'bool'>

saltValue

spinCount
Values must be of type <class 'int'>

tagname = 'sheetProtection'

openpyxl.chartsheet.publish module

class openpyxl.chartsheet.publish.**WebPublishItem**(*id=None*, *divId=None*, *sourceType=None*, *sourceRef=None*, *sourceObject=None*, *destinationFile=None*, *title=None*, *autoRepublish=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

autoRepublish
Values must be of type <class 'bool'>

destinationFile
Values must be of type <class 'str'>

divId
Values must be of type <class 'str'>

id
Values must be of type <class 'int'>

sourceObject
Values must be of type <class 'str'>

sourceRef
Values must be of type <class 'str'>

sourceType
Value must be one of {'query', 'sheet', 'pivotTable', 'label', 'printArea', 'autoFilter', 'range', 'chart'}

tagname = 'webPublishItem'

title
Values must be of type <class 'str'>

class openpyxl.chartsheet.publish.**WebPublishItems**(*count=None*, *webPublishItem=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

count
Values must be of type <class 'int'>

tagname = 'WebPublishItems'

webPublishItem
A sequence (list or tuple) that may only contain objects of the declared type

openpyxl.chartsheet.relation module

class openpyxl.chartsheet.relation.**DrawingHF**(*id=None, lho=None, lhe=None, lhf=None, cho=None, che=None, chf=None, rho=None, rhe=None, rhf=None, lfo=None, lfe=None, lff=None, cfo=None, cfe=None, cff=None, rfo=None, rfe=None, rff=None*)

Bases: *openpyxl.descriptors.serialisable.Serialisable*

cfe
Values must be of type <class 'int'>

cff
Values must be of type <class 'int'>

cfo
Values must be of type <class 'int'>

che
Values must be of type <class 'int'>

chf
Values must be of type <class 'int'>

cho
Values must be of type <class 'int'>

id
Values must be of type <class 'str'>

lfe
Values must be of type <class 'int'>

lff
Values must be of type <class 'int'>

lfo
Values must be of type <class 'int'>

lhe
Values must be of type <class 'int'>

lhf
Values must be of type <class 'int'>

lho
Values must be of type <class 'int'>

rfe
Values must be of type <class 'int'>

rff
Values must be of type <class 'int'>

rfo
Values must be of type <class 'int'>

rhe
Values must be of type <class 'int'>

rhf
Values must be of type <class 'int'>

rho
Values must be of type <class 'int'>

class openpyxl.chartsheet.relation.**SheetBackgroundPicture**(*id*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

id
Values must be of type <class 'str'>

tagname = 'picture'

openpyxl.chartsheet.views module

class openpyxl.chartsheet.views.**ChartsheetView**(*tabSelected=None*, *zoomScale=None*, *workbookViewId=0*, *zoomToFit=None*, *extLst=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

extLst
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

tabSelected
Values must be of type <class 'bool'>

tagname = 'sheetView'

workbookViewId
Values must be of type <class 'int'>

zoomScale
Values must be of type <class 'int'>

zoomToFit
Values must be of type <class 'bool'>

class openpyxl.chartsheet.views.**ChartsheetViewList**(*sheetView=None*, *extLst=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

extLst
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

sheetView
A sequence (list or tuple) that may only contain objects of the declared type

tagname = 'sheetViews'

openpyxl.comments package

Submodules

openpyxl.comments.author module

class openpyxl.comments.author.**AuthorList**(*author=()*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

author
A sequence (list or tuple) that may only contain objects of the declared type

tagname = 'authors'

openpyxl.comments.comments module

class `openpyxl.comments.comments.`**`Comment`**(*text*, *author*)

Bases: `object`

`parent`

`text`

Any comment text stripped of all formatting.

openpyxl.comments.properties module

class `openpyxl.comments.properties.`**`Comment`**(*ref=''*, *authorId=0*, *guid=None*, *shapeId=0*, *text=None*, *commentPr=None*, *author=None*)

Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

`author`

Values must be of type <class 'str'>

`authorId`

Values must be of type <class 'int'>

`commentPr`

Values must be of type <class 'openpyxl.comments.properties.Properties'>

`content`

Remove all inline formatting and stuff

`guid`

`ref`

Values must be of type <class 'str'>

`shapeId`

Values must be of type <class 'int'>

`tagname` **= 'comment'**

`text`

Values must be of type <class 'openpyxl.cell.text.Text'>

class `openpyxl.comments.properties.`**`CommentSheet`**(*authors=None*, *commentList=None*, *extLst=None*)

Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

`authors`

Values must be of type <class 'openpyxl.comments.author.AuthorList'>

`commentList`

Wrap a sequence in an containing object

`extLst`

Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

`tagname` **= 'comments'**

`to_tree`()

class `openpyxl.comments.properties.`**`ObjectAnchor`**(*moveWithCells=None*, *sizeWithCells=None*)

Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

`moveWithCells`

Values must be of type <class 'bool'>

`sizeWithCells`

Values must be of type <class 'bool'>

class `openpyxl.comments.properties.`**`Properties`**(*locked=None*, *defaultSize=None*, *_print=None*, *disabled=None*, *uiObject=None*, *autoFill=None*, *autoLine=None*, *altText=None*, *textHAlign=None*, *textVAlign=None*, *lockText=None*, *justLastX=None*, *autoScale=None*, *rowHidden=None*, *colHidden=None*, *anchor=None*)

Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

`altText`
Values must be of type <class 'str'>

`anchor`
Values must be of type <class 'openpyxl.comments.properties.ObjectAnchor'>

`autoFill`
Values must be of type <class 'bool'>

`autoLine`
Values must be of type <class 'bool'>

`autoScale`
Values must be of type <class 'bool'>

`colHidden`
Values must be of type <class 'bool'>

`defaultSize`
Values must be of type <class 'bool'>

`disabled`
Values must be of type <class 'bool'>

`justLastX`
Values must be of type <class 'bool'>

`lockText`
Values must be of type <class 'bool'>

`locked`
Values must be of type <class 'bool'>

`rowHidden`
Values must be of type <class 'bool'>

`textHAlign`
Value must be one of {'right', 'justify', 'center', 'distributed', 'left'}

`textVAlign`
Value must be one of {'justify', 'center', 'top', 'bottom', 'distributed'}

`uiObject`
Values must be of type <class 'bool'>

openpyxl.comments.reader module

`openpyxl.comments.reader.`**`get_comments_file`**(*worksheet_path*, *archive*, *valid_files*)
Returns the XML filename in the archive which contains the comments for the spreadsheet with codename sheet_codename.

`openpyxl.comments.reader.`**`read_comments`**(*ws*, *xml_source*)
Given a worksheet and the XML of its comments file, assigns comments to cells

openpyxl.comments.writer module

class `openpyxl.comments.writer.`**`CommentWriter`**`(`*sheet*`)`

Bases: `object`

`write_comments``()`

Create list of comments and authors

`write_comments_vml``()`

openpyxl.descriptors package

class `openpyxl.descriptors.`**`MetaSerialisable`**

Bases: `type`

class `openpyxl.descriptors.`**`MetaStrict`**

Bases: `type`

class `openpyxl.descriptors.`**`Strict`**

Bases: `object`

Submodules

openpyxl.descriptors.base module

class `openpyxl.descriptors.base.`**`ASCII`**`(`**args*, ***kw*`)`

Bases: *`openpyxl.descriptors.base.Typed`*

`expected_type`

alias of `bytes`

class `openpyxl.descriptors.base.`**`Alias`**`(`*alias*`)`

Bases: *`openpyxl.descriptors.base.Descriptor`*

Aliases can be used when either the desired attribute name is not allowed or confusing in Python (eg. "type") or a more descriptve name is desired (eg. "underline" for "u")

class `openpyxl.descriptors.base.`**`Bool`**`(`**args*, ***kw*`)`

Bases: *`openpyxl.descriptors.base.Convertible`*

`expected_type`

alias of `bool`

class `openpyxl.descriptors.base.`**`Convertible`**`(`**args*, ***kw*`)`

Bases: *`openpyxl.descriptors.base.Typed`*

Values must be convertible to a particular type

class `openpyxl.descriptors.base.`**`DateTime`**`(`**args*, ***kw*`)`

Bases: *`openpyxl.descriptors.base.Typed`*

`expected_type`

alias of `datetime`

class `openpyxl.descriptors.base.`**`Default`**`(`*name=None*, ***kw*`)`

Bases: *`openpyxl.descriptors.base.Typed`*

When called returns an instance of the expected type. Additional default values can be passed in to the descriptor

class `openpyxl.descriptors.base.`**`Descriptor`**`(`*name=None*, ***kw*`)`

Bases: `object`

class `openpyxl.descriptors.base.`**`Float`**`(`**args*, ***kw*`)`
Bases: *`openpyxl.descriptors.base.Convertible`*

`expected_type`
alias of `float`

class `openpyxl.descriptors.base.`**`Integer`**`(`**args*, ***kw*`)`
Bases: *`openpyxl.descriptors.base.Convertible`*

`expected_type`
alias of `int`

class `openpyxl.descriptors.base.`**`Length`**`(`*name=None*, ***kw*`)`
Bases: *`openpyxl.descriptors.base.Descriptor`*

class `openpyxl.descriptors.base.`**`MatchPattern`**`(`*name=None*, ***kw*`)`
Bases: *`openpyxl.descriptors.base.Descriptor`*

Values must match a regex pattern

`allow_none` **= False**

class `openpyxl.descriptors.base.`**`Max`**`(`***kw*`)`
Bases: *`openpyxl.descriptors.base.Convertible`*

Values must be less than a *max* value

`allow_none` **= False**

`expected_type`
alias of `float`

class `openpyxl.descriptors.base.`**`Min`**`(`***kw*`)`
Bases: *`openpyxl.descriptors.base.Convertible`*

Values must be greater than a *min* value

`allow_none` **= False**

`expected_type`
alias of `float`

class `openpyxl.descriptors.base.`**`MinMax`**`(`***kw*`)`
Bases: *`openpyxl.descriptors.base.Min`*, *`openpyxl.descriptors.base.Max`*

Values must be greater than *min* value and less than a *max* one

class `openpyxl.descriptors.base.`**`NoneSet`**`(`*name=None*, ***kw*`)`
Bases: *`openpyxl.descriptors.base.Set`*

'none' will be treated as None

class `openpyxl.descriptors.base.`**`Set`**`(`*name=None*, ***kw*`)`
Bases: *`openpyxl.descriptors.base.Descriptor`*

Value can only be from a set of know values

class `openpyxl.descriptors.base.`**`String`**`(`**args*, ***kw*`)`
Bases: *`openpyxl.descriptors.base.Typed`*

`expected_type`
alias of `str`

class `openpyxl.descriptors.base.`**`Tuple`**`(`**args*, ***kw*`)`
Bases: *`openpyxl.descriptors.base.Typed`*

expected_type
alias of `tuple`

class `openpyxl.descriptors.base.`**`Typed`**(**args*, ***kw*)
Bases: *`openpyxl.descriptors.base.Descriptor`*

Values must of a particular type

allow_none = False

expected_type
alias of `NoneType`

nested = False

openpyxl.descriptors.excel module

class `openpyxl.descriptors.excel.`**`Base64Binary`**(*name=None*, ***kw*)
Bases: *`openpyxl.descriptors.base.MatchPattern`*

pattern = '^(?:[A-Za-z0-9+/]{4})*(?:[A-Za-z0-9+/]{2}==|[A-Za-z0-9+/]{3}=|[A-Za-z0-9+/]{4})$'

class `openpyxl.descriptors.excel.`**`Extension`**(*uri=None*)
Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

uri
Values must be of type <class 'str'>

class `openpyxl.descriptors.excel.`**`ExtensionList`**(*ext=()*)
Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

ext
A sequence (list or tuple) that may only contain objects of the declared type

class `openpyxl.descriptors.excel.`**`Guid`**(*name=None*, ***kw*)
Bases: *`openpyxl.descriptors.base.MatchPattern`*

pattern = '{[0-9A-F]{8}-[0-9A-F]{4}-[0-9A-F]{4}-[0-9A-F]{4}-[0-9A-F]{12}\\}'

class `openpyxl.descriptors.excel.`**`HexBinary`**(*name=None*, ***kw*)
Bases: *`openpyxl.descriptors.base.MatchPattern`*

pattern = '[0-9a-fA-F]+$'

class `openpyxl.descriptors.excel.`**`Percentage`**(*name=None*, ***kw*)
Bases: *`openpyxl.descriptors.base.MatchPattern`*

pattern = '((100)|([0-9][0-9]?))(\\.[0-9][0-9]?)?%'

class `openpyxl.descriptors.excel.`**`Relation`**(**args*, ***kw*)
Bases: *`openpyxl.descriptors.base.String`*

allow_none = True

namespace = 'http://schemas.openxmlformats.org/officeDocument/2006/relationships'

class `openpyxl.descriptors.excel.`**`TextPoint`**(***kw*)
Bases: *`openpyxl.descriptors.base.MinMax`*

Size in hundredths of points. In theory other units of measurement can be used but these are unbounded

expected_type
alias of `int`

max = 400000

min = -400000

class openpyxl.descriptors.excel.**UniversalMeasure**(*name=None*, ***kw*)
Bases: *openpyxl.descriptors.base.MatchPattern*

pattern = **'[0-9]+(\\.[0-9]+)?(mm|cm|in|pt|pc|pi)'**

openpyxl.descriptors.namespace module

openpyxl.descriptors.namespace.**namespaced**(*obj*, *tagname*, *namespace=None*)
Utility to create a namespaced tag for an object

openpyxl.descriptors.nested module

class openpyxl.descriptors.nested.**EmptyTag**(**args*, ***kw*)
Bases: *openpyxl.descriptors.nested.Nested*, *openpyxl.descriptors.base.Bool*

Boolean if a tag exists or not.

from_tree(*node*)

to_tree(*tagname=None*, *value=None*, *namespace=None*)

class openpyxl.descriptors.nested.**Nested**(*name=None*, ***kw*)
Bases: *openpyxl.descriptors.base.Descriptor*

attribute = **'val'**

from_tree(*node*)

nested = **True**

to_tree(*tagname=None*, *value=None*, *namespace=None*)

class openpyxl.descriptors.nested.**NestedBool**(**args*, ***kw*)
Bases: *openpyxl.descriptors.nested.NestedValue*, *openpyxl.descriptors.base.Bool*

from_tree(*node*)

class openpyxl.descriptors.nested.**NestedFloat**(**args*, ***kw*)
Bases: *openpyxl.descriptors.nested.NestedValue*, *openpyxl.descriptors.base.Float*

class openpyxl.descriptors.nested.**NestedInteger**(**args*, ***kw*)
Bases: *openpyxl.descriptors.nested.NestedValue*, *openpyxl.descriptors.base.Integer*

class openpyxl.descriptors.nested.**NestedMinMax**(***kw*)
Bases: *openpyxl.descriptors.nested.Nested*, *openpyxl.descriptors.base.MinMax*

class openpyxl.descriptors.nested.**NestedNoneSet**(*name=None*, ***kw*)
Bases: *openpyxl.descriptors.nested.Nested*, *openpyxl.descriptors.base.NoneSet*

class openpyxl.descriptors.nested.**NestedSet**(*name=None*, ***kw*)
Bases: *openpyxl.descriptors.nested.Nested*, *openpyxl.descriptors.base.Set*

class openpyxl.descriptors.nested.**NestedString**(**args*, ***kw*)
Bases: *openpyxl.descriptors.nested.NestedValue*, *openpyxl.descriptors.base.String*

class openpyxl.descriptors.nested.**NestedText**(**args*, ***kw*)
Bases: *openpyxl.descriptors.nested.NestedValue*

Represents any nested tag with the value as the contents of the tag

from_tree(*node*)

to_tree(*tagname=None*, *value=None*, *namespace=None*)

class `openpyxl.descriptors.nested.`**`NestedValue`**(**args*, ***kw*)
Bases: *`openpyxl.descriptors.nested.Nested`*, *`openpyxl.descriptors.base.Convertible`*

Nested tag storing the value on the 'val' attribute

openpyxl.descriptors.sequence module

class `openpyxl.descriptors.sequence.`**`NestedSequence`**(*name=None*, ***kw*)
Bases: *`openpyxl.descriptors.sequence.Sequence`*

Wrap a sequence in an containing object

`count` = **False**

`from_tree`(*node*)

`to_tree`(*tagname*, *obj*, *namespace=None*)

class `openpyxl.descriptors.sequence.`**`Sequence`**(*name=None*, ***kw*)
Bases: *`openpyxl.descriptors.base.Descriptor`*

A sequence (list or tuple) that may only contain objects of the declared type

`expected_type`
alias of `NoneType`

`idx_base` = **0**

`seq_types` = **(<class 'list'>, <class 'tuple'>)**

`to_tree`(*tagname*, *obj*, *namespace=None*)
Convert the sequence represented by the descriptor to an XML element

`unique` = **False**

class `openpyxl.descriptors.sequence.`**`ValueSequence`**(*name=None*, ***kw*)
Bases: *`openpyxl.descriptors.sequence.Sequence`*

A sequence of primitive types that are stored as a single attribute. "val" is the default attribute

`attribute` = **'val'**

`from_tree`(*node*)

`to_tree`(*tagname*, *obj*, *namespace=None*)

openpyxl.descriptors.serialisable module

class `openpyxl.descriptors.serialisable.`**`Serialisable`**
Bases: `openpyxl.descriptors._Serialisable`

Objects can serialise to XML their attributes and child objects. The following class attributes are created by the metaclass at runtime: __attrs__ = attributes __nested__ = single-valued child treated as an attribute __elements__ = child elements

classmethod **`from_tree`**(*node*)
Create object from XML

`idx_base` = **0**

`namespace` = **None**

`tagname`

`to_tree`(*tagname=None*, *idx=None*, *namespace=None*)

openpyxl.drawing package

Submodules

openpyxl.drawing.colors module

class `openpyxl.drawing.colors.`**`ColorChoice`**(*scrgbClr=None*, *srgbClr=None*, *hslClr=None*, *sysClr=None*, *schemeClr=None*, *prstClr=None*)

Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

`hslClr`
Values must be of type <class 'openpyxl.drawing.colors.HSLColor'>

`namespace` = 'http://schemas.openxmlformats.org/drawingml/2006/main'

`prstClr`
Value must be one of {'lightSlateGray', 'oldLace', 'ltPink', 'lightSteelBlue', 'peachPuff', 'steelBlue', 'dkViolet', 'greenYellow', 'darkGrey', 'moccasin', 'snow', 'yellow', 'firebrick', 'medTurquoise', 'gray', 'lightSkyBlue', 'darkOrchid', 'medSeaGreen', 'salmon', 'mistyRose', 'black', 'aquamarine', 'dkOrange', 'mintCream', 'red', 'magenta', 'ltSalmon', 'indianRed', 'dkGoldenrod', 'lightSeaGreen', 'paleVioletRed', 'royalBlue', 'darkSlateBlue', 'pink', 'crimson', 'darkGoldenrod', 'darkTurquoise', 'dimGray', 'tomato', 'dkOliveGreen', 'springGreen', 'dkKhaki', 'mediumSlateBlue', 'lightBlue', 'lavenderBlush', 'darkViolet', 'lightCyan', 'bisque', 'lightSlateGrey', 'oliveDrab', 'peru', 'darkBlue', 'wheat', 'blanchedAlmond', 'maroon', 'midnightBlue', 'darkGray', 'grey', 'antiqueWhite', 'darkOrange', 'dkGreen', 'goldenrod', 'orchid', 'navy', 'ltGray', 'ltSkyBlue', 'ltSteelBlue', 'medSlateBlue', 'navajoWhite', 'violet', 'gold', 'dkSlateGrey', 'dkTurquoise', 'paleGoldenrod', 'dkGray', 'medPurple', 'mediumPurple', 'darkGreen', 'darkSeaGreen', 'saddleBrown', 'dkRed', 'skyBlue', 'teal', 'ghostWhite', 'mediumVioletRed', 'ltSlateGray', 'cornsilk', 'seaGreen', 'silver', 'honeydew', 'ltGreen', 'dkSeaGreen', 'deepPink', 'medAquamarine', 'dkMagenta', 'lightCoral', 'medBlue', 'medOrchid', 'darkSlateGray', 'aqua', 'beige', 'ltSeaGreen', 'lemonChiffon', 'orange', 'whiteSmoke', 'blue', 'lightGoldenrodYellow', 'cyan', 'dkCyan', 'indigo', 'chocolate', 'lightSalmon', 'coral', 'darkSalmon', 'dkGrey', 'sienna', 'dkSalmon', 'papayaWhip', 'darkCyan', 'thistle', 'khaki', 'lightPink', 'dimGrey', 'ltGrey', 'cornflowerBlue', 'ltSlateGrey', 'purple', 'orangeRed', 'ivory', 'dkOrchid', 'floralWhite', 'linen', 'rosyBrown', 'gainsboro', 'olive', 'hotPink', 'lightGreen', 'dkBlue', 'dodgerBlue', 'darkRed', 'blueViolet', 'darkSlateGrey', 'ltGoldenrodYellow', 'mediumOrchid', 'burlyWood', 'ltYellow', 'lawnGreen', 'azure', 'limeGreen', 'lightYellow', 'dkSlateBlue', 'ltBlue', 'slateBlue', 'mediumAquamarine', 'tan', 'green', 'slateGrey', 'lightGray', 'medVioletRed', 'dkSlateGray', 'lavender', 'darkKhaki', 'cadetBlue', 'mediumSeaGreen', 'darkOliveGreen', 'paleGreen', 'ltCoral', 'mediumBlue', 'sandyBrown', 'paleTurquoise', 'mediumSpringGreen', 'brown', 'fuchsia', 'deepSkyBlue', 'plum', 'seaShell', 'ltCyan', 'forestGreen', 'slateGray', 'lightGrey', 'chartreuse', 'aliceBlue', 'lime', 'mediumTurquoise', 'darkMagenta', 'medSpringGreen', 'yellowGreen', 'powderBlue', 'turquoise', 'white'}

`schemeClr`
Value must be one of {'accent3', 'phClr', 'accent5', 'hlink', 'dk1', 'accent6', 'bg1', 'lt2', 'accent2', 'accent1', 'dk2', 'lt1', 'accent4', 'bg2', 'folHlink', 'tx1', 'tx2'}

`scrgbClr`
Values must be of type <class 'openpyxl.drawing.colors.RGBPercent'>

`srgbClr`
Values must be of type <class 'str'>

`sysClr`
Values must be of type <class 'openpyxl.drawing.colors.SystemColor'>

`tagname` = 'colorChoice'

class `openpyxl.drawing.colors.`**`ColorChoiceDescriptor`**(**args*, ***kw*)

Bases: *`openpyxl.descriptors.base.Typed`*

Objects can choose from 7 different kinds of color system. Assume RGBHex if a string is passed in.

allow_none = True

expected_type
alias of `ColorChoice`

class `openpyxl.drawing.colors.`**`ColorMapping`**(*bg1='lt1', tx1='dk1', bg2='lt2', tx2='dk2', accent1='accent1', accent2='accent2', accent3='accent3', accent4='accent4', accent5='accent5', accent6='accent6', hlink='hlink', folHlink='folHlink', extLst=None*)

Bases: `openpyxl.descriptors.serialisable.Serialisable`

accent1
Value must be one of {'accent3', 'accent5', 'hlink', 'dk1', 'accent6', 'lt2', 'accent2', 'accent1', 'dk2', 'lt1', 'accent4', 'folHlink'}

accent2
Value must be one of {'accent3', 'accent5', 'hlink', 'dk1', 'accent6', 'lt2', 'accent2', 'accent1', 'dk2', 'lt1', 'accent4', 'folHlink'}

accent3
Value must be one of {'accent3', 'accent5', 'hlink', 'dk1', 'accent6', 'lt2', 'accent2', 'accent1', 'dk2', 'lt1', 'accent4', 'folHlink'}

accent4
Value must be one of {'accent3', 'accent5', 'hlink', 'dk1', 'accent6', 'lt2', 'accent2', 'accent1', 'dk2', 'lt1', 'accent4', 'folHlink'}

accent5
Value must be one of {'accent3', 'accent5', 'hlink', 'dk1', 'accent6', 'lt2', 'accent2', 'accent1', 'dk2', 'lt1', 'accent4', 'folHlink'}

accent6
Value must be one of {'accent3', 'accent5', 'hlink', 'dk1', 'accent6', 'lt2', 'accent2', 'accent1', 'dk2', 'lt1', 'accent4', 'folHlink'}

bg1
Value must be one of {'accent3', 'accent5', 'hlink', 'dk1', 'accent6', 'lt2', 'accent2', 'accent1', 'dk2', 'lt1', 'accent4', 'folHlink'}

bg2
Value must be one of {'accent3', 'accent5', 'hlink', 'dk1', 'accent6', 'lt2', 'accent2', 'accent1', 'dk2', 'lt1', 'accent4', 'folHlink'}

extLst
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

folHlink
Value must be one of {'accent3', 'accent5', 'hlink', 'dk1', 'accent6', 'lt2', 'accent2', 'accent1', 'dk2', 'lt1', 'accent4', 'folHlink'}

hlink
Value must be one of {'accent3', 'accent5', 'hlink', 'dk1', 'accent6', 'lt2', 'accent2', 'accent1', 'dk2', 'lt1', 'accent4', 'folHlink'}

tagname = 'clrMapOvr'

tx1
Value must be one of {'accent3', 'accent5', 'hlink', 'dk1', 'accent6', 'lt2', 'accent2', 'accent1', 'dk2', 'lt1', 'accent4', 'folHlink'}

tx2
Value must be one of {'accent3', 'accent5', 'hlink', 'dk1', 'accent6', 'lt2', 'accent2', 'accent1', 'dk2', 'lt1', 'accent4', 'folHlink'}

class openpyxl.drawing.colors.**HSLColor**(*hue=None*, *sat=None*, *lum=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

hue
Values must be of type <class 'int'>

lum
Values must be of type <class 'float'>

sat
Values must be of type <class 'float'>

tagname = 'hslClr'

class openpyxl.drawing.colors.**RGBPercent**(*r=None*, *g=None*, *b=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

b
Values must be of type <class 'float'>

g
Values must be of type <class 'float'>

r
Values must be of type <class 'float'>

tagname = 'rgbClr'

class openpyxl.drawing.colors.**SystemColor**(*val='bg1'*, *lastClr=None*, *tint=None*, *shade=None*, *comp=None*, *inv=None*, *gray=None*, *alpha=None*, *alphaOff=None*, *alphaMod=None*, *hue=None*, *hueOff=None*, *hueMod=None*, *sat=None*, *satOff=None*, *satMod=None*, *lum=None*, *lumOff=None*, *lumMod=None*, *red=None*, *redOff=None*, *redMod=None*, *green=None*, *greenOff=None*, *greenMod=None*, *blue=None*, *blueOff=None*, *blueMod=None*, *gamma=None*, *invGamma=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

alpha
Values must be of type <class 'int'>

alphaMod
Values must be of type <class 'int'>

alphaOff
Values must be of type <class 'int'>

blue
Values must be of type <class 'int'>

blueMod
Values must be of type <class 'int'>

blueOff
Values must be of type <class 'int'>

comp
Values must be of type <class 'openpyxl.drawing.colors.Transform'>

gamma
Values must be of type <class 'openpyxl.drawing.colors.Transform'>

gray
Values must be of type <class 'openpyxl.drawing.colors.Transform'>

green
Values must be of type <class 'int'>

greenMod
Values must be of type <class 'int'>

greenOff
Values must be of type <class 'int'>

hue
Values must be of type <class 'int'>

hueMod
Values must be of type <class 'int'>

hueOff
Values must be of type <class 'int'>

inv
Values must be of type <class 'openpyxl.drawing.colors.Transform'>

invGamma
Values must be of type <class 'openpyxl.drawing.colors.Transform'>

lastClr
Values must be of type <class 'openpyxl.styles.colors.RGB'>

lum
Values must be of type <class 'int'>

lumMod
Values must be of type <class 'int'>

lumOff
Values must be of type <class 'int'>

red
Values must be of type <class 'int'>

redMod
Values must be of type <class 'int'>

redOff
Values must be of type <class 'int'>

sat
Values must be of type <class 'int'>

satMod
Values must be of type <class 'int'>

satOff
Values must be of type <class 'int'>

shade
Values must be of type <class 'int'>

tagname = 'sysClr'

tint
Values must be of type <class 'int'>

val
Value must be one of {'accent3', 'phClr', 'accent5', 'hlink', 'dk1', 'accent6', 'bg1', 'lt2', 'accent2', 'accent1', 'dk2', 'lt1', 'accent4', 'bg2', 'folHlink', 'tx1', 'tx2'}

class `openpyxl.drawing.colors.`**`Transform`**
Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

openpyxl.drawing.drawing module

class `openpyxl.drawing.drawing.`**`Drawing`**
Bases: `object`

a drawing object - eg container for shapes or charts we assume user specifies dimensions in pixels; units are converted to EMU in the drawing part

anchor

count = 0

get_emu_dimensions()
return (x, y, w, h) in EMU

height

set_dimension(*w=0*, *h=0*)

width

openpyxl.drawing.effect module

class `openpyxl.drawing.effect.`**`AlphaBiLevelEffect`**(*thresh=None*)
Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

thresh
Values must be of type <class 'int'>

class `openpyxl.drawing.effect.`**`AlphaCeilingEffect`**
Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

class `openpyxl.drawing.effect.`**`AlphaFloorEffect`**
Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

class `openpyxl.drawing.effect.`**`AlphaInverseEffect`**
Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

class `openpyxl.drawing.effect.`**`AlphaModulateEffect`**(*cont=None*)
Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

cont
Values must be of type <class 'openpyxl.drawing.effect.EffectContainer'>

class `openpyxl.drawing.effect.`**`AlphaModulateFixedEffect`**(*amt=None*)
Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

amt
Values must be of type <class 'int'>

class `openpyxl.drawing.effect.`**`AlphaReplaceEffect`**(*a=None*)
Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

`a`
Values must be of type <class 'int'>

class `openpyxl.drawing.effect.`**`BiLevelEffect`**(*thresh=None*)
Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

`thresh`
Values must be of type <class 'int'>

class `openpyxl.drawing.effect.`**`BlurEffect`**(*rad=None*, *grow=None*)
Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

`grow`
Values must be of type <class 'bool'>

`rad`
Values must be of type <class 'float'>

class `openpyxl.drawing.effect.`**`Color`**
Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

class `openpyxl.drawing.effect.`**`ColorChangeEffect`**(*useA=None*, *clrFrom=None*, *clrTo=None*)
Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

`clrFrom`
Values must be of type <class 'openpyxl.drawing.effect.Color'>

`clrTo`
Values must be of type <class 'openpyxl.drawing.effect.Color'>

`useA`
Values must be of type <class 'bool'>

class `openpyxl.drawing.effect.`**`ColorReplaceEffect`**
Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

class `openpyxl.drawing.effect.`**`DuotoneEffect`**
Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

class `openpyxl.drawing.effect.`**`EffectContainer`**(*type=None*, *name=None*)
Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

`name`
Values must be of type <class 'str'>

`type`
Value must be one of {'sib', 'tree'}

class `openpyxl.drawing.effect.`**`EffectList`**(*blur=None*, *fillOverlay=None*, *glow=None*, *innerShdw=None*, *outerShdw=None*, *prstShdw=None*, *reflection=None*, *softEdge=None*)
Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

`blur`
Values must be of type <class 'openpyxl.drawing.effect.BlurEffect'>

`fillOverlay`
Values must be of type <class 'openpyxl.drawing.effect.FillOverlayEffect'>

glow
Values must be of type <class 'openpyxl.drawing.effect.GlowEffect'>

innerShdw
Values must be of type <class 'openpyxl.drawing.effect.InnerShadowEffect'>

outerShdw
Values must be of type <class 'openpyxl.drawing.effect.OuterShadowEffect'>

prstShdw
Values must be of type <class 'openpyxl.drawing.effect.PresetShadowEffect'>

reflection
Values must be of type <class 'openpyxl.drawing.effect.ReflectionEffect'>

softEdge
Values must be of type <class 'openpyxl.drawing.effect.SoftEdgesEffect'>

class `openpyxl.drawing.effect.`**`FillOverlayEffect`**(*blend=None*)
Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

blend
Value must be one of {'over', 'mult', 'screen', 'darken', 'lighten'}

class `openpyxl.drawing.effect.`**`GlowEffect`**(*rad=None*, ***kw*)
Bases: *`openpyxl.drawing.colors.ColorChoice`*

hslClr
Values must be of type <class 'openpyxl.drawing.colors.HSLColor'>

prstClr
Value must be one of {'lightSlateGray', 'oldLace', 'ltPink', 'lightSteelBlue', 'peachPuff', 'steelBlue', 'dkViolet', 'greenYellow', 'darkGrey', 'moccasin', 'snow', 'yellow', 'firebrick', 'medTurquoise', 'gray', 'lightSkyBlue', 'darkOrchid', 'medSeaGreen', 'salmon', 'mistyRose', 'black', 'aquamarine', 'dkOrange', 'mintCream', 'red', 'magenta', 'ltSalmon', 'indianRed', 'dkGoldenrod', 'lightSeaGreen', 'paleVioletRed', 'royalBlue', 'darkSlateBlue', 'pink', 'crimson', 'darkGoldenrod', 'darkTurquoise', 'dimGray', 'tomato', 'dkOliveGreen', 'springGreen', 'dkKhaki', 'mediumSlateBlue', 'lightBlue', 'lavenderBlush', 'darkViolet', 'lightCyan', 'bisque', 'lightSlateGrey', 'oliveDrab', 'peru', 'darkBlue', 'wheat', 'blanchedAlmond', 'maroon', 'midnightBlue', 'darkGray', 'grey', 'antiqueWhite', 'darkOrange', 'dkGreen', 'goldenrod', 'orchid', 'navy', 'ltGray', 'ltSkyBlue', 'ltSteelBlue', 'medSlateBlue', 'navajoWhite', 'violet', 'gold', 'dkSlateGrey', 'dkTurquoise', 'paleGoldenrod', 'dkGray', 'medPurple', 'mediumPurple', 'darkGreen', 'darkSeaGreen', 'saddleBrown', 'dkRed', 'skyBlue', 'teal', 'ghostWhite', 'mediumVioletRed', 'ltSlateGray', 'cornsilk', 'seaGreen', 'silver', 'honeydew', 'ltGreen', 'dkSeaGreen', 'deepPink', 'medAquamarine', 'dkMagenta', 'lightCoral', 'medBlue', 'medOrchid', 'darkSlateGray', 'aqua', 'beige', 'ltSeaGreen', 'lemonChiffon', 'orange', 'whiteSmoke', 'blue', 'lightGoldenrodYellow', 'cyan', 'dkCyan', 'indigo', 'chocolate', 'lightSalmon', 'coral', 'darkSalmon', 'dkGrey', 'sienna', 'dkSalmon', 'papayaWhip', 'darkCyan', 'thistle', 'khaki', 'lightPink', 'dimGrey', 'ltGrey', 'cornflowerBlue', 'ltSlateGrey', 'purple', 'orangeRed', 'ivory', 'dkOrchid', 'floralWhite', 'linen', 'rosyBrown', 'gainsboro', 'olive', 'hotPink', 'lightGreen', 'dkBlue', 'dodgerBlue', 'darkRed', 'blueViolet', 'darkSlateGrey', 'ltGoldenrodYellow', 'mediumOrchid', 'burlyWood', 'ltYellow', 'lawnGreen', 'azure', 'limeGreen', 'lightYellow', 'dkSlateBlue', 'ltBlue', 'slateBlue', 'mediumAquamarine', 'tan', 'green', 'slateGrey', 'lightGray', 'medVioletRed', 'dkSlateGray', 'lavender', 'darkKhaki', 'cadetBlue', 'mediumSeaGreen', 'darkOliveGreen', 'paleGreen', 'ltCoral', 'mediumBlue', 'sandyBrown', 'paleTurquoise', 'mediumSpringGreen', 'brown', 'fuchsia', 'deepSkyBlue', 'plum', 'seaShell', 'ltCyan', 'forestGreen', 'slateGray', 'lightGrey', 'chartreuse', 'aliceBlue', 'lime', 'mediumTurquoise', 'darkMagenta', 'medSpringGreen', 'yellowGreen', 'powderBlue', 'turquoise', 'white'}

rad
Values must be of type <class 'float'>

schemeClr
Value must be one of {'accent3', 'phClr', 'accent5', 'hlink', 'dk1', 'accent6', 'bg1', 'lt2', 'accent2', 'accent1', 'dk2', 'lt1', 'accent4', 'bg2', 'folHlink', 'tx1', 'tx2'}

scrgbClr
Values must be of type <class 'openpyxl.drawing.colors.RGBPercent'>

srgbClr
Values must be of type <class 'str'>

sysClr
Values must be of type <class 'openpyxl.drawing.colors.SystemColor'>

class openpyxl.drawing.effect.**GrayscaleEffect**
Bases: *openpyxl.descriptors.serialisable.Serialisable*

class openpyxl.drawing.effect.**HSLEffect**(*hue=None*, *sat=None*, *lum=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

hue
Values must be of type <class 'int'>

lum
Values must be of type <class 'int'>

sat
Values must be of type <class 'int'>

class openpyxl.drawing.effect.**InnerShadowEffect**(*blurRad=None*, *dist=None*, *dir=None*, ***kw*)
Bases: *openpyxl.drawing.colors.ColorChoice*

blurRad
Values must be of type <class 'float'>

dir
Values must be of type <class 'int'>

dist
Values must be of type <class 'float'>

hslClr
Values must be of type <class 'openpyxl.drawing.colors.HSLColor'>

prstClr
Value must be one of {'lightSlateGray', 'oldLace', 'ltPink', 'lightSteelBlue', 'peachPuff', 'steelBlue', 'dkViolet', 'greenYellow', 'darkGrey', 'moccasin', 'snow', 'yellow', 'firebrick', 'medTurquoise', 'gray', 'lightSkyBlue', 'darkOrchid', 'medSeaGreen', 'salmon', 'mistyRose', 'black', 'aquamarine', 'dkOrange', 'mintCream', 'red', 'magenta', 'ltSalmon', 'indianRed', 'dkGoldenrod', 'lightSeaGreen', 'paleVioletRed', 'royalBlue', 'darkSlateBlue', 'pink', 'crimson', 'darkGoldenrod', 'darkTurquoise', 'dimGray', 'tomato', 'dkOliveGreen', 'springGreen', 'dkKhaki', 'mediumSlateBlue', 'lightBlue', 'lavenderBlush', 'darkViolet', 'lightCyan', 'bisque', 'lightSlateGrey', 'oliveDrab', 'peru', 'darkBlue', 'wheat', 'blanchedAlmond', 'maroon', 'midnightBlue', 'darkGray', 'grey', 'antiqueWhite', 'darkOrange', 'dkGreen', 'goldenrod', 'orchid', 'navy', 'ltGray', 'ltSkyBlue', 'ltSteelBlue', 'medSlateBlue', 'navajoWhite', 'violet', 'gold', 'dkSlateGrey', 'dkTurquoise', 'paleGoldenrod', 'dkGray', 'medPurple', 'mediumPurple', 'darkGreen', 'darkSeaGreen', 'saddleBrown', 'dkRed', 'skyBlue', 'teal', 'ghostWhite', 'mediumVioletRed', 'ltSlateGray', 'cornsilk', 'seaGreen', 'silver', 'honeydew', 'ltGreen', 'dkSeaGreen', 'deepPink', 'medAquamarine', 'dkMagenta', 'lightCoral', 'medBlue', 'medOrchid', 'darkSlateGray', 'aqua', 'beige', 'ltSeaGreen', 'lemonChiffon', 'orange', 'whiteSmoke', 'blue', 'lightGoldenrodYellow', 'cyan', 'dkCyan', 'indigo', 'chocolate', 'lightSalmon', 'coral', 'darkSalmon', 'dkGrey', 'sienna', 'dkSalmon',

'papayaWhip', 'darkCyan', 'thistle', 'khaki', 'lightPink', 'dimGrey', 'ltGrey', 'cornflowerBlue', 'ltSlateGrey', 'purple', 'orangeRed', 'ivory', 'dkOrchid', 'floralWhite', 'linen', 'rosyBrown', 'gainsboro', 'olive', 'hotPink', 'lightGreen', 'dkBlue', 'dodgerBlue', 'darkRed', 'blueViolet', 'darkSlateGrey', 'ltGoldenrodYellow', 'mediumOrchid', 'burlyWood', 'ltYellow', 'lawnGreen', 'azure', 'limeGreen', 'lightYellow', 'dkSlateBlue', 'ltBlue', 'slateBlue', 'mediumAquamarine', 'tan', 'green', 'slateGrey', 'lightGray', 'medVioletRed', 'dkSlateGray', 'lavender', 'darkKhaki', 'cadetBlue', 'mediumSeaGreen', 'darkOliveGreen', 'paleGreen', 'ltCoral', 'mediumBlue', 'sandyBrown', 'paleTurquoise', 'mediumSpringGreen', 'brown', 'fuchsia', 'deepSkyBlue', 'plum', 'seaShell', 'ltCyan', 'forestGreen', 'slateGray', 'lightGrey', 'chartreuse', 'aliceBlue', 'lime', 'mediumTurquoise', 'darkMagenta', 'medSpringGreen', 'yellowGreen', 'powderBlue', 'turquoise', 'white'}

schemeClr
Value must be one of {'accent3', 'phClr', 'accent5', 'hlink', 'dk1', 'accent6', 'bg1', 'lt2', 'accent2', 'accent1', 'dk2', 'lt1', 'accent4', 'bg2', 'folHlink', 'tx1', 'tx2'}

scrgbClr
Values must be of type <class 'openpyxl.drawing.colors.RGBPercent'>

srgbClr
Values must be of type <class 'str'>

sysClr
Values must be of type <class 'openpyxl.drawing.colors.SystemColor'>

class openpyxl.drawing.effect.**LuminanceEffect**(*bright=None*, *contrast=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

bright
Values must be of type <class 'int'>

contrast
Values must be of type <class 'int'>

class openpyxl.drawing.effect.**OuterShadowEffect**(*blurRad=None*, *dist=None*, *dir=None*, *sx=None*, *sy=None*, *kx=None*, *ky=None*, *algn=None*, *rotWithShape=None*, ***kw*)
Bases: *openpyxl.drawing.colors.ColorChoice*

algn
Value must be one of {'br', 'r', 'ctr', 'l', 'b', 'tl', 'bl', 'tr', 't'}

blurRad
Values must be of type <class 'float'>

dir
Values must be of type <class 'int'>

dist
Values must be of type <class 'float'>

hslClr
Values must be of type <class 'openpyxl.drawing.colors.HSLColor'>

kx
Values must be of type <class 'int'>

ky
Values must be of type <class 'int'>

prstClr
Value must be one of {'lightSlateGray', 'oldLace', 'ltPink', 'lightSteelBlue', 'peachPuff', 'steelBlue', 'dkViolet', 'greenYellow', 'darkGrey', 'moccasin', 'snow', 'yellow', 'firebrick', 'medTurquoise',

'gray', 'lightSkyBlue', 'darkOrchid', 'medSeaGreen', 'salmon', 'mistyRose', 'black', 'aquamarine', 'dkOrange', 'mintCream', 'red', 'magenta', 'ltSalmon', 'indianRed', 'dkGoldenrod', 'lightSeaGreen', 'paleVioletRed', 'royalBlue', 'darkSlateBlue', 'pink', 'crimson', 'darkGoldenrod', 'darkTurquoise', 'dimGray', 'tomato', 'dkOliveGreen', 'springGreen', 'dkKhaki', 'mediumSlateBlue', 'lightBlue', 'lavenderBlush', 'darkViolet', 'lightCyan', 'bisque', 'lightSlateGrey', 'oliveDrab', 'peru', 'darkBlue', 'wheat', 'blanchedAlmond', 'maroon', 'midnightBlue', 'darkGray', 'grey', 'antiqueWhite', 'darkOrange', 'dkGreen', 'goldenrod', 'orchid', 'navy', 'ltGray', 'ltSkyBlue', 'ltSteelBlue', 'medSlateBlue', 'navajoWhite', 'violet', 'gold', 'dkSlateGrey', 'dkTurquoise', 'paleGoldenrod', 'dkGray', 'medPurple', 'mediumPurple', 'darkGreen', 'darkSeaGreen', 'saddleBrown', 'dkRed', 'skyBlue', 'teal', 'ghostWhite', 'mediumVioletRed', 'ltSlateGray', 'cornsilk', 'seaGreen', 'silver', 'honeydew', 'ltGreen', 'dkSeaGreen', 'deepPink', 'medAquamarine', 'dkMagenta', 'lightCoral', 'medBlue', 'medOrchid', 'darkSlateGray', 'aqua', 'beige', 'ltSeaGreen', 'lemonChiffon', 'orange', 'whiteSmoke', 'blue', 'lightGoldenrodYellow', 'cyan', 'dkCyan', 'indigo', 'chocolate', 'lightSalmon', 'coral', 'darkSalmon', 'dkGrey', 'sienna', 'dkSalmon', 'papayaWhip', 'darkCyan', 'thistle', 'khaki', 'lightPink', 'dimGrey', 'ltGrey', 'cornflowerBlue', 'ltSlateGrey', 'purple', 'orangeRed', 'ivory', 'dkOrchid', 'floralWhite', 'linen', 'rosyBrown', 'gainsboro', 'olive', 'hotPink', 'lightGreen', 'dkBlue', 'dodgerBlue', 'darkRed', 'blueViolet', 'darkSlateGrey', 'ltGoldenrodYellow', 'mediumOrchid', 'burlyWood', 'ltYellow', 'lawnGreen', 'azure', 'limeGreen', 'lightYellow', 'dkSlateBlue', 'ltBlue', 'slateBlue', 'mediumAquamarine', 'tan', 'green', 'slateGrey', 'lightGray', 'medVioletRed', 'dkSlateGray', 'lavender', 'darkKhaki', 'cadetBlue', 'mediumSeaGreen', 'darkOliveGreen', 'paleGreen', 'ltCoral', 'mediumBlue', 'sandyBrown', 'paleTurquoise', 'mediumSpringGreen', 'brown', 'fuchsia', 'deepSkyBlue', 'plum', 'seaShell', 'ltCyan', 'forestGreen', 'slateGray', 'lightGrey', 'chartreuse', 'aliceBlue', 'lime', 'mediumTurquoise', 'darkMagenta', 'medSpringGreen', 'yellowGreen', 'powderBlue', 'turquoise', 'white'}

rotWithShape
Values must be of type <class 'bool'>

schemeClr
Value must be one of {'accent3', 'phClr', 'accent5', 'hlink', 'dk1', 'accent6', 'bg1', 'lt2', 'accent2', 'accent1', 'dk2', 'lt1', 'accent4', 'bg2', 'folHlink', 'tx1', 'tx2'}

scrgbClr
Values must be of type <class 'openpyxl.drawing.colors.RGBPercent'>

srgbClr
Values must be of type <class 'str'>

sx
Values must be of type <class 'int'>

sy
Values must be of type <class 'int'>

sysClr
Values must be of type <class 'openpyxl.drawing.colors.SystemColor'>

class `openpyxl.drawing.effect.`**`PresetShadowEffect`**(*prst=None*, *dist=None*, *dir=None*, ***kw*)

Bases: `openpyxl.drawing.colors.ColorChoice`

dir
Values must be of type <class 'int'>

dist
Values must be of type <class 'float'>

hslClr
Values must be of type <class 'openpyxl.drawing.colors.HSLColor'>

prst
Value must be one of {'shdw7', 'shdw19', 'shdw1', 'shdw4', 'shdw20', 'shdw10', 'shdw2', 'shdw15', 'shdw11', 'shdw14', 'shdw13', 'shdw12', 'shdw17', 'shdw8', 'shdw3', 'shdw5', 'shdw6', 'shdw9', 'shdw16', 'shdw18'}

prstClr
Value must be one of {'lightSlateGray', 'oldLace', 'ltPink', 'lightSteelBlue', 'peachPuff', 'steelBlue', 'dkViolet', 'greenYellow', 'darkGrey', 'moccasin', 'snow', 'yellow', 'firebrick', 'medTurquoise', 'gray', 'lightSkyBlue', 'darkOrchid', 'medSeaGreen', 'salmon', 'mistyRose', 'black', 'aquamarine', 'dkOrange', 'mintCream', 'red', 'magenta', 'ltSalmon', 'indianRed', 'dkGoldenrod', 'lightSeaGreen', 'paleVioletRed', 'royalBlue', 'darkSlateBlue', 'pink', 'crimson', 'darkGoldenrod', 'darkTurquoise', 'dimGray', 'tomato', 'dkOliveGreen', 'springGreen', 'dkKhaki', 'mediumSlateBlue', 'lightBlue', 'lavenderBlush', 'darkViolet', 'lightCyan', 'bisque', 'lightSlateGrey', 'oliveDrab', 'peru', 'darkBlue', 'wheat', 'blanchedAlmond', 'maroon', 'midnightBlue', 'darkGray', 'grey', 'antiqueWhite', 'darkOrange', 'dkGreen', 'goldenrod', 'orchid', 'navy', 'ltGray', 'ltSkyBlue', 'ltSteelBlue', 'medSlateBlue', 'navajoWhite', 'violet', 'gold', 'dkSlateGrey', 'dkTurquoise', 'paleGoldenrod', 'dkGray', 'medPurple', 'mediumPurple', 'darkGreen', 'darkSeaGreen', 'saddleBrown', 'dkRed', 'skyBlue', 'teal', 'ghostWhite', 'mediumVioletRed', 'ltSlateGray', 'cornsilk', 'seaGreen', 'silver', 'honeydew', 'ltGreen', 'dkSeaGreen', 'deepPink', 'medAquamarine', 'dkMagenta', 'lightCoral', 'medBlue', 'medOrchid', 'darkSlateGray', 'aqua', 'beige', 'ltSeaGreen', 'lemonChiffon', 'orange', 'whiteSmoke', 'blue', 'lightGoldenrodYellow', 'cyan', 'dkCyan', 'indigo', 'chocolate', 'lightSalmon', 'coral', 'darkSalmon', 'dkGrey', 'sienna', 'dkSalmon', 'papayaWhip', 'darkCyan', 'thistle', 'khaki', 'lightPink', 'dimGrey', 'ltGrey', 'cornflowerBlue', 'ltSlateGrey', 'purple', 'orangeRed', 'ivory', 'dkOrchid', 'floralWhite', 'linen', 'rosyBrown', 'gainsboro', 'olive', 'hotPink', 'lightGreen', 'dkBlue', 'dodgerBlue', 'darkRed', 'blueViolet', 'darkSlateGrey', 'ltGoldenrodYellow', 'mediumOrchid', 'burlyWood', 'ltYellow', 'lawnGreen', 'azure', 'limeGreen', 'lightYellow', 'dkSlateBlue', 'ltBlue', 'slateBlue', 'mediumAquamarine', 'tan', 'green', 'slateGrey', 'lightGray', 'medVioletRed', 'dkSlateGray', 'lavender', 'darkKhaki', 'cadetBlue', 'mediumSeaGreen', 'darkOliveGreen', 'paleGreen', 'ltCoral', 'mediumBlue', 'sandyBrown', 'paleTurquoise', 'mediumSpringGreen', 'brown', 'fuchsia', 'deepSkyBlue', 'plum', 'seaShell', 'ltCyan', 'forestGreen', 'slateGray', 'lightGrey', 'chartreuse', 'aliceBlue', 'lime', 'mediumTurquoise', 'darkMagenta', 'medSpringGreen', 'yellowGreen', 'powderBlue', 'turquoise', 'white'}

schemeClr
Value must be one of {'accent3', 'phClr', 'accent5', 'hlink', 'dk1', 'accent6', 'bg1', 'lt2', 'accent2', 'accent1', 'dk2', 'lt1', 'accent4', 'bg2', 'folHlink', 'tx1', 'tx2'}

scrgbClr
Values must be of type <class 'openpyxl.drawing.colors.RGBPercent'>

srgbClr
Values must be of type <class 'str'>

sysClr
Values must be of type <class 'openpyxl.drawing.colors.SystemColor'>

class `openpyxl.drawing.effect.`**`ReflectionEffect`**(*blurRad=None*, *stA=None*, *stPos=None*, *endA=None*, *endPos=None*, *dist=None*, *dir=None*, *fadeDir=None*, *sx=None*, *sy=None*, *kx=None*, *ky=None*, *algn=None*, *rotWithShape=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

algn
Value must be one of {'br', 'r', 'ctr', 'l', 'b', 'tl', 'bl', 'tr', 't'}

blurRad
Values must be of type <class 'float'>

dir
Values must be of type <class 'int'>

dist
Values must be of type <class 'float'>

endA
Values must be of type <class 'int'>

endPos
Values must be of type <class 'int'>

fadeDir
Values must be of type <class 'int'>

kx
Values must be of type <class 'int'>

ky
Values must be of type <class 'int'>

rotWithShape
Values must be of type <class 'bool'>

stA
Values must be of type <class 'int'>

stPos
Values must be of type <class 'int'>

sx
Values must be of type <class 'int'>

sy
Values must be of type <class 'int'>

class openpyxl.drawing.effect.**SoftEdgesEffect**(*rad=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

rad
Values must be of type <class 'float'>

class openpyxl.drawing.effect.**TintEffect**(*hue=None*, *amt=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

amt
Values must be of type <class 'int'>

hue
Values must be of type <class 'int'>

openpyxl.drawing.fill module

class openpyxl.drawing.fill.**Blip**(*cstate=None*, *embed=None*, *link=None*, *noGrp=None*, *noSelect=None*, *noRot=None*, *noChangeAspect=None*, *noMove=None*, *noResize=None*, *noEditPoints=None*, *noAdjustHandles=None*, *noChangeArrowheads=None*, *noChangeShapeType=None*, *extLst=None*, *alphaBiLevel=None*, *alphaCeiling=None*, *alphaFloor=None*, *alphaInv=None*, *alphaMod=None*, *alphaModFix=None*, *alphaRepl=None*, *biLevel=None*, *blur=None*, *clrChange=None*, *clrRepl=None*, *duotone=None*, *fillOverlay=None*, *grayscl=None*, *hsl=None*, *lum=None*, *tint=None*)

Bases: *openpyxl.descriptors.serialisable.Serialisable*

alphaBiLevel
Values must be of type <class 'openpyxl.drawing.effect.AlphaBiLevelEffect'>

alphaCeiling
Values must be of type <class 'openpyxl.drawing.effect.AlphaCeilingEffect'>

alphaFloor
Values must be of type <class 'openpyxl.drawing.effect.AlphaFloorEffect'>

alphaInv
Values must be of type <class 'openpyxl.drawing.effect.AlphaInverseEffect'>

alphaMod
Values must be of type <class 'openpyxl.drawing.effect.AlphaModulateEffect'>

alphaModFix
Values must be of type <class 'openpyxl.drawing.effect.AlphaModulateFixedEffect'>

alphaRepl
Values must be of type <class 'openpyxl.drawing.effect.AlphaReplaceEffect'>

biLevel
Values must be of type <class 'openpyxl.drawing.effect.BiLevelEffect'>

blur
Values must be of type <class 'openpyxl.drawing.effect.BlurEffect'>

clrChange
Values must be of type <class 'openpyxl.drawing.effect.ColorChangeEffect'>

clrRepl
Values must be of type <class 'openpyxl.drawing.effect.ColorReplaceEffect'>

cstate
Value must be one of {'print', 'screen', 'hqprint', 'email'}

duotone
Values must be of type <class 'openpyxl.drawing.effect.DuotoneEffect'>

embed
Values must be of type <class 'str'>

extLst
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

fillOverlay
Values must be of type <class 'openpyxl.drawing.effect.FillOverlayEffect'>

grayscl
Values must be of type <class 'openpyxl.drawing.effect.GrayscaleEffect'>

hsl
Values must be of type <class 'openpyxl.drawing.effect.HSLEffect'>

link
Values must be of type <class 'str'>

lum
Values must be of type <class 'openpyxl.drawing.effect.LuminanceEffect'>

namespace = 'http://schemas.openxmlformats.org/drawingml/2006/main'

noAdjustHandles
Values must be of type <class 'bool'>

noChangeArrowheads
Values must be of type <class 'bool'>

noChangeAspect
Values must be of type <class 'bool'>

noChangeShapeType
Values must be of type <class 'bool'>

noEditPoints
Values must be of type <class 'bool'>

noGrp
Values must be of type <class 'bool'>

noMove
Values must be of type <class 'bool'>

noResize
Values must be of type <class 'bool'>

noRot
Values must be of type <class 'bool'>

noSelect
Values must be of type <class 'bool'>

tagname = 'blip'

tint
Values must be of type <class 'openpyxl.drawing.effect.TintEffect'>

class `openpyxl.drawing.fill.`**BlipFillProperties**(*dpi=None*, *rotWithShape=None*, *blip=None*, *tile=None*, *stretch=<openpyxl.drawing.fill.StretchInfoProperties object>*, *srcRect=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

blip
Values must be of type <class 'openpyxl.drawing.fill.Blip'>

dpi
Values must be of type <class 'int'>

rotWithShape
Values must be of type <class 'bool'>

srcRect
Values must be of type <class 'openpyxl.drawing.fill.RelativeRect'>

stretch
Values must be of type <class 'openpyxl.drawing.fill.StretchInfoProperties'>

tagname = 'blipFill'

tile
Values must be of type <class 'openpyxl.drawing.fill.TileInfoProperties'>

class `openpyxl.drawing.fill.`**GradientFillProperties**(*flip=None*, *rotWithShape=None*, *gsLst=None*, *lin=None*, *path=None*, *tileRect=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

flip
Value must be one of {‘y’, ‘xy’, ‘x’}

gsLst
Values must be of type <class ‘openpyxl.drawing.fill.GradientStopList’>

lin
Values must be of type <class ‘openpyxl.drawing.fill.LinearShadeProperties’>

path
Values must be of type <class ‘openpyxl.drawing.fill.PathShadeProperties’>

rotWithShape
Values must be of type <class ‘bool’>

tagname = ‘gradFill’

tileRect
Values must be of type <class ‘openpyxl.drawing.fill.RelativeRect’>

class openpyxl.drawing.fill.**GradientStop**(*pos=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

pos
Values must be of type <class ‘float’>

tagname = ‘gradStop’

class openpyxl.drawing.fill.**GradientStopList**(*gs=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

gs
A sequence (list or tuple) that may only contain objects of the declared type

tagname = ‘gradStopLst’

class openpyxl.drawing.fill.**LinearShadeProperties**(*ang=None*, *scaled=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

ang
Values must be of type <class ‘int’>

scaled
Values must be of type <class ‘bool’>

class openpyxl.drawing.fill.**PathShadeProperties**(*path=None*, *fillToRect=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

fillToRect
Values must be of type <class ‘openpyxl.drawing.fill.RelativeRect’>

path
Value must be one of {‘shape’, ‘rect’, ‘circle’}

class openpyxl.drawing.fill.**PatternFillProperties**(*prst=None*, *fgClr=None*, *bg-Clr=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

bgClr
Values must be of type <class ‘openpyxl.drawing.colors.ColorChoice’>

fgClr
Values must be of type <class ‘openpyxl.drawing.colors.ColorChoice’>

namespace = ‘http://schemas.openxmlformats.org/drawingml/2006/main’

prst
Value must be one of {'ltHorz', 'trellis', 'lgCheck', 'pct60', 'diagBrick', 'dkVert', 'pct80', 'narVert', 'dotDmnd', 'weave', 'dashVert', 'pct50', 'plaid', 'dashUpDiag', 'pct10', 'narHorz', 'dkDnDiag', 'pct20', 'wdUpDiag', 'solidDmnd', 'openDmnd', 'pct40', 'lgConfetti', 'pct5', 'dkHorz', 'pct70', 'smGrid', 'dashHorz', 'wdDnDiag', 'smCheck', 'pct90', 'wave', 'divot', 'horz', 'pct30', 'cross', 'zigZag', 'dashDnDiag', 'dotGrid', 'sphere', 'pct75', 'ltUpDiag', 'ltVert', 'dnDiag', 'dkUpDiag', 'horzBrick', 'ltDnDiag', 'smConfetti', 'shingle', 'upDiag', 'lgGrid', 'diagCross', 'vert', 'pct25'}

tagname = 'pattFill'

class openpyxl.drawing.fill.**RelativeRect**(*l=None*, *t=None*, *r=None*, *b=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

b
Values must be of type <class 'float'>

l
Values must be of type <class 'float'>

namespace = 'http://schemas.openxmlformats.org/drawingml/2006/main'

r
Values must be of type <class 'float'>

t
Values must be of type <class 'float'>

tagname = 'rect'

class openpyxl.drawing.fill.**StretchInfoProperties**(*fillRect=<openpyxl.drawing.fill.RelativeRect object>*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

fillRect
Values must be of type <class 'openpyxl.drawing.fill.RelativeRect'>

namespace = 'http://schemas.openxmlformats.org/drawingml/2006/main'

tagname = 'stretch'

class openpyxl.drawing.fill.**TileInfoProperties**(*tx=None*, *ty=None*, *sx=None*, *sy=None*, *flip=None*, *algn=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

algn
Value must be one of {'br', 'r', 'ctr', 'l', 'b', 'tl', 'bl', 'tr', 't'}

flip
Value must be one of {'y', 'xy', 'x'}

sx
Values must be of type <class 'int'>

sy
Values must be of type <class 'int'>

tx
Values must be of type <class 'int'>

ty
Values must be of type <class 'int'>

openpyxl.drawing.graphic module

class `openpyxl.drawing.graphic.`**`ChartRelation`**(*id*)

Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

`id`
Values must be of type <class 'str'>

`namespace` **= 'http://schemas.openxmlformats.org/drawingml/2006/chart'**

`tagname` **= 'chart'**

class `openpyxl.drawing.graphic.`**`Connection`**(*id=None*, *idx=None*)

Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

`id`
Values must be of type <class 'int'>

`idx`
Values must be of type <class 'int'>

class `openpyxl.drawing.graphic.`**`Connector`**(*macro=None*, *fPublished=None*, *nvCxnSpPr=None*, *spPr=None*, *style=None*)

Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

`fPublished`
Values must be of type <class 'bool'>

`macro`
Values must be of type <class 'str'>

`nvCxnSpPr`
Values must be of type <class 'openpyxl.drawing.graphic.ConnectorNonVisual'>

`spPr`
Values must be of type <class 'openpyxl.chart.shapes.GraphicalProperties'>

`style`
Values must be of type <class 'openpyxl.drawing.shapes.ShapeStyle'>

class `openpyxl.drawing.graphic.`**`ConnectorLocking`**(*extLst=None*)

Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

`extLst`
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

class `openpyxl.drawing.graphic.`**`ConnectorNonVisual`**(*cNvPr=None*, *cNvCxnSpPr=None*)

Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

`cNvCxnSpPr`
Values must be of type <class 'openpyxl.drawing.graphic.NonVisualConnectorProperties'>

`cNvPr`
Values must be of type <class 'openpyxl.drawing.graphic.NonVisualDrawingProps'>

class `openpyxl.drawing.graphic.`**`GraphicData`**(*uri='http://schemas.openxmlformats.org/drawingml/2006/chart'*, *chart=None*)

Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

`chart`
Values must be of type <class 'openpyxl.drawing.graphic.ChartRelation'>

`namespace` **= 'http://schemas.openxmlformats.org/drawingml/2006/main'**

`tagname` **= 'graphicData'**

uri
Values must be of type <class 'str'>

class openpyxl.drawing.graphic.**GraphicFrame**(*nvGraphicFramePr=None*, *xfrm=None*, *graphic=None*, *macro=None*, *fPublished=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

fPublished
Values must be of type <class 'bool'>

graphic
Values must be of type <class 'openpyxl.drawing.graphic.GraphicObject'>

macro
Values must be of type <class 'str'>

nvGraphicFramePr
Values must be of type <class 'openpyxl.drawing.graphic.NonVisualGraphicFrame'>

tagname = 'graphicFrame'

xfrm
Values must be of type <class 'openpyxl.drawing.shapes.Transform2D'>

class openpyxl.drawing.graphic.**GraphicFrameLocking**(*noGrp=None*, *noDrilldown=None*, *noSelect=None*, *noChangeAspect=None*, *noMove=None*, *noResize=None*, *extLst=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

extLst
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

noChangeAspect
Values must be of type <class 'bool'>

noDrilldown
Values must be of type <class 'bool'>

noGrp
Values must be of type <class 'bool'>

noMove
Values must be of type <class 'bool'>

noResize
Values must be of type <class 'bool'>

noSelect
Values must be of type <class 'bool'>

class openpyxl.drawing.graphic.**GraphicObject**(*graphicData=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

graphicData
Values must be of type <class 'openpyxl.drawing.graphic.GraphicData'>

namespace = 'http://schemas.openxmlformats.org/drawingml/2006/main'

tagname = 'graphic'

class `openpyxl.drawing.graphic.`**`GroupLocking`**(*noGrp=None*, *noUngrp=None*, *noSelect=None*, *noRot=None*, *noChangeAspect=None*, *noMove=None*, *noResize=None*, *extLst=None*)

Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

`extLst`
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

`noChangeAspect`
Values must be of type <class 'bool'>

`noGrp`
Values must be of type <class 'bool'>

`noMove`
Values must be of type <class 'bool'>

`noResize`
Values must be of type <class 'bool'>

`noRot`
Values must be of type <class 'bool'>

`noSelect`
Values must be of type <class 'bool'>

`noUngrp`
Values must be of type <class 'bool'>

class `openpyxl.drawing.graphic.`**`GroupShape`**(*nvGrpSpPr=None*, *grpSpPr=None*)

Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

`grpSpPr`
Values must be of type <class 'openpyxl.drawing.graphic.GroupShapeProperties'>

`nvGrpSpPr`
Values must be of type <class 'openpyxl.drawing.graphic.NonVisualGroupShape'>

class `openpyxl.drawing.graphic.`**`GroupShapeProperties`**(*bwMode=None*, *xfrm=None*, *scene3d=None*, *extLst=None*)

Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

`bwMode`
Value must be one of {'gray', 'blackWhite', 'hidden', 'auto', 'grayWhite', 'ltGray', 'white', 'clr', 'invGray', 'blackGray', 'black'}

`extLst`
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

`scene3d`
Values must be of type <class 'openpyxl.drawing.shapes.Scene3D'>

`xfrm`
Values must be of type <class 'openpyxl.drawing.graphic.GroupTransform2D'>

class `openpyxl.drawing.graphic.`**`GroupTransform2D`**(*rot=None*, *flipH=None*, *flipV=None*, *off=None*, *ext=None*, *chOff=None*, *chExt=None*)

Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

`chExt`
Values must be of type <class 'openpyxl.drawing.shapes.PositiveSize2D'>

chOff
Values must be of type <class 'openpyxl.drawing.shapes.Point2D'>

ext
Values must be of type <class 'openpyxl.drawing.shapes.PositiveSize2D'>

flipH
Values must be of type <class 'bool'>

flipV
Values must be of type <class 'bool'>

off
Values must be of type <class 'openpyxl.drawing.shapes.Point2D'>

rot
Values must be of type <class 'int'>

class `openpyxl.drawing.graphic.`**`NonVisualConnectorProperties`**(*cxnSpLocks=None, stCxn=None, endCxn=None, extLst=None*)

Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

cxnSpLocks
Values must be of type <class 'openpyxl.drawing.graphic.ConnectorLocking'>

endCxn
Values must be of type <class 'openpyxl.drawing.graphic.Connection'>

extLst
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

stCxn
Values must be of type <class 'openpyxl.drawing.graphic.Connection'>

class `openpyxl.drawing.graphic.`**`NonVisualDrawingProps`**(*id=None, name=None, descr=None, hidden=None, title=None, hlinkClick=None, hlinkHover=None, extLst=None*)

Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

descr
Values must be of type <class 'str'>

extLst
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

hidden
Values must be of type <class 'bool'>

hlinkClick
Values must be of type <class 'openpyxl.drawing.text.Hyperlink'>

hlinkHover
Values must be of type <class 'openpyxl.drawing.text.Hyperlink'>

id
Values must be of type <class 'int'>

name
Values must be of type <class 'str'>

tagname = 'cNvPr'

title
Values must be of type <class 'str'>

class `openpyxl.drawing.graphic.`**`NonVisualGraphicFrame`**(*cNvPr=None*, *cNvGraphicFramePr=None*)
Bases: `openpyxl.descriptors.serialisable.Serialisable`

cNvGraphicFramePr
Values must be of type <class 'openpyxl.drawing.graphic.NonVisualGraphicFrameProperties'>

cNvPr
Values must be of type <class 'openpyxl.drawing.graphic.NonVisualDrawingProps'>

tagname = 'nvGraphicFramePr'

class `openpyxl.drawing.graphic.`**`NonVisualGraphicFrameProperties`**(*graphicFrameLocks=None*, *extLst=None*)
Bases: `openpyxl.descriptors.serialisable.Serialisable`

extLst
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

graphicFrameLocks
Values must be of type <class 'openpyxl.drawing.graphic.GraphicFrameLocking'>

tagname = 'cNvGraphicFramePr'

class `openpyxl.drawing.graphic.`**`NonVisualGroupDrawingShapeProps`**(*grpSpLocks=None*, *extLst=None*)
Bases: `openpyxl.descriptors.serialisable.Serialisable`

extLst
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

grpSpLocks
Values must be of type <class 'openpyxl.drawing.graphic.GroupLocking'>

class `openpyxl.drawing.graphic.`**`NonVisualGroupShape`**(*cNvPr=None*, *cNvGrpSpPr=None*)
Bases: `openpyxl.descriptors.serialisable.Serialisable`

cNvGrpSpPr
Values must be of type <class 'openpyxl.drawing.graphic.NonVisualGroupDrawingShapeProps'>

cNvPr
Values must be of type <class 'openpyxl.drawing.graphic.NonVisualDrawingProps'>

class `openpyxl.drawing.graphic.`**`NonVisualPictureProperties`**(*preferRelativeResize=None*, *picLocks=None*, *extLst=None*)
Bases: `openpyxl.descriptors.serialisable.Serialisable`

extLst
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

picLocks
Values must be of type <class 'openpyxl.drawing.graphic.PictureLocking'>

preferRelativeResize
Values must be of type <class 'bool'>

tagname = 'cNvPicPr'

class `openpyxl.drawing.graphic.`**`PictureFrame`**(*macro=None*, *fPublished=None*, *nvPicPr=None*, *blipFill=None*, *spPr=None*, *style=None*)

Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

`blipFill`
Values must be of type <class 'openpyxl.drawing.fill.BlipFillProperties'>

`fPublished`
Values must be of type <class 'bool'>

`macro`
Values must be of type <class 'str'>

`nvPicPr`
Values must be of type <class 'openpyxl.drawing.graphic.PictureNonVisual'>

`spPr`
Values must be of type <class 'openpyxl.chart.shapes.GraphicalProperties'>

`style`
Values must be of type <class 'openpyxl.drawing.shapes.ShapeStyle'>

`tagname` = 'pic'

class `openpyxl.drawing.graphic.`**`PictureLocking`**(*noCrop=None*, *noGrp=None*, *noSelect=None*, *noRot=None*, *noChangeAspect=None*, *noMove=None*, *noResize=None*, *noEditPoints=None*, *noAdjustHandles=None*, *noChangeArrowheads=None*, *noChangeShapeType=None*, *extLst=None*)

Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

`extLst`
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

`namespace` = 'http://schemas.openxmlformats.org/drawingml/2006/main'

`noAdjustHandles`
Values must be of type <class 'bool'>

`noChangeArrowheads`
Values must be of type <class 'bool'>

`noChangeAspect`
Values must be of type <class 'bool'>

`noChangeShapeType`
Values must be of type <class 'bool'>

`noCrop`
Values must be of type <class 'bool'>

`noEditPoints`
Values must be of type <class 'bool'>

`noGrp`
Values must be of type <class 'bool'>

`noMove`
Values must be of type <class 'bool'>

noResize
Values must be of type <class 'bool'>

noRot
Values must be of type <class 'bool'>

noSelect
Values must be of type <class 'bool'>

tagname = 'picLocks'

class openpyxl.drawing.graphic.**PictureNonVisual**(*cNvPr=None*, *cNvPicPr=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

cNvPicPr
Values must be of type <class 'openpyxl.drawing.graphic.NonVisualPictureProperties'>

cNvPr
Values must be of type <class 'openpyxl.drawing.graphic.NonVisualDrawingProps'>

tagname = 'nvPicPr'

openpyxl.drawing.image module

class openpyxl.drawing.image.**Image**(*img*, *coordinates=((0, 0), (1, 1))*, *size=(None, None)*, *nochangeaspect=True*, *nochangearrowheads=True*)
Bases: object

Raw Image class

anchor(*cell*, *anchortype='absolute'*)
anchors the image to the given cell optional parameter anchortype supports 'absolute' or 'oneCell'

openpyxl.drawing.image.**bounding_box**(*bw*, *bh*, *w*, *h*)
Returns a tuple (new_width, new_height) which has the property that it fits within box_width and box_height and has (close to) the same aspect ratio as the original size

openpyxl.drawing.line module

class openpyxl.drawing.line.**DashStop**(*d=0*, *sp=0*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

d
Values must be of type <class 'int'>

namespace = 'http://schemas.openxmlformats.org/drawingml/2006/main'

sp
Values must be of type <class 'int'>

tagname = 'ds'

class openpyxl.drawing.line.**DashStopList**(*ds=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

ds
A sequence (list or tuple) that may only contain objects of the declared type

class openpyxl.drawing.line.**LineEndProperties**(*type=None*, *w=None*, *len=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

len
Value must be one of {'lg', 'med', 'sm'}

namespace = 'http://schemas.openxmlformats.org/drawingml/2006/main'

tagname = 'end'

type
Value must be one of {'stealth', 'arrow', 'none', 'diamond', 'triangle', 'oval'}

w
Value must be one of {'lg', 'med', 'sm'}

class `openpyxl.drawing.line.`**`LineJoinMiterProperties`**(*lim=None*)
Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

lim
Values must be of type <class 'int'>

namespace = 'http://schemas.openxmlformats.org/drawingml/2006/main'

tagname = 'miter'

class `openpyxl.drawing.line.`**`LineProperties`**(*w=None, cap=None, cmpd=None, algn=None, noFill=None, solidFill=None, gradFill=None, pattFill=None, prstDash=None, custDash=None, round=None, bevel=None, mitre=None, headEnd=None, tailEnd=None, extLst=None*)
Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

algn
Value must be one of {'in', 'ctr'}

bevel
Values must be of type <class 'bool'>

cap
Value must be one of {'sq', 'flat', 'rnd'}

cmpd
Value must be one of {'thickThin', 'tri', 'thinThick', 'sng', 'dbl'}

custDash
Values must be of type <class 'openpyxl.drawing.line.DashStop'>

extLst
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

gradFill
Values must be of type <class 'openpyxl.drawing.fill.GradientFillProperties'>

headEnd
Values must be of type <class 'openpyxl.drawing.line.LineEndProperties'>

miter
Values must be of type <class 'openpyxl.drawing.line.LineJoinMiterProperties'>

namespace = 'http://schemas.openxmlformats.org/drawingml/2006/main'

noFill
Values must be of type <class 'bool'>

pattFill
Values must be of type <class 'openpyxl.drawing.fill.PatternFillProperties'>

prstDash
Value must be one of {'solid', 'sysDashDot', 'lgDash', 'lgDashDot', 'lgDashDotDot', 'sysDashDotDot', 'sysDash', 'dashDot', 'dash', 'sysDot', 'dot'}

round
Values must be of type <class 'bool'>

solidFill
Values must be of type <class 'openpyxl.drawing.colors.ColorChoice'>

tagname = 'ln'

tailEnd
Values must be of type <class 'openpyxl.drawing.line.LineEndProperties'>

w
Values must be of type <class 'float'>

openpyxl.drawing.shape module

class openpyxl.drawing.shape.**Shape**(*chart*, *coordinates=((0, 0), (1, 1))*, *text=None*, *scheme='accent1'*)
Bases: object

a drawing inside a chart coordiantes are specified by the user in the axis units

FONT_HEIGHT = 8

FONT_WIDTH = 7

MARGIN_BOTTOM = 28

MARGIN_LEFT = 20

RECT = 'rect'
"line" "lineInv" "triangle" "rtTriangle" "diamond" "parallelogram" "trapezoid" "nonIsoscelesTrapezoid" "pentagon" "hexagon" "heptagon" "octagon" "decagon" "dodecagon" "star4" "star5" "star6" "star7" "star8" "star10" "star12" "star16" "star24" "star32" "roundRect" "round1Rect" "round2SameRect" "round2DiagRect" "snipRoundRect" "snip1Rect" "snip2SameRect" "snip2DiagRect" "plaque" "ellipse" "teardrop" "homePlate" "chevron" "pieWedge" "pie" "blockArc" "donut" "noSmoking" "rightArrow" "leftArrow" "upArrow" "downArrow" "stripedRightArrow" "notchedRightArrow" "bentUpArrow" "leftRightArrow" "upDownArrow" "leftUpArrow" "leftRightUpArrow" "quadArrow" "leftArrowCallout" "rightArrowCallout" "upArrowCallout" "downArrowCallout" "leftRightArrowCallout" "upDownArrowCallout" "quadArrowCallout" "bentArrow" "uturnArrow" "circularArrow" "leftCircularArrow" "leftRightCircularArrow" "curvedRightArrow" "curvedLeftArrow" "curvedUpArrow" "curvedDownArrow" "swooshArrow" "cube" "can" "lightningBolt" "heart" "sun" "moon" "smileyFace" "irregularSeal1" "irregularSeal2" "foldedCorner" "bevel" "frame" "halfFrame" "corner" "diagStripe" "chord" "arc" "leftBracket" "rightBracket" "leftBrace" "rightBrace" "bracketPair" "bracePair" "straightConnector1" "bentConnector2" "bentConnector3" "bentConnector4" "bentConnector5" "curvedConnector2" "curvedConnector3" "curvedConnector4" "curvedConnector5" "callout1" "callout2" "callout3" "accentCallout1" "accentCallout2" "accentCallout3" "borderCallout1" "borderCallout2" "borderCallout3" "accentBorderCallout1" "accentBorderCallout2" "accentBorderCallout3" "wedgeRectCallout" "wedgeRoundRectCallout" "wedgeEllipseCallout" "cloudCallout" "cloud" "ribbon" "ribbon2" "ellipseRibbon" "ellipseRibbon2" "leftRightRibbon" "verticalScroll" "horizontalScroll" "wave" "doubleWave" "plus" "flowChartProcess" "flowChartDecision" "flowChartInputOutput" "flowChartPredefinedProcess" "flowChartInternalStorage" "flowChartDocument" "flowChartMultidocument" "flowChartTerminator" "flowChartPreparation" "flowChartManualInput" "flowChartManualOperation" "flowChartConnector" "flowChartPunchedCard" "flowChartPunchedTape" "flowChartSummingJunction" "flowChartOr" "flowChartCollate" "flowChartSort" "flowChartExtract" "flowChartMerge" "flowChartOfflineStorage" "flowChartOnlineStorage" "flowChartMagneticTape" "flowChartMagneticDisk" "flowChartMagneticDrum" "flowChartDisplay" "flowChartDelay" "flowChartAlternateProcess" "flowChartOffpageConnector" "actionButtonBlank" "actionButtonHome" "actionButtonHelp" "actionButtonInformation" "actionButtonForwardNext" "actionButtonBackPrevious" "actionButtonEnd" "actionButtonBeginning" "actionButtonReturn" "actionButtonDocument" "actionButtonSound" "actionButtonMovie" "gear6" "gear9"

“funnel” “mathPlus” “mathMinus” “mathMultiply” “mathDivide” “mathEqual” “mathNotEqual” “cornerTabs” “squareTabs” “plaqueTabs” “chartX” “chartStar” “chartPlus”

ROUND_RECT = ‘roundRect’

border_color

border_width

color

coordinates

Return coordindates in axis units

text_color

class openpyxl.drawing.shape.**ShapeWriter**(*shapes*)

Bases: object

one file per shape

write(*shape_id*)

openpyxl.drawing.shapes module

class openpyxl.drawing.shapes.**AdjPoint2D**(*x=None*, *y=None*)

Bases: *openpyxl.descriptors.serialisable.Serialisable*

x

Values must be of type <class ‘int’>

y

Values must be of type <class ‘int’>

class openpyxl.drawing.shapes.**AdjustHandleList**

Bases: *openpyxl.descriptors.serialisable.Serialisable*

class openpyxl.drawing.shapes.**Backdrop**(*anchor=None*, *norm=None*, *up=None*, *extLst=None*)

Bases: *openpyxl.descriptors.serialisable.Serialisable*

anchor

Values must be of type <class ‘openpyxl.drawing.shapes.Point3D’>

extLst

Values must be of type <class ‘openpyxl.descriptors.excel.ExtensionList’>

norm

Values must be of type <class ‘openpyxl.drawing.shapes.Vector3D’>

up

Values must be of type <class ‘openpyxl.drawing.shapes.Vector3D’>

class openpyxl.drawing.shapes.**Bevel**(*w=None*, *h=None*, *prst=None*)

Bases: *openpyxl.descriptors.serialisable.Serialisable*

h

Values must be of type Values must be of type <class ‘int’>

prst

Values must be of type <openpyxl.descriptors.base.Set object at 0x7fd32b6e5898>

w

Values must be of type Values must be of type <class ‘int’>

class openpyxl.drawing.shapes.**Camera**(*prst=None*, *fov=None*, *zoom=None*, *rot=None*)

Bases: *openpyxl.descriptors.serialisable.Serialisable*

fov
Values must be of type <class 'openpyxl.descriptors.base.Integer'>

prst
Values must be of type <openpyxl.descriptors.base.Set object at 0x7fd32b6e5080>

rot
Values must be of type <class 'openpyxl.drawing.shapes.SphereCoords'>

zoom
Values must be of type <class 'openpyxl.descriptors.excel.Percentage'>

class openpyxl.drawing.shapes.**ConnectionSite**(*ang=None*, *pos=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

ang
Values must be of type <class 'float'>

pos
Values must be of type <class 'openpyxl.drawing.shapes.AdjPoint2D'>

class openpyxl.drawing.shapes.**ConnectionSiteList**(*cxn=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

cxn
Values must be of type <class 'openpyxl.drawing.shapes.ConnectionSite'>

class openpyxl.drawing.shapes.**CustomGeometry2D**(*avLst=None*, *gdLst=None*, *ahLst=None*, *cxnLst=None*, *rect=None*, *pathLst=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

ahLst
Values must be of type <class 'openpyxl.drawing.shapes.AdjustHandleList'>

avLst
Values must be of type <class 'openpyxl.drawing.shapes.GeomGuideList'>

cxnLst
Values must be of type <class 'openpyxl.drawing.shapes.ConnectionSiteList'>

gdLst
Values must be of type <class 'openpyxl.drawing.shapes.GeomGuideList'>

pathLst
Values must be of type <class 'openpyxl.drawing.shapes.Path2DList'>

rect
Values must be of type <class 'openpyxl.drawing.shapes.GeomRect'>

class openpyxl.drawing.shapes.**FontReference**(*idx=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

idx
Value must be one of {'minor', 'major'}

class openpyxl.drawing.shapes.**GeomGuide**(*name=None*, *fmla=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

fmla
Values must be of type <class 'str'>

name
Values must be of type <class 'str'>

class `openpyxl.drawing.shapes.`**`GeomGuideList`**(*gd=None*)
Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

`gd`
Values must be of type <class 'openpyxl.drawing.shapes.GeomGuide'>

class `openpyxl.drawing.shapes.`**`GeomRect`**(*l=None*, *t=None*, *r=None*, *b=None*)
Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

`b`
Values must be of type <class 'int'>

`l`
Values must be of type <class 'int'>

`r`
Values must be of type <class 'int'>

`t`
Values must be of type <class 'int'>

class `openpyxl.drawing.shapes.`**`LightRig`**(*rig=None*, *dir=None*, *rot=None*)
Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

`dir`
Values must be of type <openpyxl.descriptors.base.Set object at 0x7fd32b6e52b0>

`rig`
Values must be of type <openpyxl.descriptors.base.Set object at 0x7fd32b6e51d0>

`rot`
Values must be of type <class 'openpyxl.drawing.shapes.SphereCoords'>

class `openpyxl.drawing.shapes.`**`Path2D`**(*w=None*, *h=None*, *fill=None*, *stroke=None*, *extrusionOk=None*)
Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

`extrusionOk`
Values must be of type <class 'bool'>

`fill`
Value must be one of {'darkenLess', 'norm', 'lightenLess', 'lighten', 'darken'}

`h`
Values must be of type <class 'float'>

`stroke`
Values must be of type <class 'bool'>

`w`
Values must be of type <class 'float'>

class `openpyxl.drawing.shapes.`**`Path2DList`**(*path=None*)
Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

`path`
Values must be of type <class 'openpyxl.drawing.shapes.Path2D'>

class `openpyxl.drawing.shapes.`**`Point2D`**(*x=None*, *y=None*)
Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

`x`
Values must be of type <class 'int'>

y
Values must be of type <class 'int'>

class openpyxl.drawing.shapes.**Point3D**(*x=None*, *y=None*, *z=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

x
Values must be of type <class 'openpyxl.descriptors.base.Integer'>

y
Values must be of type <class 'openpyxl.descriptors.base.Integer'>

z
Values must be of type <class 'openpyxl.descriptors.base.Integer'>

class openpyxl.drawing.shapes.**PositiveSize2D**(*cx=None*, *cy=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

Dimensions in EMUs

cx
Values must be of type <class 'int'>

cy
Values must be of type <class 'int'>

class openpyxl.drawing.shapes.**PresetGeometry2D**(*prst=None*, *avLst=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

avLst
Values must be of type <class 'openpyxl.drawing.shapes.GeomGuideList'>

namespace = 'http://schemas.openxmlformats.org/drawingml/2006/main'

prst
Value must be one of {'flowChartOnlineStorage', 'gear6', 'bentUpArrow', 'bentConnector3', 'homePlate', 'callout2', 'flowChartManualOperation', 'borderCallout3', 'actionButtonBackPrevious', 'star8', 'round2SameRect', 'accentCallout3', 'leftUpArrow', 'decagon', 'corner', 'flowChartInputOutput', 'mathNotEqual', 'diamond', 'borderCallout1', 'actionButtonMovie', 'horizontalScroll', 'flowChartManualInput', 'leftArrowCallout', 'callout3', 'star5', 'accentCallout1', 'star10', 'flowChartMagneticDrum', 'actionButtonReturn', 'actionButtonSound', 'flowChartMultidocument', 'actionButtonHome', 'actionButtonEnd', 'mathEqual', 'stripedRightArrow', 'callout1', 'mathMultiply', 'flowChartInternalStorage', 'flowChartPunchedCard', 'ribbon2', 'actionButtonBlank', 'quadArrowCallout', 'bracePair', 'flowChartOfflineStorage', 'blockArc', 'curvedUpArrow', 'foldedCorner', 'heptagon', 'uturnArrow', 'hexagon', 'roundRect', 'flowChartPreparation', 'trapezoid', 'flowChartMagneticTape', 'donut', 'lightningBolt', 'star4', 'ellipseRibbon', 'irregularSeal1', 'octagon', 'triangle', 'doubleWave', 'noSmoking', 'mathPlus', 'wedgeRectCallout', 'accentBorderCallout2', 'upArrowCallout', 'pentagon', 'plaque', 'ellipse', 'borderCallout2', 'cornerTabs', 'pie', 'quadArrow', 'flowChartDocument', 'notchedRightArrow', 'teardrop', 'snip2DiagRect', 'star6', 'actionButtonBeginning', 'leftRightArrow', 'curvedRightArrow', 'accentCallout2', 'leftRightCircularArrow', 'leftRightUpArrow', 'round2DiagRect', 'moon', 'actionButtonDocument', 'parallelogram', 'cloudCallout', 'flowChartExtract', 'curvedConnector3', 'flowChartMagneticDisk', 'lineInv', 'irregularSeal2', 'curvedConnector4', 'line', 'flowChartSort', 'leftRightRibbon', 'diagStripe', 'rtTriangle', 'rect', 'star12', 'star16', 'flowChartOffpageConnector', 'chord', 'halfFrame', 'wedgeRoundRectCallout', 'squareTabs', 'rightArrowCallout', 'gear9', 'upDownArrowCallout', 'ellipseRibbon2', 'snip2SameRect', 'flowChartPunchedTape', 'actionButtonInformation', 'flowChartProcess', 'accentBorderCallout3', 'flowChartCollate', 'upDownArrow', 'rightArrow', 'circularArrow', 'flowChartMerge', 'bevel', 'wave', 'flowChartAlternateProcess', 'smileyFace', 'flowChartConnector', 'flowChartPredefinedProcess', 'curvedConnector5', 'bentArrow', 'curvedConnector2', 'can', 'flowChartDisplay', 'mathMinus', 'nonIsoscelesTrapezoid', 'mathDivide', 'arc', 'bentConnector4', 'snip1Rect',

'downArrow', 'star7', 'rightBrace', 'accentBorderCallout1', 'rightBracket', 'flowChartDelay', 'leftBracket', 'chartX', 'bentConnector5', 'actionButtonForwardNext', 'cube', 'curvedLeftArrow', 'sun', 'leftArrow', 'straightConnector1', 'leftCircularArrow', 'frame', 'chartPlus', 'dodecagon', 'flowChartDecision', 'actionButtonHelp', 'snipRoundRect', 'star24', 'flowChartOr', 'funnel', 'curvedDownArrow', 'leftRightArrowCallout', 'swooshArrow', 'pieWedge', 'leftBrace', 'plaqueTabs', 'round1Rect', 'heart', 'plus', 'chevron', 'flowChartTerminator', 'chartStar', 'downArrowCallout', 'bracketPair', 'upArrow', 'verticalScroll', 'flowChartSummingJunction', 'star32', 'wedgeEllipseCallout', 'bentConnector2', 'cloud', 'ribbon'}

class `openpyxl.drawing.shapes.`**`Scene3D`**(*camera=None*, *lightRig=None*, *backdrop=None*, *extLst=None*)

Bases: `openpyxl.descriptors.serialisable.Serialisable`

`backdrop`
Values must be of type <class 'openpyxl.drawing.shapes.Backdrop'>

`camera`
Values must be of type <class 'openpyxl.drawing.shapes.Camera'>

`extLst`
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

`lightRig`
Values must be of type <class 'openpyxl.drawing.shapes.LightRig'>

class `openpyxl.drawing.shapes.`**`Shape3D`**(*z=None*, *extrusionH=None*, *contourW=None*, *prstMaterial=None*, *bevelT=None*, *bevelB=None*, *extrusionClr=None*, *contourClr=None*, *extLst=None*)

Bases: `openpyxl.descriptors.serialisable.Serialisable`

`bevelB`
Values must be of type <class 'openpyxl.drawing.shapes.Bevel'>

`bevelT`
Values must be of type <class 'openpyxl.drawing.shapes.Bevel'>

`contourClr`
Values must be of type <class 'openpyxl.styles.colors.Color'>

`contourW`
Values must be of type Values must be of type <class 'int'>

`extLst`
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

`extrusionClr`
Values must be of type <class 'openpyxl.styles.colors.Color'>

`extrusionH`
Values must be of type Values must be of type <class 'int'>

`prstMaterial`
Values must be of type <openpyxl.descriptors.base.Set object at 0x7fd32b6e5a58>

`z`
Values must be of type <class 'openpyxl.descriptors.base.Integer'>

class `openpyxl.drawing.shapes.`**`ShapeStyle`**(*lnRef=None*, *fillRef=None*, *effectRef=None*, *fontRef=None*)

Bases: `openpyxl.descriptors.serialisable.Serialisable`

`effectRef`
Values must be of type <class 'openpyxl.drawing.shapes.StyleMatrixReference'>

fillRef
Values must be of type <class 'openpyxl.drawing.shapes.StyleMatrixReference'>

fontRef
Values must be of type <class 'openpyxl.drawing.shapes.FontReference'>

lnRef
Values must be of type <class 'openpyxl.drawing.shapes.StyleMatrixReference'>

class `openpyxl.drawing.shapes.`**`SphereCoords`**(*lat=None*, *lon=None*, *rev=None*)
Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

lat
Values must be of type <class 'openpyxl.descriptors.base.Integer'>

lon
Values must be of type <class 'openpyxl.descriptors.base.Integer'>

rev
Values must be of type <class 'openpyxl.descriptors.base.Integer'>

class `openpyxl.drawing.shapes.`**`StyleMatrixReference`**(*idx=None*)
Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

idx
Values must be of type <class 'int'>

class `openpyxl.drawing.shapes.`**`Transform2D`**(*rot=None*, *flipH=None*, *flipV=None*, *off=None*, *ext=None*)
Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

ext
Values must be of type <class 'openpyxl.drawing.shapes.PositiveSize2D'>

flipH
Values must be of type <class 'bool'>

flipV
Values must be of type <class 'bool'>

off
Values must be of type <class 'openpyxl.drawing.shapes.Point2D'>

rot
Values must be of type <class 'int'>

tagname = 'xfrm'

class `openpyxl.drawing.shapes.`**`Vector3D`**(*dx=None*, *dy=None*, *dz=None*)
Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

dx
Values must be of type <class 'openpyxl.descriptors.base.Integer'>

dy
Values must be of type <class 'openpyxl.descriptors.base.Integer'>

dz
Values must be of type <class 'openpyxl.descriptors.base.Integer'>

openpyxl.drawing.spreadsheet_drawing module

class `openpyxl.drawing.spreadsheet_drawing.`**`AbsoluteAnchor`**(*pos=None*, *ext=None*, ***kw*)

Bases: `openpyxl.drawing.spreadsheet_drawing._AnchorBase`

`clientData`
Values must be of type <class 'openpyxl.drawing.spreadsheet_drawing.AnchorClientData'>

`contentPart`
Values must be of type <class 'str'>

`cxnSp`
Values must be of type <class 'openpyxl.drawing.graphic.Connector'>

`ext`
Values must be of type <class 'openpyxl.drawing.shapes.PositiveSize2D'>

`graphicFrame`
Values must be of type <class 'openpyxl.drawing.graphic.GraphicFrame'>

`grpSp`
Values must be of type <class 'openpyxl.drawing.graphic.GroupShape'>

`pic`
Values must be of type <class 'openpyxl.drawing.graphic.PictureFrame'>

`pos`
Values must be of type <class 'openpyxl.drawing.shapes.Point2D'>

`sp`
Value must be one of {'coneToMax', 'pyramid', 'pyramidToMax', 'cylinder', 'box', 'cone'}

`tagname` **= 'absoluteAnchor'**

class `openpyxl.drawing.spreadsheet_drawing.`**`AnchorClientData`**(*fLocksWithSheet=None*, *fPrintsWithSheet=None*)

Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

`fLocksWithSheet`
Values must be of type <class 'bool'>

`fPrintsWithSheet`
Values must be of type <class 'bool'>

class `openpyxl.drawing.spreadsheet_drawing.`**`AnchorMarker`**(*col=0*, *colOff=0*, *row=0*, *rowOff=0*)

Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

`col`
Values must be of type <class 'int'>

`colOff`
Values must be of type <class 'int'>

`row`
Values must be of type <class 'int'>

`rowOff`
Values must be of type <class 'int'>

`tagname` **= 'marker'**

class `openpyxl.drawing.spreadsheet_drawing.`**`OneCellAnchor`**(*_from=None*, *ext=None*, ***kw*)

Bases: `openpyxl.drawing.spreadsheet_drawing._AnchorBase`

clientData
Values must be of type <class 'openpyxl.drawing.spreadsheet_drawing.AnchorClientData'>

contentPart
Values must be of type <class 'str'>

cxnSp
Values must be of type <class 'openpyxl.drawing.graphic.Connector'>

ext
Values must be of type <class 'openpyxl.drawing.shapes.PositiveSize2D'>

graphicFrame
Values must be of type <class 'openpyxl.drawing.graphic.GraphicFrame'>

grpSp
Values must be of type <class 'openpyxl.drawing.graphic.GroupShape'>

pic
Values must be of type <class 'openpyxl.drawing.graphic.PictureFrame'>

sp
Value must be one of {'coneToMax', 'pyramid', 'pyramidToMax', 'cylinder', 'box', 'cone'}

tagname = 'oneCellAnchor'

class `openpyxl.drawing.spreadsheet_drawing.`**`SpreadsheetDrawing`**(*twoCellAnchor=()*, *oneCellAnchor=()*, *absoluteAnchor=()*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

absoluteAnchor
A sequence (list or tuple) that may only contain objects of the declared type

oneCellAnchor
A sequence (list or tuple) that may only contain objects of the declared type

tagname = 'wsDr'

twoCellAnchor
A sequence (list or tuple) that may only contain objects of the declared type

class `openpyxl.drawing.spreadsheet_drawing.`**`TwoCellAnchor`**(*editAs=None*, *_from=None*, *to=None*, ***kw*)
Bases: `openpyxl.drawing.spreadsheet_drawing._AnchorBase`

clientData
Values must be of type <class 'openpyxl.drawing.spreadsheet_drawing.AnchorClientData'>

contentPart
Values must be of type <class 'str'>

cxnSp
Values must be of type <class 'openpyxl.drawing.graphic.Connector'>

editAs
Value must be one of {'oneCell', 'twoCell', 'absolute'}

graphicFrame
Values must be of type <class 'openpyxl.drawing.graphic.GraphicFrame'>

grpSp
Values must be of type <class 'openpyxl.drawing.graphic.GroupShape'>

pic
Values must be of type <class 'openpyxl.drawing.graphic.PictureFrame'>

sp
Value must be one of {'coneToMax', 'pyramid', 'pyramidToMax', 'cylinder', 'box', 'cone'}

tagname = 'twoCellAnchor'

to
Values must be of type <class 'openpyxl.drawing.spreadsheet_drawing.AnchorMarker'>

openpyxl.drawing.text module

class openpyxl.drawing.text.**AutonumberBullet**(*type=None*, *startAt=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

startAt
Values must be of type <class 'int'>

type
Value must be one of {'arabicDbPlain', 'hindiAlpha1Period', 'ea1JpnKorPeriod', 'ea1ChsPlain', 'circleNumWdWhitePlain', 'thaiAlphaParenR', 'circleNumWdBlackPlain', 'ea1ChtPlain', 'thaiAlphaParenBoth', 'alphaUcParenR', 'hebrew2Minus', 'romanUcPeriod', 'arabicDbPeriod', 'hindiAlphaPeriod', 'arabicPlain', 'circleNumDbPlain', 'ea1JpnChsDbPeriod', 'thaiNumParenBoth', 'arabic2Minus', 'thaiAlphaPeriod', 'romanLcPeriod', 'arabicParenR', 'alphaLcParenR', 'romanUcParenR', 'ea1ChsPeriod', 'arabicParenBoth', 'alphaLcPeriod', 'romanLcParenR', 'alphaUcParenBoth', 'ea1ChtPeriod', 'thaiNumParenR', 'romanLcParenBoth', 'arabic1Minus', 'alphaLcParenBoth', 'romanUcParenBoth', 'alphaUcPeriod', 'arabicPeriod', 'thaiNumPeriod', 'hindiNumPeriod', 'hindiNumParenR', 'ea1JpnKorPlain'}

class openpyxl.drawing.text.**CharacterProperties**(*kumimoji=None*, *lang=None*, *altLang=None*, *sz=None*, *b=None*, *i=None*, *u=None*, *strike=None*, *kern=None*, *cap=None*, *spc=None*, *normalizeH=None*, *baseline=None*, *noProof=None*, *dirty=None*, *err=None*, *smtClean=None*, *smtId=None*, *bmk=None*, *ln=None*, *highlight=None*, *latin=None*, *ea=None*, *cs=None*, *sym=None*, *hlinkClick=None*, *hlinkMouseOver=None*, *rtl=None*, *extLst=None*, *noFill=None*, *solidFill=None*, *gradFill=None*, *blipFill=None*, *pattFill=None*, *grpFill=None*, *effectLst=None*, *effectDag=None*, *uLnTx=None*, *uLn=None*, *uFillTx=None*, *uFill=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

altLang
Values must be of type <class 'str'>

b
Values must be of type <class 'bool'>

baseline
Values must be of type <class 'int'>

blipFill
Values must be of type <class 'openpyxl.drawing.fill.BlipFillProperties'>

bmk
Values must be of type <class 'str'>

cap
Value must be one of {'all', 'small'}

cs
Values must be of type <class 'openpyxl.drawing.text.Font'>

dirty
Values must be of type <class 'bool'>

ea
Values must be of type <class 'openpyxl.drawing.text.Font'>

effectDag
Values must be of type <class 'openpyxl.drawing.effect.EffectContainer'>

effectLst
Values must be of type <class 'openpyxl.drawing.effect.EffectList'>

err
Values must be of type <class 'bool'>

extLst
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

gradFill
Values must be of type <class 'openpyxl.drawing.fill.GradientFillProperties'>

grpFill
Values must be of type <class 'bool'>

highlight
Values must be of type <class 'openpyxl.styles.colors.Color'>

hlinkClick
Values must be of type <class 'openpyxl.drawing.text.Hyperlink'>

hlinkMouseOver
Values must be of type <class 'openpyxl.drawing.text.Hyperlink'>

i
Values must be of type <class 'bool'>

kern
Values must be of type <class 'int'>

kumimoji
Values must be of type <class 'bool'>

lang
Values must be of type <class 'str'>

latin
Values must be of type <class 'openpyxl.drawing.text.Font'>

ln
Values must be of type <class 'openpyxl.drawing.line.LineProperties'>

namespace = 'http://schemas.openxmlformats.org/drawingml/2006/main'

noFill
Values must be of type <class 'bool'>

noProof
Values must be of type <class 'bool'>

normalizeH
Values must be of type <class 'bool'>

pattFill
Values must be of type <class 'openpyxl.drawing.fill.PatternFillProperties'>

rtl
Values must be of type <class 'bool'>

smtClean
Values must be of type <class 'bool'>

smtId
Values must be of type <class 'int'>

solidFill
Values must be of type <class 'openpyxl.drawing.colors.ColorChoice'>

spc
Values must be of type <class 'int'>

strike
Value must be one of {'noStrike', 'dblStrike', 'sngStrike'}

sym
Values must be of type <class 'openpyxl.drawing.text.Font'>

sz
Values must be of type <class 'int'>

tagname = 'defRPr'

u
Value must be one of {'wavy', 'wavyHeavy', 'words', 'wavyDbl', 'dotDotDashHeavy', 'dottedHeavy', 'heavy', 'dashLong', 'dashLongHeavy', 'dotDashHeavy', 'dashHeavy', 'dotted', 'dotDotDash', 'dash', 'sng', 'dotDash', 'dbl'}

uFill
Values must be of type <class 'bool'>

uFillTx
Values must be of type <class 'bool'>

uLn
Values must be of type <class 'openpyxl.drawing.line.LineProperties'>

uLnTx
Values must be of type <class 'bool'>

class openpyxl.drawing.text.**EmbeddedWAVAudioFile**(*name=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

name
Values must be of type <class 'openpyxl.descriptors.base.String'>

class openpyxl.drawing.text.**Font**(*typeface=None*, *panose=None*, *pitchFamily=None*, *charset=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

charset
Values must be of type <class 'openpyxl.descriptors.base.MinMax'>

namespace = 'http://schemas.openxmlformats.org/drawingml/2006/main'

panose
Values must be of type <class 'openpyxl.descriptors.excel.HexBinary'>

pitchFamily
Values must be of type <class 'openpyxl.descriptors.base.MinMax'>

tagname = 'latin'

typeface
Values must be of type <class 'str'>

class openpyxl.drawing.text.**GeomGuide**(*name=None*, *fmla=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

fmla
Values must be of type Values must be of type <class 'str'>

name
Values must be of type Values must be of type <class 'str'>

class openpyxl.drawing.text.**GeomGuideList**(*gd=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

gd
A sequence (list or tuple) that may only contain objects of the declared type

class openpyxl.drawing.text.**Hyperlink**(*invalidUrl=None*, *action=None*, *tgtFrame=None*, *tooltip=None*, *history=None*, *highlightClick=None*, *endSnd=None*, *snd=None*, *extLst=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

action
Values must be of type <class 'openpyxl.descriptors.base.String'>

endSnd
Values must be of type <class 'openpyxl.descriptors.base.Bool'>

extLst
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

highlightClick
Values must be of type <class 'openpyxl.descriptors.base.Bool'>

history
Values must be of type <class 'openpyxl.descriptors.base.Bool'>

invalidUrl
Values must be of type <class 'openpyxl.descriptors.base.String'>

snd
Values must be of type <class 'openpyxl.drawing.text.EmbeddedWAVAudioFile'>

tgtFrame
Values must be of type <class 'openpyxl.descriptors.base.String'>

tooltip
Values must be of type <class 'openpyxl.descriptors.base.String'>

class openpyxl.drawing.text.**LineBreak**(*rPr=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

rPr
Values must be of type <class 'openpyxl.drawing.text.CharacterProperties'>

class `openpyxl.drawing.text.`**`ListStyle`**(*defPPr=None*, *lvl1pPr=None*, *lvl2pPr=None*, *lvl3pPr=None*, *lvl4pPr=None*, *lvl5pPr=None*, *lvl6pPr=None*, *lvl7pPr=None*, *lvl8pPr=None*, *lvl9pPr=None*, *extLst=None*)

Bases: `openpyxl.descriptors.serialisable.Serialisable`

`defPPr`
Values must be of type <class 'openpyxl.drawing.text.ParagraphProperties'>

`extLst`
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

`lvl1pPr`
Values must be of type <class 'openpyxl.drawing.text.ParagraphProperties'>

`lvl2pPr`
Values must be of type <class 'openpyxl.drawing.text.ParagraphProperties'>

`lvl3pPr`
Values must be of type <class 'openpyxl.drawing.text.ParagraphProperties'>

`lvl4pPr`
Values must be of type <class 'openpyxl.drawing.text.ParagraphProperties'>

`lvl5pPr`
Values must be of type <class 'openpyxl.drawing.text.ParagraphProperties'>

`lvl6pPr`
Values must be of type <class 'openpyxl.drawing.text.ParagraphProperties'>

`lvl7pPr`
Values must be of type <class 'openpyxl.drawing.text.ParagraphProperties'>

`lvl8pPr`
Values must be of type <class 'openpyxl.drawing.text.ParagraphProperties'>

`lvl9pPr`
Values must be of type <class 'openpyxl.drawing.text.ParagraphProperties'>

`namespace` = 'http://schemas.openxmlformats.org/drawingml/2006/main'

`tagname` = 'lstStyle'

class `openpyxl.drawing.text.`**`Paragraph`**(*pPr=None*, *endParaRPr=None*, *r=None*, *br=None*, *fld=None*)

Bases: `openpyxl.descriptors.serialisable.Serialisable`

`br`
Values must be of type <class 'openpyxl.drawing.text.LineBreak'>

`endParaRPr`
Values must be of type <class 'openpyxl.drawing.text.CharacterProperties'>

`fld`
Values must be of type <class 'openpyxl.drawing.text.TextField'>

`namespace` = 'http://schemas.openxmlformats.org/drawingml/2006/main'

`pPr`
Values must be of type <class 'openpyxl.drawing.text.ParagraphProperties'>

`r`
Values must be of type <class 'openpyxl.drawing.text.RegularTextRun'>

`tagname` = 'p'

class `openpyxl.drawing.text.`**`ParagraphProperties`**(*marL=None*, *marR=None*, *lvl=None*, *indent=None*, *algn=None*, *defTabSz=None*, *rtl=None*, *eaLnBrk=None*, *fontAlgn=None*, *latinLnBrk=None*, *hangingPunct=None*, *lnSpc=None*, *spcBef=None*, *spcAft=None*, *tabLst=None*, *defRPr=None*, *extLst=None*, *buClrTx=None*, *buClr=None*, *buSzTx=None*, *buSzPct=None*, *buSzPts=None*, *buFontTx=None*, *buFont=None*, *buNone=None*, *buAutoNum=None*, *buChar=None*, *buBlip=None*)

Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

`algn`
Value must be one of {‘dist’, ‘r’, ‘ctr’, ‘l’, ‘just’, ‘thaiDist’, ‘justLow’}

`buAutoNum`
Values must be of type <class ‘bool’>

`buBlip`
Values must be of type <class ‘openpyxl.drawing.fill.Blip’>

`buChar`
Values must be of type <class ‘str’>

`buClr`
Values must be of type <class ‘openpyxl.styles.colors.Color’>

`buClrTx`
Values must be of type <class ‘bool’>

`buFont`
Values must be of type <class ‘openpyxl.drawing.text.Font’>

`buFontTx`
Values must be of type <class ‘bool’>

`buNone`
Values must be of type <class ‘bool’>

`buSzPct`
Values must be of type <class ‘int’>

`buSzPts`
Values must be of type <class ‘int’>

`buSzTx`
Values must be of type <class ‘bool’>

`defRPr`
Values must be of type <class ‘openpyxl.drawing.text.CharacterProperties’>

`defTabSz`
Values must be of type <class ‘openpyxl.descriptors.base.Integer’>

`eaLnBrk`
Values must be of type <class ‘bool’>

`extLst`
Values must be of type <class ‘openpyxl.descriptors.excel.ExtensionList’>

fontAlgn
Value must be one of {'b', 'ctr', 'auto', 'base', 't'}

hangingPunct
Values must be of type <class 'bool'>

indent
Values must be of type <class 'int'>

latinLnBrk
Values must be of type <class 'bool'>

lnSpc
Values must be of type <class 'openpyxl.drawing.text.Spacing'>

lvl
Values must be of type <class 'int'>

marL
Values must be of type <class 'int'>

marR
Values must be of type <class 'int'>

namespace = 'http://schemas.openxmlformats.org/drawingml/2006/main'

rtl
Values must be of type <class 'bool'>

spcAft
Values must be of type <class 'openpyxl.drawing.text.Spacing'>

spcBef
Values must be of type <class 'openpyxl.drawing.text.Spacing'>

tabLst
Values must be of type <class 'openpyxl.drawing.text.TabStopList'>

tagname = 'pPr'

class `openpyxl.drawing.text.`**PresetTextShape**(*prst=None*, *avLst=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

avLst
Values must be of type <class 'openpyxl.drawing.text.GeomGuideList'>

prst
Values must be of type <openpyxl.descriptors.base.Set object at 0x7fd32e0830f0>

class `openpyxl.drawing.text.`**RegularTextRun**(*rPr=None*, *t=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

namespace = 'http://schemas.openxmlformats.org/drawingml/2006/main'

rPr
Values must be of type <class 'openpyxl.drawing.text.CharacterProperties'>

t
Values must be of type <class 'str'>

tagname = 'r'

class `openpyxl.drawing.text.`**`RichTextProperties`**(*rot=None*, *spcFirstLastPara=None*, *vertOverflow=None*, *horzOverflow=None*, *vert=None*, *wrap=None*, *lIns=None*, *tIns=None*, *rIns=None*, *bIns=None*, *numCol=None*, *spcCol=None*, *rtlCol=None*, *fromWordArt=None*, *anchor=None*, *anchorCtr=None*, *forceAA=None*, *upright=None*, *compatLnSpc=None*, *prstTxWarp=None*, *scene3d=None*, *extLst=None*, *noAutofit=None*, *normAutofit=None*, *spAutoFit=None*, *flatTx=None*)

Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

`anchor`
Value must be one of {'b', 'ctr', 'just', 'dist', 't'}

`anchorCtr`
Values must be of type <class 'bool'>

`bIns`
Values must be of type <class 'int'>

`compatLnSpc`
Values must be of type <class 'bool'>

`extLst`
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

`flatTx`
Values must be of type <class 'int'>

`forceAA`
Values must be of type <class 'bool'>

`fromWordArt`
Values must be of type <class 'bool'>

`horzOverflow`
Value must be one of {'clip', 'overflow'}

`lIns`
Values must be of type <class 'int'>

`namespace` = 'http://schemas.openxmlformats.org/drawingml/2006/main'

`noAutofit`
Values must be of type <class 'bool'>

`normAutofit`
Values must be of type <class 'bool'>

`numCol`
Values must be of type <class 'int'>

`prstTxWarp`
Values must be of type <class 'openpyxl.drawing.text.PresetTextShape'>

`rIns`
Values must be of type <class 'int'>

`rot`
Values must be of type <class 'int'>

rtlCol
Values must be of type <class 'bool'>

scene3d
Values must be of type <class 'openpyxl.drawing.shapes.Scene3D'>

spAutoFit
Values must be of type <class 'bool'>

spcCol
Values must be of type <class 'int'>

spcFirstLastPara
Values must be of type <class 'bool'>

tIns
Values must be of type <class 'int'>

tagname = 'bodyPr'

upright
Values must be of type <class 'bool'>

vert
Value must be one of {'mongolianVert', 'eaVert', 'wordArtVertRtl', 'horz', 'vert270', 'vert', 'wordArtVert'}

vertOverflow
Value must be one of {'clip', 'ellipsis', 'overflow'}

wrap
Value must be one of {'none', 'square'}

class openpyxl.drawing.text.**Spacing**(*spcPct=None*, *spcPts=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

spcPct
Values must be of type <class 'int'>

spcPts
Values must be of type <class 'int'>

class openpyxl.drawing.text.**TabStop**(*pos=None*, *algn=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

algn
Values must be of type <openpyxl.descriptors.base.Set object at 0x7fd32e076e80>

pos
Values must be of type <class 'openpyxl.descriptors.base.Integer'>

class openpyxl.drawing.text.**TabStopList**(*tab=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

tab
Values must be of type <class 'openpyxl.drawing.text.TabStop'>

class openpyxl.drawing.text.**TextField**(*id=None*, *type=None*, *rPr=None*, *pPr=None*, *t=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

id
Values must be of type <class 'str'>

pPr
Values must be of type <class 'openpyxl.drawing.text.ParagraphProperties'>

rPr
Values must be of type <class 'openpyxl.drawing.text.CharacterProperties'>

t
Values must be of type <class 'openpyxl.descriptors.base.String'>

type
Values must be of type <class 'str'>

class openpyxl.drawing.text.**TextNormalAutofit**(*fontScale=None*, *lnSpcReduction=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

fontScale
Values must be of type <class 'int'>

lnSpcReduction
Values must be of type <class 'int'>

openpyxl.formatting package

Submodules

openpyxl.formatting.formatting module

class openpyxl.formatting.formatting.**ConditionalFormatting**
Bases: object

Conditional formatting rules.

add(*range_string*, *cfRule*)
Add a rule such as ColorScaleRule, FormulaRule or CellIsRule

The priority will be added automatically.

setDxfStyles(*wb*)

update(*cfRules*)

openpyxl.formatting.formatting.**unpack_rules**(*cfRules*)

openpyxl.formatting.rule module

openpyxl.formatting.rule.**CellIsRule**(*operator=None*, *formula=None*, *stopIfTrue=None*, *font=None*, *border=None*, *fill=None*)
Conditional formatting rule based on cell contents.

class openpyxl.formatting.rule.**ColorScale**(*cfvo=None*, *color=None*)
Bases: *openpyxl.formatting.rule.RuleType*

color
A sequence (list or tuple) that may only contain objects of the declared type

tagname = 'colorScale'

openpyxl.formatting.rule.**ColorScaleRule**(*start_type=None*, *start_value=None*, *start_color=None*, *mid_type=None*, *mid_value=None*, *mid_color=None*, *end_type=None*, *end_value=None*, *end_color=None*)
Backwards compatibility

class `openpyxl.formatting.rule.`**`DataBar`**(*minLength=None*, *maxLength=None*, *showValue=None*, *cfvo=None*, *color=None*)

Bases: `openpyxl.formatting.rule.RuleType`

`color`
Values must be of type <class 'openpyxl.styles.colors.Color'>

`maxLength`
Values must be of type <class 'int'>

`minLength`
Values must be of type <class 'int'>

`showValue`
Values must be of type <class 'bool'>

`tagname` = **'dataBar'**

`openpyxl.formatting.rule.`**`DataBarRule`**(*start_type=None*, *start_value=None*, *end_type=None*, *end_value=None*, *color=None*, *showValue=None*, *minLength=None*, *maxLength=None*)

class `openpyxl.formatting.rule.`**`FormatObject`**(*type*, *val=None*, *gte=None*, *extLst=None*)

Bases: `openpyxl.descriptors.serialisable.Serialisable`

`extLst`
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

`gte`
Values must be of type <class 'bool'>

`tagname` = **'cfvo'**

`type`
Value must be one of {'percentile', 'min', 'percent', 'num', 'max', 'formula'}

`val`
Values must be of type <class 'float'>

`openpyxl.formatting.rule.`**`FormulaRule`**(*formula=None*, *stopIfTrue=None*, *font=None*, *border=None*, *fill=None*)

Conditional formatting with custom differential style

class `openpyxl.formatting.rule.`**`IconSet`**(*iconSet=None*, *showValue=None*, *percent=None*, *reverse=None*, *cfvo=None*)

Bases: `openpyxl.formatting.rule.RuleType`

`iconSet`
Value must be one of {'3TrafficLights1', '5Quarters', '4RedToBlack', '3Symbols2', '4Arrows', '3Symbols', '3TrafficLights2', '4Rating', '5Rating', '3Arrows', '5Arrows', '3ArrowsGray', '3Flags', '4TrafficLights', '5ArrowsGray', '4ArrowsGray', '3Signs'}

`percent`
Values must be of type <class 'bool'>

`reverse`
Values must be of type <class 'bool'>

`showValue`
Values must be of type <class 'bool'>

`tagname` = **'iconSet'**

`openpyxl.formatting.rule.`**`IconSetRule`**(*icon_style=None*, *type=None*, *values=None*, *showValue=None*, *percent=None*, *reverse=None*)

Convenience function for creating icon set rules

class `openpyxl.formatting.rule.`**`Rule`**(*type*, *dxfId=None*, *priority=0*, *stopIfTrue=None*, *aboveAverage=None*, *percent=None*, *bottom=None*, *operator=None*, *text=None*, *timePeriod=None*, *rank=None*, *stdDev=None*, *equalAverage=None*, *formula=[]*, *colorScale=None*, *dataBar=None*, *iconSet=None*, *extLst=None*, *dxf=None*)

Bases: `openpyxl.descriptors.serialisable.Serialisable`

`aboveAverage`
Values must be of type <class 'bool'>

`bottom`
Values must be of type <class 'bool'>

`colorScale`
Values must be of type <class 'openpyxl.formatting.rule.ColorScale'>

`dataBar`
Values must be of type <class 'openpyxl.formatting.rule.DataBar'>

`dxf`
Values must be of type <class 'openpyxl.styles.differential.DifferentialStyle'>

`dxfId`
Values must be of type <class 'int'>

`equalAverage`
Values must be of type <class 'bool'>

`extLst`
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

`formula`
A sequence (list or tuple) that may only contain objects of the declared type

`iconSet`
Values must be of type <class 'openpyxl.formatting.rule.IconSet'>

`operator`
Value must be one of {'notEqual', 'notContains', 'between', 'beginsWith', 'endsWith', 'greaterThan', 'lessThanOrEqual', 'notBetween', 'containsText', 'greaterThanOrEqual', 'lessThan', 'equal'}

`percent`
Values must be of type <class 'bool'>

`priority`
Values must be of type <class 'int'>

`rank`
Values must be of type <class 'int'>

`stdDev`
Values must be of type <class 'int'>

`stopIfTrue`
Values must be of type <class 'bool'>

`tagname` **= 'cfRule'**

`text`
Values must be of type <class 'str'>

timePeriod
Value must be one of {'yesterday', 'last7Days', 'tomorrow', 'nextMonth', 'lastWeek', 'nextWeek', 'lastMonth', 'thisMonth', 'thisWeek', 'today'}

type
Value must be one of {'aboveAverage', 'dataBar', 'top10', 'cellIs', 'expression', 'notContainsBlanks', 'colorScale', 'uniqueValues', 'beginsWith', 'endsWith', 'iconSet', 'containsErrors', 'notContainsErrors', 'containsBlanks', 'containsText', 'timePeriod', 'duplicateValues', 'notContainsText'}

class openpyxl.formatting.rule.**RuleType**
Bases: *openpyxl.descriptors.serialisable.Serialisable*

cfvo
A sequence (list or tuple) that may only contain objects of the declared type

class openpyxl.formatting.rule.**ValueDescriptor**(**args*, ***kw*)
Bases: *openpyxl.descriptors.base.Float*

Expected type depends upon type attribue of parent :-(

openpyxl.packaging package

Stuff related to Office OpenXML packaging: relationships, archive, content types.

Submodules

openpyxl.packaging.manifest module

class openpyxl.packaging.manifest.**FileExtension**(*Extension*, *ContentType*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

ContentType
Values must be of type <class 'str'>

Extension
Values must be of type <class 'str'>

tagname = **'Default'**

class openpyxl.packaging.manifest.**Manifest**(*Default=()*, *Override=()*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

Default
A sequence (list or tuple) that may only contain objects of the declared type

Override
A sequence (list or tuple) that may only contain objects of the declared type

extensions

filenames

tagname = **'Types'**

to_tree()
Custom serialisation method to allow setting a default namespace

class openpyxl.packaging.manifest.**Override**(*PartName*, *ContentType*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

ContentType
Values must be of type <class 'str'>

PartName
Values must be of type <class 'str'>

tagname = 'Override'

openpyxl.packaging.manifest.**write_content_types**(*workbook*, *as_template=False*, *exts=None*)

openpyxl.packaging.relationship module

class openpyxl.packaging.relationship.**Relationship**(*type=None*, *target=None*, *targetMode=None*, *id=None*, *Id=None*, *Type=None*, *Target=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

Represents many kinds of relationships.

Id
Values must be of type <class 'str'>

Target
Values must be of type <class 'str'>

TargetMode
Values must be of type <class 'str'>

Type
Values must be of type <class 'str'>

tagname = 'Relationship'

class openpyxl.packaging.relationship.**RelationshipList**(*Relationship=()*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

Relationship
A sequence (list or tuple) that may only contain objects of the declared type

append(*value*)

tagname = 'Relationships'

to_tree()

openpyxl.packaging.relationship.**get_dependents**(*archive*, *filename*)
Normalise dependency file paths to absolute ones

Relative paths are relative to parent object

openpyxl.reader package

Submodules

openpyxl.reader.excel module

openpyxl.reader.excel.**load_workbook**(*filename*, *read_only=False*, *keep_vba=False*, *data_only=False*, *guess_types=False*)
Open the given filename and return the workbook

Parameters

- **filename** (string or a file-like object open in binary mode c.f., zipfile.ZipFile) – the path to open or a file-like object
- **read_only** (*bool*) – optimised for reading, content cannot be edited

- **keep_vba** (*bool*) – preseve vba content (this does NOT mean you can use it)
- **guess_types** (*bool*) – guess cell content type and do not read it from the file
- **data_only** (*bool*) – controls whether cells with formulae have either the formula (default) or the value stored the last time Excel read the sheet

Return type openpyxl.workbook.Workbook

Note: When using lazy load, all worksheets will be openpyxl.worksheet.iter_worksheet.IterableWorksheet and the returned workbook will be read-only.

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openpyxl.reader.excel.**repair_central_directory**(*zipFile*, *is_file_instance*)
trims trailing data from the central directory code taken from http://stackoverflow.com/a/7457686/570216, courtesy of Uri Cohen

openpyxl.reader.strings module

openpyxl.reader.strings.**read_string_table**(*xml_source*)
Read in all shared strings in the table

openpyxl.reader.style module

openpyxl.reader.workbook module

openpyxl.reader.workbook.**read_content_types**(*archive*)
Read content types.

openpyxl.reader.workbook.**read_rels**(*archive*)
Read relationships for a workbook

openpyxl.reader.workbook.**read_sheets**(*archive*)
Read worksheet titles and ids for a workbook

openpyxl.reader.worksheet module

class openpyxl.reader.worksheet.**WorkSheetParser**(*wb*, *title*, *xml_source*, *shared_strings*)
Bases: object

CELL_TAG = '{http://schemas.openxmlformats.org/spreadsheetml/2006/main}c'

FORMULA_TAG = '{http://schemas.openxmlformats.org/spreadsheetml/2006/main}f'

INLINE_STRING = '{http://schemas.openxmlformats.org/spreadsheetml/2006/main}is'

MERGE_TAG = '{http://schemas.openxmlformats.org/spreadsheetml/2006/main}mergeCell'

VALUE_TAG = '{http://schemas.openxmlformats.org/spreadsheetml/2006/main}v'

parse()

parse_auto_filter(*element*)

parse_cell(*element*)

parse_column_dimensions(*col*)

parse_data_validation(*element*)

parse_extensions(*element*)

parse_header_footer(*element*)

parse_legacy_drawing(*element*)

parse_margins (*element*)

parse_merge (*element*)

parse_page_setup (*element*)

parse_print_options (*element*)

parse_properties (*element*)

parse_row_dimensions (*row*)

parse_sheet_protection (*element*)

parse_sheet_views (*element*)

parse_sort (*element*)

parser_conditional_formatting (*element*)

openpyxl.styles package

class openpyxl.styles.**Style** (*font=Font(color=Color(indexed=Values must be of type <class 'int'>, auto=Values must be of type <class 'bool'>, theme=Values must be of type <class 'int'>)), fill=, border=, alignment=, number_format=None, protection=*)

Bases: *openpyxl.styles.hashable.HashableObject*

Style object containing all formatting details.

alignment
Values must be of type <class 'openpyxl.styles.alignment.Alignment'>

border
Values must be of type <class 'openpyxl.styles.borders.Border'>

copy ()

fill
Values must be of type <class 'openpyxl.styles.fills.Fill'>

font
Values must be of type <class 'openpyxl.styles.fonts.Font'>

number_format
Values must be of type <class 'str'>

protection
Values must be of type <class 'openpyxl.styles.protection.Protection'>

Submodules

openpyxl.styles.alignment module

class openpyxl.styles.alignment.**Alignment** (*horizontal=None, vertical=None, textRotation=0, wrapText=None, shrinkToFit=None, indent=0, relativeIndent=0, justifyLastLine=None, readingOrder=0, text_rotation=None, wrap_text=None, shrink_to_fit=None, mergeCell=None*)

Bases: *openpyxl.styles.hashable.HashableObject*

Alignment options for use in styles.

horizontal
Value must be one of {'center', 'general', 'right', 'centerContinuous', 'left', 'fill', 'justify', 'distributed'}

indent
Values must be of type <class 'float'>

justifyLastLine
Values must be of type <class 'bool'>

readingOrder
Values must be of type <class 'float'>

relativeIndent
Values must be of type <class 'float'>

shrinkToFit
Values must be of type <class 'bool'>

tagname = 'alignment'

textRotation
Value must be one of {0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180}

vertical
Value must be one of {'justify', 'center', 'top', 'bottom', 'distributed'}

wrapText
Values must be of type <class 'bool'>

openpyxl.styles.borders module

class openpyxl.styles.borders.**Border**(*left=*, *right=*, *top=*, *bottom=*, *diagonal=*, *diagonal_direction=None*, *vertical=None*, *horizontal=None*, *diagonalUp=False*, *diagonalDown=False*, *outline=True*, *start=None*, *end=None*)
Bases: *openpyxl.styles.hashable.HashableObject*

Border positioning for use in styles.

bottom
Values must be of type <class 'openpyxl.styles.borders.Side'>

diagonal
Values must be of type <class 'openpyxl.styles.borders.Side'>

diagonalDown
Values must be of type <class 'bool'>

diagonalUp
Values must be of type <class 'bool'>

end
Values must be of type <class 'openpyxl.styles.borders.Side'>

horizontal
Values must be of type <class 'openpyxl.styles.borders.Side'>

left
Values must be of type <class 'openpyxl.styles.borders.Side'>

outline
Values must be of type <class 'bool'>

right
Values must be of type <class 'openpyxl.styles.borders.Side'>

start
Values must be of type <class 'openpyxl.styles.borders.Side'>

tagname = 'border'

top
Values must be of type <class 'openpyxl.styles.borders.Side'>

vertical
Values must be of type <class 'openpyxl.styles.borders.Side'>

class openpyxl.styles.borders.**Side**(*style=None*, *color=None*, *border_style=None*)
Bases: *openpyxl.styles.hashable.HashableObject*

Border options for use in styles. Caution: if you do not specify a border_style, other attributes will have no effect !

color
Values must be of type <class 'openpyxl.styles.colors.Color'>

style
Value must be one of {'dashed', 'thick', 'mediumDashed', 'thin', 'slantDashDot', 'mediumDashDotDot', 'dashDotDot', 'dashDot', 'medium', 'mediumDashDot', 'dotted', 'double', 'hair'}

openpyxl.styles.colors module

class openpyxl.styles.colors.**Color**(*rgb='00000000'*, *indexed=None*, *auto=None*, *theme=None*, *tint=0.0*, *index=None*, *type='rgb'*)
Bases: *openpyxl.styles.hashable.HashableObject*

Named colors for use in styles.

auto
Values must be of type <class 'bool'>

index

indexed
Values must be of type <class 'int'>

rgb
Values must be of type <class 'str'>

tagname = 'color'

theme
Values must be of type <class 'int'>

tint
Values must be of type <class 'float'>

type
Values must be of type <class 'str'>

value

class `openpyxl.styles.colors.`**`ColorDescriptor`**(**args*, ***kw*)
Bases: *`openpyxl.descriptors.base.Typed`*

`expected_type`
alias of *`Color`*

class `openpyxl.styles.colors.`**`ColorList`**(*indexedColors=None*, *mruColors=None*)
Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

`index`

`indexedColors`
Values must be of type <class 'openpyxl.styles.colors.IndexedColorList'>

`mruColors`
Values must be of type <class 'openpyxl.styles.colors.MRUColorList'>

class `openpyxl.styles.colors.`**`IndexedColorList`**(*rgbColor=()*)
Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

`rgbColor`
A sequence (list or tuple) that may only contain objects of the declared type

class `openpyxl.styles.colors.`**`MRUColorList`**(*color=None*)
Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

`color`
A sequence (list or tuple) that may only contain objects of the declared type

class `openpyxl.styles.colors.`**`RGB`**(**args*, ***kw*)
Bases: *`openpyxl.descriptors.base.Typed`*

Descriptor for aRGB values If not supplied alpha is 00

`expected_type`
alias of `str`

class `openpyxl.styles.colors.`**`RgbColor`**(*rgb=None*)
Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

`rgb`

openpyxl.styles.differential module

class `openpyxl.styles.differential.`**`DifferentialStyle`**(*font=None*, *numFmt=None*, *fill=None*, *alignment=None*, *border=None*, *protection=None*, *extLst=None*)
Bases: *`openpyxl.styles.hashable.HashableObject`*

`alignment`
Values must be of type <class 'openpyxl.styles.alignment.Alignment'>

`border`
Values must be of type <class 'openpyxl.styles.borders.Border'>

`fill`
Values must be of type <class 'openpyxl.styles.fills.Fill'>

`font`
Values must be of type <class 'openpyxl.styles.fonts.Font'>

`numFmt`
Values must be of type <class 'openpyxl.styles.numbers.NumberFormat'>

protection
Values must be of type <class 'openpyxl.styles.protection.Protection'>

tagname = 'dxf'

openpyxl.styles.fills module

class `openpyxl.styles.fills.`**Fill**
Bases: *openpyxl.styles.hashable.HashableObject*

Base class

classmethod from_tree (*el*)

tagname = 'fill'

class `openpyxl.styles.fills.`**GradientFill** (*type='linear'*, *degree=0*, *left=0*, *right=0*, *top=0*, *bottom=0*, *stop=()*, *fill_type=None*)
Bases: *openpyxl.styles.fills.Fill*

bottom
Values must be of type <class 'float'>

degree
Values must be of type <class 'float'>

left
Values must be of type <class 'float'>

right
Values must be of type <class 'float'>

stop
A sequence of primitive types that are stored as a single attribute. "val" is the default attribute

tagname = 'gradientFill'

to_tree (*tagname=None*, *namespace=None*, *idx=None*)

top
Values must be of type <class 'float'>

type
Value must be one of {'path', 'linear'}

class `openpyxl.styles.fills.`**PatternFill** (*patternType=None*, *fgColor=Color(indexed=Values must be of type <class 'int'>*, *auto=Values must be of type <class 'bool'>*, *theme=Values must be of type <class 'int'>)*, *bgColor=Color(indexed=Values must be of type <class 'int'>*, *auto=Values must be of type <class 'bool'>*, *theme=Values must be of type <class 'int'>)*, *fill_type=None*, *start_color=None*, *end_color=None*)
Bases: *openpyxl.styles.fills.Fill*

Area fill patterns for use in styles. Caution: if you do not specify a fill_type, other attributes will have no effect !

bgColor
Values must be of type <class 'openpyxl.styles.colors.Color'>

fgColor
Values must be of type <class 'openpyxl.styles.colors.Color'>

patternType
Value must be one of {'lightHorizontal', 'solid', 'darkTrellis', 'lightGray', 'darkGrid', 'gray125', 'lightUp', 'darkGray', 'darkVertical', 'lightVertical', 'gray0625', 'lightGrid', 'lightDown', 'lightTrellis', 'darkHorizontal', 'darkUp', 'mediumGray', 'darkDown'}

tagname = 'patternFill'

to_tree (*tagname=None*, *idx=None*)

openpyxl.styles.fonts module

class openpyxl.styles.fonts.**Font** (*name='Calibri'*, *sz=11*, *b=False*, *i=False*, *charset=None*, *u=None*, *strike=False*, *color='00000000'*, *scheme=None*, *family=2*, *size=None*, *bold=None*, *italic=None*, *strikethrough=None*, *underline=None*, *vertAlign=None*, *outline=False*, *shadow=False*, *condense=False*, *extend=False*)

Bases: *openpyxl.styles.hashable.HashableObject*

Font options used in styles.

UNDERLINE_DOUBLE = 'double'

UNDERLINE_DOUBLE_ACCOUNTING = 'doubleAccounting'

UNDERLINE_SINGLE = 'single'

UNDERLINE_SINGLE_ACCOUNTING = 'singleAccounting'

b
Values must be of type <class 'bool'>

charset
Values must be of type <class 'int'>

color
Values must be of type <class 'openpyxl.styles.colors.Color'>

condense
Values must be of type <class 'bool'>

extend
Values must be of type <class 'bool'>

family
Values must be of type <class 'float'>

i
Values must be of type <class 'bool'>

name
Values must be of type <class 'str'>

outline
Values must be of type <class 'bool'>

scheme
Value must be one of {'minor', 'major'}

shadow
Values must be of type <class 'bool'>

strike
Values must be of type <class 'bool'>

sz
Values must be of type <class 'float'>

tagname = 'font'

u
Value must be one of {'single', 'doubleAccounting', 'double', 'singleAccounting'}

vertAlign
Value must be one of {'superscript', 'subscript', 'baseline'}

openpyxl.styles.hashable module

class openpyxl.styles.hashable.**HashableObject**
Bases: *openpyxl.descriptors.serialisable.Serialisable*

Define how to hash property classes.

copy(***kwargs*)

key
Use a tuple of fields as the basis for a key

openpyxl.styles.named_styles module

class openpyxl.styles.named_styles.**NamedCellStyle**(*name=None*, *xfId=None*, *builtinId=None*, *iLevel=None*, *hidden=None*, *customBuiltin=None*, *extLst=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

Pointer-based representation of named styles in XML xfId refers to the corresponding CellStyleXf

builtinId
Values must be of type <class 'int'>

customBuiltin
Values must be of type <class 'bool'>

extLst
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

hidden
Values must be of type <class 'bool'>

iLevel
Values must be of type <class 'int'>

name
Values must be of type <class 'str'>

tagname = 'cellStyle'

xfId
Values must be of type <class 'int'>

class openpyxl.styles.named_styles.**NamedCellStyleList**(*count=None*, *cellStyle=()*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

cellStyle
A sequence (list or tuple) that may only contain objects of the declared type

count

names
Convert to NamedStyle objects and remove duplicates

tagname = 'cellStyles'

class openpyxl.styles.named_styles.**NamedStyle**(*name='Normal', font=Font(color=Color(indexed=Values must be of type <class 'int'>, auto=Values must be of type <class 'bool'>, theme=Values must be of type <class 'int'>)), fill=, border=, alignment=, number_format=None, protection=, builtinId=0, hidden=False*)
Bases: *openpyxl.styles.hashable.HashableObject*

Named and editable styles

alignment
Values must be of type <class 'openpyxl.styles.alignment.Alignment'>

border
Values must be of type <class 'openpyxl.styles.borders.Border'>

builtinId
Values must be of type <class 'int'>

fill
Values must be of type <class 'openpyxl.styles.fills.Fill'>

font
Values must be of type <class 'openpyxl.styles.fonts.Font'>

hidden
Values must be of type <class 'bool'>

number_format
Values must be of type <class 'str'>

protection
Values must be of type <class 'openpyxl.styles.protection.Protection'>

openpyxl.styles.numbers module

class openpyxl.styles.numbers.**NumberFormat**(*numFmtId=None, formatCode=None*)
Bases: *openpyxl.styles.hashable.HashableObject*

formatCode
Values must be of type <class 'str'>

numFmtId
Values must be of type <class 'int'>

class openpyxl.styles.numbers.**NumberFormatDescriptor**(**args, **kw*)
Bases: *openpyxl.descriptors.base.String*

class openpyxl.styles.numbers.**NumberFormatList**(*count=None, numFmt=()*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

count

numFmt
A sequence (list or tuple) that may only contain objects of the declared type

openpyxl.styles.numbers.**builtin_format_code**(*index*)
Return one of the standard format codes by index.

`openpyxl.styles.numbers.`**`builtin_format_id`**(*fmt*)

Return the id of a standard style.

`openpyxl.styles.numbers.`**`is_builtin`**(*fmt*)

`openpyxl.styles.numbers.`**`is_date_format`**(*fmt*)

openpyxl.styles.protection module

class `openpyxl.styles.protection.`**`Protection`**(*locked=True*, *hidden=False*)

Bases: *`openpyxl.styles.hashable.HashableObject`*

Protection options for use in styles.

`hidden`

Values must be of type <class 'bool'>

`locked`

Values must be of type <class 'bool'>

`tagname` **= 'protection'**

openpyxl.styles.proxy module

class `openpyxl.styles.proxy.`**`StyleProxy`**(*target*)

Bases: `object`

Proxy formatting objects so that they cannot be altered

`copy`(***kw*)

Return a copy of the proxied object. Keyword args will be passed through

openpyxl.styles.styleable module

class `openpyxl.styles.styleable.`**`NumberFormatDescriptor`**

Bases: `object`

`collection` **= '_number_formats'**

`key` **= 'numFmtId'**

class `openpyxl.styles.styleable.`**`StyleDescriptor`**(*collection*, *key*)

Bases: `object`

class `openpyxl.styles.styleable.`**`StyleableObject`**(*sheet*, *style_array=None*)

Bases: `object`

Base class for styleble objects implementing proxy and lookup functions

`has_style`

`parent`

`pivotButton`

`quotePrefix`

`style`

`style_id`

openpyxl.utils package

openpyxl.utils.**absolute_coordinate**(*coord_string*)
Convert a coordinate to an absolute coordinate string (B12 -> $B$12)

openpyxl.utils.**cols_from_range**(*range_string*)
Get individual addresses for every cell in a range. Yields one row at a time.

openpyxl.utils.**column_index_from_string**(*str_col*)
Convert a column name into a numerical index ('A' -> 1)

openpyxl.utils.**coordinate_from_string**(*coord_string*)
Convert a coordinate string like 'B12' to a tuple ('B', 12)

openpyxl.utils.**coordinate_to_tuple**(*coordinate*)
Convert an Excel style coordinate to (row, colum) tuple

openpyxl.utils.**get_column_interval**(*start*, *end*)

openpyxl.utils.**get_column_letter**(*idx*)
Convert a column index into a column letter (3 -> 'C')

openpyxl.utils.**quote_sheetname**(*sheetname*)

openpyxl.utils.**range_boundaries**(*range_string*)
Convert a range string into a tuple of boundaries: (min_col, min_row, max_col, max_row) Cell coordinates will be converted into a range with the cell at both end

openpyxl.utils.**range_to_tuple**(*range_string*)
Convert a worksheet range to the sheetname and maximum and minimum coordinate indices

openpyxl.utils.**rows_from_range**(*range_string*)
Get individual addresses for every cell in a range. Yields one row at a time.

Submodules

openpyxl.utils.bound_dictionary module

class openpyxl.utils.bound_dictionary.**BoundDictionary**(*reference=None*, **args*, ***kw*)
Bases: collections.defaultdict

A default dictionary where elements are tightly coupled.

The factory method is responsible for binding the parent object to the child.

If a reference attribute is assigned then child objects will have the key assigned to this.

Otherwise it's just a defaultdict.

openpyxl.utils.datetime module

class openpyxl.utils.datetime.**GMT**
Bases: datetime.tzinfo

dst(*dt*)

tzname(*dt*)

utcoffset(*dt*)

openpyxl.utils.datetime.**W3CDTF_to_datetime**(*formatted_string*)
Convert from a timestamp string to a datetime object.

openpyxl.utils.datetime.**datetime_to_W3CDTF**(*dt*)
Convert from a datetime to a timestamp string.

openpyxl.utils.datetime.**days_to_time**(*value*)

openpyxl.utils.datetime.**from_excel**(*value*, *offset=2415018.5*)

openpyxl.utils.datetime.**time_to_days**(*value*)
Convert a time value to fractions of day

openpyxl.utils.datetime.**timedelta_to_days**(*value*)
Convert a timedelta value to fractions of a day

openpyxl.utils.datetime.**to_excel**(*dt*, *offset=2415018.5*)

openpyxl.utils.exceptions module

exception openpyxl.utils.exceptions.**CellCoordinatesException**
Bases: `Exception`

Error for converting between numeric and A1-style cell references.

exception openpyxl.utils.exceptions.**IllegalCharacterError**
Bases: `Exception`

The data submitted which cannot be used directly in Excel files. It must be removed or escaped.

exception openpyxl.utils.exceptions.**InsufficientCoordinatesException**
Bases: `Exception`

Error for partially specified cell coordinates.

exception openpyxl.utils.exceptions.**InvalidFileException**
Bases: `Exception`

Error for trying to open a non-ooxml file.

exception openpyxl.utils.exceptions.**NamedRangeException**
Bases: `Exception`

Error for badly formatted named ranges.

exception openpyxl.utils.exceptions.**ReadOnlyWorkbookException**
Bases: `Exception`

Error for trying to modify a read-only workbook

exception openpyxl.utils.exceptions.**SheetTitleException**
Bases: `Exception`

Error for bad sheet names.

exception openpyxl.utils.exceptions.**WorkbookAlreadySaved**
Bases: `Exception`

Error when attempting to perform operations on a dump workbook while it has already been dumped once

openpyxl.utils.indexed_list module

class openpyxl.utils.indexed_list.**IndexedList**(*iterable=None*)
Bases: `list`

List with optimised access by value Based on Alex Martelli's recipe

http://code.activestate.com/recipes/52303-the-auxiliary-dictionary-idiom-for-sequences-with-/

add(*value*)

append(*value*)

index(*value*)

openpyxl.utils.units module

openpyxl.utils.units.**DEFAULT_HEADER = 0.3**

From the ECMA Spec (4th Edition part 1) Page setup: "Left Page Margin in inches" p. 1647

Docs from http://startbigthinksmall.wordpress.com/2010/01/04/points-inches-and-emus-measuring-units-in-office-open-xml/

See also http://msdn.microsoft.com/en-us/library/dd560821(v=office.12).aspx

dxa: The main unit in OOXML is a twentieth of a point. Also called twips. pt: point. In Excel there are 72 points to an inch hp: half-points are used to specify font sizes. A font-size of 12pt equals 24 half points pct: Half-points are used to specify font sizes. A font-size of 12pt equals 24 half points

EMU: English Metric Unit, EMUs are used for coordinates in vector-based drawings and embedded pictures. One inch equates to 914400 EMUs and a centimeter is 360000. For bitmaps the default resolution is 96 dpi (known as PixelsPerInch in Excel). Spec p. 1122

For radial geometry Excel uses integert units of 1/60000th of a degree.

openpyxl.utils.units.**EMU_to_cm**(*value*)

openpyxl.utils.units.**EMU_to_inch**(*value*)

openpyxl.utils.units.**EMU_to_pixels**(*value*)

openpyxl.utils.units.**angle_to_degrees**(*value*)

openpyxl.utils.units.**cm_to_EMU**(*value*)

1 cm = 360000 EMUs

openpyxl.utils.units.**cm_to_dxa**(*value*)

openpyxl.utils.units.**degrees_to_angle**(*value*)

1 degree = 60000 angles

openpyxl.utils.units.**dxa_to_cm**(*value*)

openpyxl.utils.units.**dxa_to_inch**(*value*)

openpyxl.utils.units.**inch_to_EMU**(*value*)

1 inch = 914400 EMUs

openpyxl.utils.units.**inch_to_dxa**(*value*)

1 inch = 72 * 20 dxa

openpyxl.utils.units.**pixels_to_EMU**(*value*)

1 pixel = 9525 EMUs

openpyxl.utils.units.**pixels_to_points**(*value*, *dpi=96*)

96 dpi, 72i

openpyxl.utils.units.**points_to_pixels**(*value*, *dpi=96*)

openpyxl.utils.units.**short_color**(*color*)

format a color to its short size

openpyxl.workbook package

Subpackages

openpyxl.workbook.names package

Submodules

openpyxl.workbook.names.external module

class `openpyxl.workbook.names.external.`**`ExternalBook`**(*Id*, *Target*, *TargetMode=None*, *Type=None*)

Bases: *`openpyxl.descriptors.Strict`*

Map the relationship of one workbook to another

`Id`
Values must be of type <class 'str'>

`Target`
Values must be of type <class 'str'>

`TargetMode` = **'External'**

`Type` = **'http://schemas.openxmlformats.org/officeDocument/2006/relationships/externalLinkPath'**

class `openpyxl.workbook.names.external.`**`ExternalRange`**(*name*, *refersTo=None*, *sheetId=None*)

Bases: *`openpyxl.descriptors.Strict`*

Map external named ranges NB. the specification for these is different to named ranges within a workbook See 18.14.5

`name`
Values must be of type <class 'str'>

`refersTo`
Values must be of type <class 'str'>

`sheetId`
Values must be of type <class 'str'>

`openpyxl.workbook.names.external.`**`detect_external_links`**(*rels*, *archive*)

`openpyxl.workbook.names.external.`**`parse_books`**(*xml*)

`openpyxl.workbook.names.external.`**`parse_ranges`**(*xml*)

`openpyxl.workbook.names.external.`**`write_external_book_rel`**(*book*)
Serialise link to external file

`openpyxl.workbook.names.external.`**`write_external_link`**(*links*)
Serialise links to ranges in a single external worbook

openpyxl.workbook.names.named_range module

class `openpyxl.workbook.names.named_range.`**`NamedRange`**(*name*, *destinations*, *scope=None*)

Bases: *`openpyxl.workbook.names.named_range.NamedValue`*

A named group of cells

Scope is a worksheet object or None for workbook scope names (the default)

`destinations`

name

repr_format = '<%s "%s">'

scope

str_format = '%s!%s'

value

openpyxl.workbook.names.named_range.**NamedRangeContainingValue**
alias of *NamedValue*

class openpyxl.workbook.names.named_range.**NamedValue**(*name*, *value*)
Bases: object

A named value

localSheetId

name

scope

value

openpyxl.workbook.names.named_range.**external_range**(*range_string*)

openpyxl.workbook.names.named_range.**read_named_ranges**(*xml_source*, *workbook*)
Read named ranges, excluding poorly defined ranges.

openpyxl.workbook.names.named_range.**refers_to_range**(*range_string*)

openpyxl.workbook.names.named_range.**split_named_range**(*range_string*)
Separate a named range into its component parts

Submodules

openpyxl.workbook.child module

openpyxl.workbook.child.**avoid_duplicate_name**(*names*, *value*)
Naive check to see whether name already exists. If name does exist suggest a name using an incrementer

openpyxl.workbook.properties module

class openpyxl.workbook.properties.**CalcProperties**(*calcId=122211*, *calcMode='auto'*, *fullCalcOnLoad=True*, *refMode='A1'*, *iterate=False*, *iterateCount=None*, *iterateDelta=None*, *fullPrecision=None*, *calcCompleted=True*, *calcOnSave=True*, *concurrentCalc=True*, *concurrentManualCount=None*, *forceFullCalc=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

calcCompleted
Values must be of type <class 'bool'>

calcId
Values must be of type <class 'int'>

calcMode
Value must be one of {'auto', 'autoNoTable', 'manual'}

calcOnSave
Values must be of type <class 'bool'>

concurrentCalc
Values must be of type <class 'bool'>

concurrentManualCount
Values must be of type <class 'int'>

forceFullCalc
Values must be of type <class 'bool'>

fullCalcOnLoad
Values must be of type <class 'bool'>

fullPrecision
Values must be of type <class 'bool'>

iterate
Values must be of type <class 'bool'>

iterateCount
Values must be of type <class 'int'>

iterateDelta
Values must be of type <class 'float'>

refMode
Value must be one of {'A1', 'R1C1'}

tagname = 'calcPr'

class openpyxl.workbook.properties.**FileVersion**(*appName=None*, *lastEdited=None*, *lowestEdited=None*, *rupBuild=None*, *codeName=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

appName
Values must be of type <class 'str'>

codeName

lastEdited
Values must be of type <class 'str'>

lowestEdited
Values must be of type <class 'str'>

rupBuild
Values must be of type <class 'str'>

tagname = 'fileVersion'

class `openpyxl.workbook.properties.`**`WorkbookProperties`**(*date1904=None*, *dateCompatibility=None*, *showObjects=None*, *showBorderUnselectedTables=None*, *filterPrivacy=None*, *promptedSolutions=None*, *showInkAnnotation=None*, *backupFile=None*, *saveExternalLinkValues=None*, *updateLinks='userSet'*, *codeName=None*, *hidePivotFieldList=None*, *showPivotChartFilter=None*, *allowRefreshQuery=None*, *publishItems=None*, *checkCompatibility=None*, *autoCompressPictures=None*, *refreshAllConnections=None*, *defaultThemeVersion=None*)

Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

`allowRefreshQuery`
Values must be of type <class 'bool'>

`autoCompressPictures`
Values must be of type <class 'bool'>

`backupFile`
Values must be of type <class 'bool'>

`checkCompatibility`
Values must be of type <class 'bool'>

`codeName`
Values must be of type <class 'str'>

`date1904`
Values must be of type <class 'bool'>

`dateCompatibility`
Values must be of type <class 'bool'>

`defaultThemeVersion`
Values must be of type <class 'int'>

`filterPrivacy`
Values must be of type <class 'bool'>

`hidePivotFieldList`
Values must be of type <class 'bool'>

`promptedSolutions`
Values must be of type <class 'bool'>

`publishItems`
Values must be of type <class 'bool'>

`refreshAllConnections`
Values must be of type <class 'bool'>

`saveExternalLinkValues`
Values must be of type <class 'bool'>

showBorderUnselectedTables
Values must be of type <class 'bool'>

showInkAnnotation
Values must be of type <class 'bool'>

showObjects
Value must be one of {'all', 'placeholders'}

showPivotChartFilter
Values must be of type <class 'bool'>

tagname = 'workbookPr'

updateLinks
Value must be one of {'userSet', 'never', 'always'}

openpyxl.workbook.workbook module

class `openpyxl.workbook.workbook.`**`Workbook`**(*write_only=False*)
Bases: `object`

Workbook is the container for all other parts of the document.

active
Get the currently active sheet

add_named_range(*named_range*)
Add an existing named_range to the list of named_ranges.

chartsheets

create_chartsheet(*title=None*, *index=None*)

create_named_range(*name*, *worksheet*, *range*, *scope=None*)
Create a new named_range on a worksheet

create_sheet(*title=None*, *index=None*)
Create a worksheet (at an optional index).

Parameters

- **title** – optional title of the sheet
- **index** (*int*) – optional position at which the sheet will be inserted

data_only

get_active_sheet()
Returns the current active sheet.

get_index(*worksheet*)
Return the index of the worksheet.

get_named_range(*name*)
Return the range specified by name.

get_named_ranges()
Return all named ranges

get_sheet_by_name(*name*)
Returns a worksheet by its name.

Parameters **name** (*string*) – the name of the worksheet to look for

get_sheet_names()

`read_only`

`remove_named_range`(*named_range*)
Remove a named_range from this workbook.

`remove_sheet`(*worksheet*)
Remove a worksheet from this workbook.

`save`(*filename*)
Save the current workbook under the given *filename*. Use this function instead of using an *ExcelWriter*.

> **Warning:** When creating your workbook using *write_only* set to True, you will only be able to call this function once. Subsequents attempts to modify or save the file will raise an `openpyxl.shared.exc.WorkbookAlreadySaved` exception.

`sheetnames`
Returns the list of the names of worksheets in the workbook.

Names are returned in the worksheets order.

Return type list of strings

`worksheets`

`write_only`

openpyxl.worksheet package

`openpyxl.worksheet.`**`isgenerator`**(*obj*)

Submodules

openpyxl.worksheet.datavalidation module

class `openpyxl.worksheet.datavalidation.`**`DataValidation`**(*type=None*, *formula1=None*, *formula2=None*, *allow_blank=False*, *showErrorMessage=True*, *showInputMessage=True*, *showDropDown=None*, *allowBlank=None*, *sqref=None*, *promptTitle=None*, *errorStyle=None*, *error=None*, *prompt=None*, *errorTitle=None*, *imeMode=None*, *operator=None*)

Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

`add`(*cell*)
Adds a openpyxl.cell to this validator

`allowBlank`
Values must be of type <class 'bool'>

`allow_blank`
Values must be of type <class 'bool'>

`error`
Values must be of type <class 'str'>

errorStyle
Value must be one of {'warning', 'stop', 'information'}

errorTitle
Values must be of type <class 'str'>

formula1
Values must be of type <class 'str'>

formula2
Values must be of type <class 'str'>

imeMode
Value must be one of {'fullKatakana', 'halfKatakana', 'noControl', 'hiragana', 'off', 'disabled', 'on', 'halfAlpha', 'fullAlpha', 'fullHangul', 'halfHangul'}

operator
Value must be one of {'notEqual', 'between', 'greaterThan', 'lessThanOrEqual', 'notBetween', 'greaterThanOrEqual', 'lessThan', 'equal'}

prompt
Values must be of type <class 'str'>

promptTitle
Values must be of type <class 'str'>

showDropDown
Values must be of type <class 'bool'>

showErrorMessage
Values must be of type <class 'bool'>

showInputMessage
Values must be of type <class 'bool'>

sqref

tagname = 'dataValidation'

type
Value must be one of {'decimal', 'list', 'custom', 'time', 'date', 'textLength', 'whole'}

class openpyxl.worksheet.datavalidation.**DataValidationList**(*disablePrompts=None*, *xWindow=None*, *yWindow=None*, *count=None*, *dataValidation=()*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

append(*dv*)

count

dataValidation
A sequence (list or tuple) that may only contain objects of the declared type

disablePrompts
Values must be of type <class 'bool'>

tagname = 'dataValidations'

xWindow
Values must be of type <class 'int'>

yWindow
Values must be of type <class 'int'>

openpyxl.worksheet.datavalidation.**collapse_cell_addresses**(*cells*, *input_ranges=()*)
Collapse a collection of cell co-ordinates down into an optimal range or collection of ranges.

E.g. Cells A1, A2, A3, B1, B2 and B3 should have the data-validation object applied, attempt to collapse down to a single range, A1:B3.

Currently only collapsing contiguous vertical ranges (i.e. above example results in A1:A3 B1:B3). More work to come.

openpyxl.worksheet.datavalidation.**expand_cell_ranges**(*range_string*)
Expand cell ranges to a sequence of addresses. Reverse of collapse_cell_addresses Eg. converts "A1:A2 B1:B2" to (A1, A2, B1, B2)

openpyxl.worksheet.dimensions module

class openpyxl.worksheet.dimensions.**ColumnDimension**(*worksheet*, *index='A'*, *width=None*, *bestFit=False*, *hidden=False*, *outlineLevel=0*, *outline_level=None*, *collapsed=False*, *style=None*, *min=None*, *max=None*, *customWidth=False*, *visible=None*, *auto_size=None*)
Bases: *openpyxl.worksheet.dimensions.Dimension*

Information about the display properties of a column.

bestFit
Values must be of type <class 'bool'>

collapsed
Values must be of type <class 'bool'>

customWidth
Always true if there is a width for the column

index
Values must be of type <class 'str'>

max
Values must be of type <class 'int'>

min
Values must be of type <class 'int'>

width
Values must be of type <class 'float'>

class openpyxl.worksheet.dimensions.**Dimension**(*index*, *hidden*, *outlineLevel*, *collapsed*, *worksheet*, *visible=True*, *style=None*)
Bases: *openpyxl.descriptors.Strict*, *openpyxl.styles.styleable.StyleableObject*

Information about the display properties of a row or column.

collapsed
Values must be of type <class 'bool'>

hidden
Values must be of type <class 'bool'>

index
Values must be of type <class 'int'>

outlineLevel
Values must be of type <class 'int'>

visible

class openpyxl.worksheet.dimensions.**DimensionHolder**(*worksheet*, *reference='index'*, *default_factory=None*)

Bases: *openpyxl.utils.bound_dictionary.BoundDictionary*

Allow columns to be grouped

group(*start*, *end=None*, *outline_level=1*, *hidden=False*)

allow grouping a range of consecutive columns together

Parameters

- **start** – first column to be grouped (mandatory)
- **end** – last column to be grouped (optional, default to start)
- **outline_level** – outline level
- **hidden** – should the group be hidden on workbook open or not

class openpyxl.worksheet.dimensions.**RowDimension**(*worksheet*, *index=0*, *ht=None*, *customHeight=None*, *s=None*, *customFormat=None*, *hidden=False*, *outlineLevel=0*, *outline_level=None*, *collapsed=False*, *visible=None*, *height=None*, *r=None*, *spans=None*, *thickBot=None*, *thickTop=None*, ***kw*)

Bases: *openpyxl.worksheet.dimensions.Dimension*

Information about the display properties of a row.

customFormat

Always true if there is a style for the row

customHeight

Always true if there is a height for the row

ht

Values must be of type <class 'float'>

thickBot

Values must be of type <class 'bool'>

thickTop

Values must be of type <class 'bool'>

openpyxl.worksheet.drawing module

class openpyxl.worksheet.drawing.**Drawing**(*id=None*)

Bases: *openpyxl.descriptors.serialisable.Serialisable*

id

Values must be of type <class 'str'>

tagname = 'drawing'

openpyxl.worksheet.filters module

class openpyxl.worksheet.filters.**AutoFilter**(*ref=None*, *filterColumn=()*, *sortState=None*, *extLst=None*)

Bases: *openpyxl.descriptors.serialisable.Serialisable*

add_filter_column (*col_id*, *vals*, *blank=False*)

Add row filter for specified column.

Parameters

- **col_id** (*int*) – Zero-origin column id. 0 means first column.
- **vals** (*str[]*) – Value list to show.
- **blank** (*bool*) – Show rows that have blank cell if True (default=‘‘False‘‘)

add_sort_condition (*ref*, *descending=False*)

Add sort condition for cpecified range of cells.

Parameters

- **ref** (*string*) – range of the cells (e.g. ‘A2:A150’)
- **descending** (*bool*) – Descending sort order (default=‘‘False‘‘)

extLst

Values must be of type <class ‘openpyxl.descriptors.excel.ExtensionList’>

filterColumn

A sequence (list or tuple) that may only contain objects of the declared type

ref

Values must be of type <class ‘str’>

sortState

Values must be of type <class ‘openpyxl.worksheet.filters.SortState’>

tagname = ‘autoFilter’

class openpyxl.worksheet.filters.**CellRange** (**args*, ***kw*)

Bases: *openpyxl.descriptors.base.Convertible*, *openpyxl.descriptors.base.MatchPattern*

allow_none = True

expected_type

alias of `str`

pattern = ‘\n[$]?(?P<min_col>[A-Z]+)\n[$]?(?P<min_row>\\d+)\n(:[$]?(?P<max_col>[A-Z]+)\n[$]?(?P<max_row>\\d+)

class openpyxl.worksheet.filters.**ColorFilter** (*dxfId=None*, *cellColor=None*)

Bases: *openpyxl.descriptors.serialisable.Serialisable*

cellColor

Values must be of type <class ‘bool’>

dxfId

Values must be of type <class ‘int’>

class openpyxl.worksheet.filters.**CustomFilter** (*operator=None*, *val=None*)

Bases: *openpyxl.descriptors.serialisable.Serialisable*

operator

Value must be one of {‘notEqual’, ‘greaterThan’, ‘lessThanOrEqual’, ‘greaterThanOrEqual’, ‘lessThan’, ‘equal’}

val

Values must be of type <class ‘str’>

class openpyxl.worksheet.filters.**CustomFilters** (*_and=None*, *customFilter=None*)

Bases: *openpyxl.descriptors.serialisable.Serialisable*

customFilter
Values must be of type <class 'openpyxl.worksheet.filters.CustomFilter'>

class `openpyxl.worksheet.filters.`**`DateGroupItem`**(*year=None*, *month=None*, *day=None*, *hour=None*, *minute=None*, *second=None*, *dateTimeGrouping=None*)
Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

dateTimeGrouping
Value must be one of {'second', 'hour', 'year', 'minute', 'month', 'day'}

day
Values must be of type <class 'int'>

hour
Values must be of type <class 'int'>

minute
Values must be of type <class 'int'>

month
Values must be of type <class 'int'>

second
Values must be of type <class 'int'>

year
Values must be of type <class 'int'>

class `openpyxl.worksheet.filters.`**`DynamicFilter`**(*type=None*, *val=None*, *valIso=None*, *maxVal=None*, *maxValIso=None*)
Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

maxVal
Values must be of type <class 'float'>

maxValIso
Values must be of type <class 'datetime.datetime'>

type
Value must be one of {'M10', 'yesterday', 'tomorrow', 'nextMonth', 'null', 'M12', 'nextWeek', 'nextYear', 'today', 'lastYear', 'lastWeek', 'M3', 'M11', 'lastQuarter', 'lastMonth', 'Q4', 'thisYear', 'Q2', 'M6', 'M2', 'belowAverage', 'M4', 'Q3', 'yearToDate', 'M5', 'M9', 'thisQuarter', 'M1', 'M8', 'aboveAverage', 'Q1', 'M7', 'thisMonth', 'thisWeek', 'nextQuarter'}

val
Values must be of type <class 'float'>

valIso
Values must be of type <class 'datetime.datetime'>

class `openpyxl.worksheet.filters.`**`FilterColumn`**(*colId=None*, *hiddenButton=None*, *showButton=None*, *filters=None*, *top10=None*, *customFilters=None*, *dynamicFilter=None*, *colorFilter=None*, *iconFilter=None*, *extLst=None*, *blank=None*, *vals=None*)
Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

colId
Values must be of type <class 'int'>

colorFilter
Values must be of type <class 'openpyxl.worksheet.filters.ColorFilter'>

customFilters
Values must be of type <class 'openpyxl.worksheet.filters.CustomFilters'>

dynamicFilter
Values must be of type <class 'openpyxl.worksheet.filters.DynamicFilter'>

extLst
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

filters
Values must be of type <class 'openpyxl.worksheet.filters.Filters'>

hiddenButton
Values must be of type <class 'bool'>

iconFilter
Values must be of type <class 'openpyxl.worksheet.filters.IconFilter'>

showButton
Values must be of type <class 'bool'>

tagname = 'filterColumn'

top10
Values must be of type <class 'openpyxl.worksheet.filters.Top10'>

class openpyxl.worksheet.filters.**Filters**(*blank=None*, *calendarType=None*, *filter=()*, *dateGroupItem=()*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

blank
Values must be of type <class 'bool'>

calendarType
Value must be one of {'gregorianMeFrench', 'japan', 'gregorianArabic', 'gregorianXlitEnglish', 'taiwan', 'gregorianUs', 'gregorian', 'korea', 'saka', 'gregorianXlitFrench', 'hijri', 'thai', 'hebrew'}

dateGroupItem
A sequence (list or tuple) that may only contain objects of the declared type

filter
A sequence of primitive types that are stored as a single attribute. "val" is the default attribute

class openpyxl.worksheet.filters.**IconFilter**(*iconSet=None*, *iconId=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

iconId
Values must be of type <class 'int'>

iconSet
Value must be one of {'3TrafficLights1', '5Quarters', '4RedToBlack', '3Symbols2', '4Arrows', '3Symbols', '3TrafficLights2', '4Rating', '5Rating', '3Arrows', '5Arrows', '3ArrowsGray', '3Flags', '4TrafficLights', '5ArrowsGray', '4ArrowsGray', '3Signs'}

class openpyxl.worksheet.filters.**SortCondition**(*ref=None*, *descending=None*, *sortBy=None*, *customList=None*, *dxfId=None*, *iconSet=None*, *iconId=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

customList
Values must be of type <class 'str'>

descending
Values must be of type <class 'bool'>

dxfId
Values must be of type <class 'int'>

iconId
Values must be of type <class 'int'>

iconSet
Value must be one of {'3TrafficLights1', '5Quarters', '4RedToBlack', '3Symbols2', '4Arrows', '3Symbols', '3TrafficLights2', '4Rating', '5Rating', '3Arrows', '5Arrows', '3ArrowsGray', '3Flags', '4TrafficLights', '5ArrowsGray', '4ArrowsGray', '3Signs'}

ref
Values must be of type <class 'str'>

sortBy
Value must be one of {'value', 'icon', 'cellColor', 'fontColor'}

tagname = 'sortCondition'

class openpyxl.worksheet.filters.**SortState**(*columnSort=None*, *caseSensitive=None*, *sortMethod=None*, *ref=None*, *sortCondition=()*, *extLst=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

caseSensitive
Values must be of type <class 'bool'>

columnSort
Values must be of type <class 'bool'>

extLst
Values must be of type <class 'openpyxl.descriptors.excel.ExtensionList'>

ref
Values must be of type <class 'str'>

sortCondition
A sequence (list or tuple) that may only contain objects of the declared type

sortMethod
Value must be one of {'stroke', 'pinYin'}

tagname = 'sortState'

class openpyxl.worksheet.filters.**Top10**(*top=None*, *percent=None*, *val=None*, *filterVal=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

filterVal
Values must be of type <class 'float'>

percent
Values must be of type <class 'bool'>

top
Values must be of type <class 'bool'>

val
Values must be of type <class 'float'>

openpyxl.worksheet.header_footer module

class openpyxl.worksheet.header_footer.**HeaderFooter**
Bases: object

Information about the header/footer for this sheet.

center_footer

center_header

getFooter()

getHeader()

hasFooter()

hasHeader()

left_footer

left_header

right_footer

right_header

setFooter(*item*)

setHeader(*item*)

class openpyxl.worksheet.header_footer.**HeaderFooterItem**(*type*)

Bases: object

Individual left/center/right header/footer items

Header & Footer ampersand codes:

- &A Inserts the worksheet name
- &B Toggles bold
- &D or &[Date] Inserts the current date
- &E Toggles double-underline
- &F or &[File] Inserts the workbook name
- &I Toggles italic
- &N or &[Pages] Inserts the total page count
- &S Toggles strikethrough
- &T Inserts the current time
- &[Tab] Inserts the worksheet name
- &U Toggles underline
- &X Toggles superscript
- &Y Toggles subscript
- &P or &[Page] Inserts the current page number
- &P+n Inserts the page number incremented by n
- &P-n Inserts the page number decremented by n
- &[Path] Inserts the workbook path
- && Escapes the ampersand character
- &"fontname" Selects the named font
- &nn Selects the specified 2-digit font point size

CENTER = 'C'

LEFT = 'L'

REPLACE_LIST = (('\n', '_x000D_'), ('&[Page]', '&P'), ('&[Pages]', '&N'), ('&[Date]', '&D'), ('&[Time]', '&T'), ('&[Pa

RIGHT = 'R'

font_color

font_name

font_size

get()

has()

set(*text*)
Convert a compound string into attributes # incomplete because formatting commands can be nested

text

type

openpyxl.worksheet.hyperlink module

class openpyxl.worksheet.hyperlink.**Hyperlink**(*ref=None*, *location=None*, *tooltip=None*, *display=None*, *id=None*, *target=None*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

display
Values must be of type <class 'str'>

id
Values must be of type <class 'str'>

location
Values must be of type <class 'str'>

ref
Values must be of type <class 'str'>

tagname = 'hyperlink'

target
Values must be of type <class 'str'>

tooltip
Values must be of type <class 'str'>

openpyxl.worksheet.page module

class openpyxl.worksheet.page.**PageMargins**(*left=0.75*, *right=0.75*, *top=1*, *bottom=1*, *header=0.5*, *footer=0.5*)
Bases: *openpyxl.descriptors.serialisable.Serialisable*

Information about page margins for view/print layouts. Standard values (in inches) left, right = 0.75 top, bottom = 1 header, footer = 0.5

bottom
Values must be of type <class 'float'>

footer
Values must be of type <class 'float'>

header
Values must be of type <class 'float'>

left
Values must be of type <class 'float'>

right
Values must be of type <class 'float'>

tagname = 'pageMargins'

top
Values must be of type <class 'float'>

class openpyxl.worksheet.page.**PrintOptions**(*horizontalCentered=None*, *verticalCentered=None*, *headings=None*, *gridLines=None*, *gridLinesSet=None*)

Bases: *openpyxl.descriptors.serialisable.Serialisable*

Worksheet print options

gridLines
Values must be of type <class 'bool'>

gridLinesSet
Values must be of type <class 'bool'>

headings
Values must be of type <class 'bool'>

horizontalCentered
Values must be of type <class 'bool'>

tag = '{http://schemas.openxmlformats.org/spreadsheetml/2006/main}printOptions'

tagname = 'printOptions'

verticalCentered
Values must be of type <class 'bool'>

class openpyxl.worksheet.page.**PrintPageSetup**(*worksheet=None*, *orientation=None*, *paperSize=None*, *scale=None*, *fitToHeight=None*, *fitToWidth=None*, *firstPageNumber=None*, *useFirstPageNumber=None*, *paperHeight=None*, *paperWidth=None*, *pageOrder=None*, *usePrinterDefaults=None*, *blackAndWhite=None*, *draft=None*, *cellComments=None*, *errors=None*, *horizontalDpi=None*, *verticalDpi=None*, *copies=None*, *id=None*)

Bases: *openpyxl.descriptors.serialisable.Serialisable*

Worksheet print page setup

autoPageBreaks

blackAndWhite
Values must be of type <class 'bool'>

cellComments
Value must be one of {'asDisplayed', 'atEnd'}

copies
Values must be of type <class 'int'>

draft
Values must be of type <class 'bool'>

errors
Value must be one of {'displayed', 'blank', 'dash', 'NA'}

firstPageNumber
Values must be of type <class 'int'>

fitToHeight
Values must be of type <class 'int'>

fitToPage

fitToWidth
Values must be of type <class 'int'>

classmethod from_tree(*node*)

horizontalCentered()

horizontalDpi
Values must be of type <class 'int'>

id
Values must be of type <class 'str'>

options()

orientation
Value must be one of {'default', 'portrait', 'landscape'}

pageOrder
Value must be one of {'downThenOver', 'overThenDown'}

paperHeight

paperSize
Values must be of type <class 'int'>

paperWidth

scale
Values must be of type <class 'int'>

setup()

sheet_properties
Proxy property

tagname = 'pageSetup'

to_tree()

useFirstPageNumber
Values must be of type <class 'bool'>

usePrinterDefaults
Values must be of type <class 'bool'>

verticalCentered()

verticalDpi
Values must be of type <class 'int'>

openpyxl.worksheet.pagebreak module

class `openpyxl.worksheet.pagebreak.`**`Break`**(*id=0*, *min=0*, *max=16383*, *man=True*, *pt=None*)

Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

`id`
Values must be of type <class 'int'>

`man`
Values must be of type <class 'bool'>

`max`
Values must be of type <class 'int'>

`min`
Values must be of type <class 'int'>

`pt`
Values must be of type <class 'bool'>

`tagname` = **'brk'**

class `openpyxl.worksheet.pagebreak.`**`PageBreak`**(*count=None*, *manualBreakCount=None*, *brk=[]*)

Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

`append`(*brk=None*)
Add a page break

`brk`
A sequence (list or tuple) that may only contain objects of the declared type

`count`

`manualBreakCount`

`tagname` = **'rowBreaks'**

openpyxl.worksheet.properties module

class `openpyxl.worksheet.properties.`**`Outline`**(*applyStyles=None*, *summaryBelow=None*, *summaryRight=None*, *showOutlineSymbols=None*)

Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

`applyStyles`
Values must be of type <class 'bool'>

`showOutlineSymbols`
Values must be of type <class 'bool'>

`summaryBelow`
Values must be of type <class 'bool'>

`summaryRight`
Values must be of type <class 'bool'>

`tag` = **'{http://schemas.openxmlformats.org/spreadsheetml/2006/main}outlinePr'**

`tagname` = **'outlinePr'**

class `openpyxl.worksheet.properties.`**`PageSetupProperties`**(*autoPageBreaks=None*, *fitToPage=None*)

Bases: *`openpyxl.descriptors.serialisable.Serialisable`*

`autoPageBreaks`
Values must be of type <class 'bool'>

fitToPage
Values must be of type <class 'bool'>

tag = '{http://schemas.openxmlformats.org/spreadsheetml/2006/main}pageSetUpPr'

tagname = 'pageSetUpPr'

class openpyxl.worksheet.properties.**WorksheetProperties**(*codeName=None*, *enableFormatConditionsCalculation=None*, *filterMode=None*, *published=None*, *syncHorizontal=None*, *syncRef=None*, *syncVertical=None*, *transitionEvaluation=None*, *transitionEntry=None*, *tabColor=None*, *outlinePr=None*, *pageSetUpPr=None*)

Bases: *openpyxl.descriptors.serialisable.Serialisable*

codeName
Values must be of type <class 'str'>

enableFormatConditionsCalculation
Values must be of type <class 'bool'>

filterMode
Values must be of type <class 'bool'>

outlinePr
Values must be of type <class 'openpyxl.worksheet.properties.Outline'>

pageSetUpPr
Values must be of type <class 'openpyxl.worksheet.properties.PageSetupProperties'>

published
Values must be of type <class 'bool'>

syncHorizontal
Values must be of type <class 'bool'>

syncRef
Values must be of type <class 'str'>

syncVertical
Values must be of type <class 'bool'>

tabColor
Values must be of type <class 'openpyxl.styles.colors.Color'>

tag = '{http://schemas.openxmlformats.org/spreadsheetml/2006/main}sheetPr'

tagname = 'sheetPr'

transitionEntry
Elements

transitionEvaluation
Values must be of type <class 'bool'>

openpyxl.worksheet.protection module

class `openpyxl.worksheet.protection.`**`SheetProtection`**(*sheet=False*, *objects=False*, *scenarios=False*, *formatCells=True*, *formatRows=True*, *formatColumns=True*, *insertColumns=True*, *insertRows=True*, *insertHyperlinks=True*, *deleteColumns=True*, *deleteRows=True*, *selectLockedCells=False*, *selectUnlockedCells=False*, *sort=True*, *autoFilter=True*, *pivotTables=True*, *password=None*, *algorithmName=None*, *saltValue=None*, *spinCount=None*, *hashValue=None*)

Bases: *`openpyxl.descriptors.serialisable.Serialisable`*, `openpyxl.worksheet.protection._Protected`

Information about protection of various aspects of a sheet. True values mean that protection for the object or action is active This is the **default** when protection is active, ie. users cannot do something

`algorithmName`
Values must be of type <class 'str'>

`autoFilter`
Values must be of type <class 'bool'>

`deleteColumns`
Values must be of type <class 'bool'>

`deleteRows`
Values must be of type <class 'bool'>

`disable`()

`enable`()

`formatCells`
Values must be of type <class 'bool'>

`formatColumns`
Values must be of type <class 'bool'>

`formatRows`
Values must be of type <class 'bool'>

`hashValue`
Values must be of type <class 'str'>

`insertColumns`
Values must be of type <class 'bool'>

`insertHyperlinks`
Values must be of type <class 'bool'>

`insertRows`
Values must be of type <class 'bool'>

`objects`
Values must be of type <class 'bool'>

`pivotTables`
Values must be of type <class 'bool'>

saltValue
Values must be of type <class 'str'>

scenarios
Values must be of type <class 'bool'>

selectLockedCells
Values must be of type <class 'bool'>

selectUnlockedCells
Values must be of type <class 'bool'>

set_password(*value=''*, *already_hashed=False*)

sheet
Values must be of type <class 'bool'>

sort
Values must be of type <class 'bool'>

spinCount
Values must be of type <class 'int'>

tagname = 'sheetProtection'

openpyxl.worksheet.protection.**hash_password**(*plaintext_password=''*)
Create a password hash from a given string for protecting a worksheet only. This will not work for encrypting a workbook.

This method is based on the algorithm provided by Daniel Rentz of OpenOffice and the PEAR package Spreadsheet_Excel_Writer by Xavier Noguer <xnoguer@rezebra.com>. See also http://blogs.msdn.com/b/ericwhite/archive/2008/02/23/the-legacy-hashing-algorithm-in-open-xml.aspx

openpyxl.worksheet.read_only module

class openpyxl.worksheet.read_only.**ReadOnlyWorksheet**(*parent_workbook*, *title*, *worksheet_path*, *xml_source*, *shared_strings*)
Bases: *openpyxl.worksheet.worksheet.Worksheet*

calculate_dimension(*force=False*)

columns

get_squared_range(*min_col*, *min_row*, *max_col*, *max_row*)
The source worksheet file may have columns or rows missing. Missing cells will be created.

max_column

max_row

min_column

min_row

rows

xml_source
Parse xml source on demand, default to Excel archive

openpyxl.worksheet.read_only.**read_dimension**(*source*)

openpyxl.worksheet.related module

class `openpyxl.worksheet.related.`**`Related`**(*id=None*)

Bases: `openpyxl.descriptors.serialisable.Serialisable`

`id`
Values must be of type <class 'str'>

`to_tree`(*tagname*)

openpyxl.worksheet.views module

class `openpyxl.worksheet.views.`**`Pane`**(*xSplit=None*, *ySplit=None*, *topLeftCell=None*, *activePane='topLeft'*, *state='split'*)

Bases: `openpyxl.descriptors.serialisable.Serialisable`

`activePane`
Value must be one of {'topLeft', 'bottomRight', 'bottomLeft', 'topRight'}

`state`
Value must be one of {'frozenSplit', 'frozen', 'split'}

`topLeftCell`
Values must be of type <class 'str'>

`xSplit`
Values must be of type <class 'float'>

`ySplit`
Values must be of type <class 'float'>

class `openpyxl.worksheet.views.`**`Selection`**(*pane=None*, *activeCell='A1'*, *activeCellId=None*, *sqref='A1'*)

Bases: `openpyxl.descriptors.serialisable.Serialisable`

`activeCell`
Values must be of type <class 'str'>

`activeCellId`
Values must be of type <class 'int'>

`pane`
Value must be one of {'topLeft', 'bottomRight', 'bottomLeft', 'topRight'}

`sqref`
Values must be of type <class 'str'>

class `openpyxl.worksheet.views.`**`SheetView`**(*windowProtection=None*, *showFormulas=None*, *showGridLines=True*, *showRowColHeaders=None*, *showZeros=None*, *rightToLeft=None*, *tabSelected=None*, *showRuler=None*, *showOutlineSymbols=None*, *defaultGridColor=None*, *showWhiteSpace=None*, *view=None*, *topLeftCell=None*, *colorId=None*, *zoomScale=None*, *zoomScaleNormal=None*, *zoomScaleSheetLayoutView=None*, *zoomScalePageLayoutView=None*, *workbookViewId=0*, *selection=None*, *pane=None*)

Bases: `openpyxl.descriptors.serialisable.Serialisable`

Information about the visible portions of this sheet.

`colorId`
Values must be of type <class 'int'>

`defaultGridColor`
Values must be of type <class 'bool'>

`pane`
Values must be of type <class 'openpyxl.worksheet.views.Pane'>

`rightToLeft`
Values must be of type <class 'bool'>

`selection`
A sequence (list or tuple) that may only contain objects of the declared type

`showFormulas`
Values must be of type <class 'bool'>

`showGridLines`
Values must be of type <class 'bool'>

`showOutlineSymbols`
Values must be of type <class 'bool'>

`showRowColHeaders`
Values must be of type <class 'bool'>

`showRuler`
Values must be of type <class 'bool'>

`showWhiteSpace`
Values must be of type <class 'bool'>

`showZeros`
Values must be of type <class 'bool'>

`tabSelected`
Values must be of type <class 'bool'>

`tagname` = 'sheetView'

`topLeftCell`
Values must be of type <class 'str'>

`view`
Value must be one of {'normal', 'pageBreakPreview', 'pageLayout'}

`windowProtection`
Values must be of type <class 'bool'>

`workbookViewId`
Values must be of type <class 'int'>

`zoomScale`
Values must be of type <class 'int'>

`zoomScaleNormal`
Values must be of type <class 'int'>

`zoomScalePageLayoutView`
Values must be of type <class 'int'>

`zoomScaleSheetLayoutView`
Values must be of type <class 'int'>

openpyxl.worksheet.worksheet module

class `openpyxl.worksheet.worksheet.`**`Worksheet`**(*parent*, *title=None*)

Bases: `openpyxl.workbook.child._WorkbookChild`

Represents a worksheet.

Do not create worksheets yourself, use `openpyxl.workbook.Workbook.create_sheet()` instead

`BREAK_COLUMN` = **2**

`BREAK_NONE` = **0**

`BREAK_ROW` = **1**

`ORIENTATION_LANDSCAPE` = **'landscape'**

`ORIENTATION_PORTRAIT` = **'portrait'**

`PAPERSIZE_A3` = **'8'**

`PAPERSIZE_A4` = **'9'**

`PAPERSIZE_A4_SMALL` = **'10'**

`PAPERSIZE_A5` = **'11'**

`PAPERSIZE_EXECUTIVE` = **'7'**

`PAPERSIZE_LEDGER` = **'4'**

`PAPERSIZE_LEGAL` = **'5'**

`PAPERSIZE_LETTER` = **'1'**

`PAPERSIZE_LETTER_SMALL` = **'2'**

`PAPERSIZE_STATEMENT` = **'6'**

`PAPERSIZE_TABLOID` = **'3'**

`SHEETSTATE_HIDDEN` = **'hidden'**

`SHEETSTATE_VERYHIDDEN` = **'veryHidden'**

`SHEETSTATE_VISIBLE` = **'visible'**

`active_cell`

`add_chart`(*chart*, *anchor=None*)

Add a chart to the sheet Optionally provide a cell for the top-left anchor

`add_data_validation`(*data_validation*)

Add a data-validation object to the sheet. The data-validation object defines the type of data-validation to be applied and the cell or range of cells it should apply to.

`add_image`(*img*, *anchor=None*)

Add an image to the sheet. Optionally provide a cell for the top-left anchor

`add_print_title`(*n*, *rows_or_cols='rows'*)

Print Titles are rows or columns that are repeated on each printed sheet. This adds n rows or columns at the top or left of the sheet

`append`(*iterable*)

Appends a group of values at the bottom of the current sheet.

- If it's a list: all values are added in order, starting from the first column
- If it's a dict: values are assigned to the columns indicated by the keys (numbers or letters)

Parameters **`iterable`** (*list/tuple/range/generator or dict*) – list, range or generator, or dict containing values to append

Usage:

- append(['This is A1', 'This is B1', 'This is C1'])
- **or** append({'A' : 'This is A1', 'C' : 'This is C1'})
- **or** append({1 : 'This is A1', 3 : 'This is C1'})

Raise TypeError when iterable is neither a list/tuple nor a dict

`calculate_dimension`()
Return the minimum bounding range for all cells containing data.

`cell`(*coordinate=None*, *row=None*, *column=None*, *value=None*)
Returns a cell object based on the given coordinates.

Usage: cell(coodinate='A15') **or** cell(row=15, column=1)

If *coordinates* are not given, then row *and* column must be given.

Cells are kept in a dictionary which is empty at the worksheet creation. Calling *cell* creates the cell in memory when they are first accessed, to reduce memory usage.

Parameters

- **`coordinate`** (*string*) – coordinates of the cell (e.g. 'B12')
- **`row`** (*int*) – row index of the cell (e.g. 4)
- **`column`** (*int*) – column index of the cell (e.g. 3)

Raise InsufficientCoordinatesException when coordinate or (row and column) are not given

Return type :class:openpyxl.cell.Cell

`columns`
Iterate over all columns in the worksheet

`dimensions`

`freeze_panes`

`get_cell_collection`()
Return an unordered list of the cells in this worksheet.

`get_named_range`(*range_string*)
Returns a 2D array of cells, with optional row and column offsets.

Parameters **`range_string`** (*string*) – *named range* name

Return type tuples of tuples of `openpyxl.cell.Cell`

`get_squared_range`(*min_col*, *min_row*, *max_col*, *max_row*)
Returns a 2D array of cells

Parameters

- **`min_col`** (*int*) – smallest column index (1-based index)
- **`min_row`** (*int*) – smallest row index (1-based index)
- **`max_col`** (*int*) – largest column index (1-based index)
- **`max_row`** (*int*) – smallest row index (1-based index)

Return type generator

`iter_rows`(*range_string=None*, *row_offset=0*, *column_offset=0*)
Returns a squared range based on the *range_string* parameter, using generators. If no range is passed, will iterate over all cells in the worksheet

Parameters

- **`range_string`** (*string*) – range of cells (e.g. 'A1:C4')
- **`row_offset`** – additional rows (e.g. 4)
- **`column_offset`** – additonal columns (e.g. 3)

Return type generator

`max_column`
Get the largest value for column currently stored.

Return type int

`max_row`
Returns the maximum row index containing data

Return type int

`merge_cells`(*range_string=None*, *start_row=None*, *start_column=None*, *end_row=None*, *end_column=None*)
Set merge on a cell range. Range is a cell range (e.g. A1:E1)

`merged_cell_ranges`
Public attribute for which cells have been merged

`merged_cells`
Utility for checking whether a cell has been merged or not

`min_column`

`min_row`

`point_pos`(*left=0*, *top=0*)
tells which cell is under the given coordinates (in pixels) counting from the top-left corner of the sheet. Can be used to locate images and charts on the worksheet

`rows`
Iterate over all rows in the worksheet

`selected_cell`

`set_printer_settings`(*paper_size*, *orientation*)
Set printer settings

`show_gridlines`

`show_summary_below`

`show_summary_right`

`unmerge_cells`(*range_string=None*, *start_row=None*, *start_column=None*, *end_row=None*, *end_column=None*)
Remove merge on a cell range. Range is a cell range (e.g. A1:E1)

`vba_code`

`openpyxl.worksheet.worksheet.`**`flatten`**(*results*)
Return cell values row-by-row

`openpyxl.worksheet.worksheet.`**`isgenerator`**(*obj*)

openpyxl.writer package

Submodules

openpyxl.writer.etree_worksheet module

`openpyxl.writer.etree_worksheet.`**`get_rows_to_write`**(*worksheet*)
Return all rows, and any cells that they contain

`openpyxl.writer.etree_worksheet.`**`write_cell`**(*worksheet*, *cell*, *styled=None*)

`openpyxl.writer.etree_worksheet.`**`write_rows`**(*xf*, *worksheet*)
Write worksheet data to xml.

openpyxl.writer.excel module

class `openpyxl.writer.excel.`**`ExcelWriter`**(*workbook*)
Bases: `object`

Write a workbook object to an Excel file.

`comment_writer`
alias of `CommentWriter`

`save`(*filename*, *as_template=False*)
Write data into the archive.

`write_data`(*archive*, *as_template=False*)
Write the various xml files into the zip archive.

`openpyxl.writer.excel.`**`save_virtual_workbook`**(*workbook*, *as_template=False*)
Return an in-memory workbook, suitable for a Django response.

`openpyxl.writer.excel.`**`save_workbook`**(*workbook*, *filename*, *as_template=False*)
Save the given workbook on the filesystem under the name filename.

Parameters

- **`workbook`** (`openpyxl.workbook.Workbook`) – the workbook to save
- **`filename`** (*string*) – the path to which save the workbook

Return type bool

openpyxl.writer.lxml_worksheet module

`openpyxl.writer.lxml_worksheet.`**`write_cell`**(*xf*, *worksheet*, *cell*, *styled=False*)

`openpyxl.writer.lxml_worksheet.`**`write_rows`**(*xf*, *worksheet*)
Write worksheet data to xml.

openpyxl.writer.relations module

`openpyxl.writer.relations.`**`write_rels`**(*worksheet*, *comments_id=None*, *vba_controls_id=None*)
Write relationships for the worksheet to xml.

openpyxl.writer.strings module

`openpyxl.writer.strings.`**`write_string_table`**(*string_table*)
Write the string table xml.

openpyxl.writer.styles module

openpyxl.writer.theme module

`openpyxl.writer.theme.`**`write_theme`**`()`
: Write the theme xml.

openpyxl.writer.workbook module

`openpyxl.writer.workbook.`**`write_properties_app`**`(`*workbook*`)`
: Write the properties xml.

`openpyxl.writer.workbook.`**`write_root_rels`**`(`*workbook*`)`
: Write the relationships xml.

`openpyxl.writer.workbook.`**`write_workbook`**`(`*workbook*`)`
: Write the core workbook xml.

`openpyxl.writer.workbook.`**`write_workbook_rels`**`(`*workbook*`)`
: Write the workbook relationships xml.

openpyxl.writer.worksheet module

`openpyxl.writer.worksheet.`**`write_cols`**`(`*worksheet*`)`
: Write worksheet columns to xml.

  <cols> may never be empty - spec says must contain at least one child

`openpyxl.writer.worksheet.`**`write_conditional_formatting`**`(`*worksheet*`)`
: Write conditional formatting to xml.

`openpyxl.writer.worksheet.`**`write_drawing`**`(`*worksheet*`)`
: Add link to drawing if required

`openpyxl.writer.worksheet.`**`write_format`**`(`*worksheet*`)`

`openpyxl.writer.worksheet.`**`write_header_footer`**`(`*worksheet*`)`

`openpyxl.writer.worksheet.`**`write_hyperlinks`**`(`*worksheet*`)`
: Write worksheet hyperlinks to xml.

`openpyxl.writer.worksheet.`**`write_mergecells`**`(`*worksheet*`)`
: Write merged cells to xml.

`openpyxl.writer.worksheet.`**`write_worksheet`**`(`*worksheet*, *shared_strings*`)`
: Write a worksheet to an xml file.

openpyxl.writer.write_only module

`openpyxl.writer.write_only.`**`WriteOnlyCell`**`(`*ws=None*, *value=None*`)`

class `openpyxl.writer.write_only.`**`WriteOnlyWorksheet`**`(`*parent_workbook*, *title*`)`
: Bases: *`openpyxl.worksheet.worksheet.Worksheet`*

  Streaming worksheet using lxml Optimised to reduce memory by writing rows just in time Cells can be styled and have comments Styles for rows and columns must be applied before writing cells

  `append``(`*row*`)`

  Parameters **`row`** (*iterable*) – iterable containing values to append

  `cell``(`**args*, ***kw*`)`

  `close``()`

  `filename`

  `merge_cells``(`**args*, ***kw*`)`

range(**args*, ***kw*)

writer = None

openpyxl.writer.write_only.**create_temporary_file**(*suffix=''*)

openpyxl.writer.write_only.**isgenerator**(*obj*)

openpyxl.writer.write_only.**removed_method**(**args*, ***kw*)

openpyxl.writer.write_only.**save_dump**(*workbook*, *filename*)

openpyxl.xml package

openpyxl.xml.**lxml_available**()

openpyxl.xml.**lxml_env_set**()

Submodules

openpyxl.xml.constants module

openpyxl.xml.functions module

openpyxl.xml.functions.**ConditionalElement**(*node*, *tag*, *condition*, *attr=None*)
Utility function for adding nodes if certain criteria are fulfilled An optional attribute can be passed in which will always be serialised as '1'

openpyxl.xml.functions.**iterparse**(*source*, **args*, ***kw*)

openpyxl.xml.functions.**localname**(*node*)

openpyxl.xml.functions.**safe_iterator**(*node*, *tag=None*)
Return an iterator that is compatible with Python 2.6

openpyxl.xml.functions.**safe_iterparse**(*source*, **args*, ***kw*)

openpyxl.xml.namespace module

CHAPTER 10

Indices and tables

- genindex
- modindex
- search

CHAPTER 11

Release Notes

11.1 2.4.0 (unreleased)

11.1.1 Minor changes

- Remove deprecated methods from DataValidation
- Convert AutoFilter to Serialisable and extend support for filters
- Add support for SortState
- Removed *use_iterators* keyword when loading workbooks. Use *read_only* instead.

11.1.2 Deprecations

Cell anchor method Worksheet point_pos method Comment text attribute

11.2 2.3.2 (unreleased)

11.3 2.3.1 (2015-11-20)

11.3.1 Bug fixes

- #534 Exception when using columns property in read-only mode.
- #536 Incorrectly handle comments from Google Docs files.
- #539 Flexible value types for conditional formatting.
- #542 Missing content types for images.
- #543 Make sure images fit containers on all OSes.
- #544 Gracefully handle missing cell styles.
- #546 ExternalLink duplicated when editing a file with macros.
- #548 Exception with non-ASCII worksheet titles
- #551 Combine multiple LineCharts

11.3.2 Minor changes

- PR 88 Fix page margins in parser.

11.4 2.3.0 (2015-10-20)

11.4.1 Major changes

- Support the creation of chartsheets

11.4.2 Bug fixes

- #532 Problems when cells have no style in read-only mode.

11.4.3 Minor changes

- PR 79 Make PlotArea editable in charts
- Use graphicalProperties as the alias for spPr

11.5 2.3.0-b2 (2015-09-04)

11.5.1 Bug fixes

- #488 Support hashValue attribute for sheetProtection
- #493 Warn that unsupported extensions will be dropped
- #494 Cells with exponentials causes a ValueError
- #497 Scatter charts are broken
- #499 Inconsistent conversion of localised datetimes
- #500 Adding images leads to unreadable files
- #509 Improve handling of sheet names
- #515 Non-ascii titles have bad repr
- #516 Ignore unassigned worksheets

11.5.2 Minor changes

- Worksheets are now iterable by row.
- Assign individual cell styles only if they are explicitly set.

11.6 2.3.0-b1 (2015-06-29)

11.6.1 Major changes

- Shift to using (row, column) indexing for cells. Cells will at some point *lose* coordinates.
- New implementation of conditional formatting. Databars now partially preserved.
- et_xmlfile is now a standalone library.
- Complete rewrite of chart package
- Include a tokenizer for fomulae to be able to adjust cell references in them. PR 63

11.6.2 Minor changes

- Read-only and write-only worksheets renamed.
- Write-only workbooks support charts and images.
- PR76 Prevent comment images from conflicting with VBA

11.6.3 Bug fixes

- #81 Support stacked bar charts
- #88 Charts break hyperlinks
- #97 Pie and combination charts
- #99 Quote worksheet names in chart references
- #150 Support additional chart options
- #172 Support surface charts
- #381 Preserve named styles
- #470 Adding more than 10 worksheets with the same name leads to duplicates sheet names and an invalid file

11.7 2.2.6 (unreleased)

11.7.1 Bug fixes

- #502 Unexpected keyword “mergeCell”
- #503 tostring missing in dump_worksheet
- #506 Non-ASCII formulae cannot be parsed
- #508 Cannot save files with coloured tabs
- Regex for ignoring named ranges is wrong (character class instead of prefix)

11.8 2.2.5 (2015-06-29)

11.8.1 Bug fixes

- #463 Unexpected keyword "mergeCell"
- #484 Unusual dimensions breaks read-only mode
- #485 Move return out of loop

11.9 2.2.4 (2015-06-17)

11.9.1 Bug fixes

- #464 Cannot use images when preserving macros
- #465 ws.cell() returns an empty cell on read-only workbooks
- #467 Cannot edit a file with ActiveX components
- #471 Sheet properties elements must be in order
- #475 Do not redefine class __slots__ in subclasses
- #477 Write-only support for SheetProtection
- #478 Write-only support for DataValidation
- Improved regex when checking for datetime formats

11.10 2.2.3 (2015-05-26)

11.10.1 Bug fixes

- #451 fitToPage setting ignored
- #458 Trailing spaces lost when saving files.
- #459 setup.py install fails with Python 3
- #462 Vestigial rId conflicts when adding charts, images or comments
- #455 Enable Zip64 extensions for all versions of Python

11.11 2.2.2 (2015-04-28)

11.11.1 Bug fixes

- #447 Uppercase datetime number formats not recognised.
- #453 Borders broken in shared_styles.

11.12 2.2.1 (2015-03-31)

11.12.1 Minor changes

- PR54 Improved precision on times near midnight.
- PR55 Preserve macro buttons

11.12.2 Bug fixes

- #429 Workbook fails to load because header and footers cannot be parsed.
- #433 File-like object with encoding=None
- #434 SyntaxError when writing page breaks.
- #436 Read-only mode duplicates empty rows.
- #437 Cell.offset raises an exception
- #438 Cells with pivotButton and quotePrefix styles cannot be read
- #440 Error when customised versions of builtin formats
- #442 Exception raised when a fill element contains no children
- #444 Styles cannot be copied

11.13 2.2.0 (2015-03-11)

11.13.1 Bug fixes

- #415 Improved exception when passing in invalid in memory files.

11.14 2.2.0-b1 (2015-02-18)

11.14.1 Major changes

- Cell styles deprecated, use formatting objects (fonts, fills, borders, etc.) directly instead
- Charts will no longer try and calculate axes by default
- Support for template file types - PR21
- Moved ancillary functions and classes into utils package - single place of reference
- PR 34 Fully support page setup
- Removed SAX-based XML Generator. Special thanks to Elias Rabel for implementing xmlfile for xml.etree
- Preserve sheet view definitions in existing files (frozen panes, zoom, etc.)

11.14.2 Bug fixes

- #103 Set the zoom of a sheet
- #199 Hide gridlines
- #215 Preserve sheet view setings
- #262 Set the zoom of a sheet
- #392 Worksheet header not read
- #387 Cannot read files without styles.xml
- #410 Exception when preserving whitespace in strings
- #417 Cannot create print titles
- #420 Rename confusing constants
- #422 Preserve color index in a workbook if it differs from the standard

11.14.3 Minor changes

- Use a 2-way cache for column index lookups
- Clean up tests in cells
- PR 40 Support frozen panes and autofilter in write-only mode
- Use ws.calculate_dimension(force=True) in read-only mode for unsized worksheets

11.15 2.1.5 (2015-02-18)

11.15.1 Bug fixes

- #403 Cannot add comments in write-only mode
- #401 Creating cells in an empty row raises an exception
- #408 from_excel adjustment for Julian dates 1 < x < 60
- #409 refersTo is an optional attribute

11.15.2 Minor changes

- Allow cells to be appended to standard worksheets for code compatibility with write-only mode.

11.16 2.1.4 (2014-12-16)

11.16.1 Bug fixes

- #393 IterableWorksheet skips empty cells in rows
- #394 Date format is applied to all columns (while only first column contains dates)
- #395 temporary files not cleaned properly

- #396 Cannot write "=" in Excel file
- #398 Cannot write empty rows in write-only mode with LXML installed

11.16.2 Minor changes

- Add relation namespace to root element for compatibility with iWork
- Serialize comments relation in LXML-backend

11.17 2.1.3 (2014-12-09)

11.17.1 Minor changes

- PR 31 Correct tutorial
- PR 32 See #380
- PR 37 Bind worksheet to ColumnDimension objects

11.17.2 Bug fixes

- #379 ws.append() doesn't set RowDimension Correctly
- #380 empty cells formatted as datetimes raise exceptions

11.18 2.1.2 (2014-10-23)

11.18.1 Minor changes

- PR 30 Fix regex for positive exponentials
- PR 28 Fix for #328

11.18.2 Bug fixes

- #120, #168 defined names with formulae raise exceptions, #292
- #328 ValueError when reading cells with hyperlinks
- #369 IndexError when reading definedNames
- #372 number_format not consistently applied from styles

11.19 2.1.1 (2014-10-08)

11.19.1 Minor changes

- PR 20 Support different workbook code names
- Allow auto_axis keyword for ScatterCharts

11.19.2 Bug fixes

- #332 Fills lost in ConditionalFormatting
- #360 Support value="none" in attributes
- #363 Support undocumented value for textRotation
- #364 Preserve integers in read-only mode
- #366 Complete read support for DataValidation
- #367 Iterate over unsized worksheets

11.20 2.1.0 (2014-09-21)

11.20.1 Major changes

- "read_only" and "write_only" new flags for workbooks
- Support for reading and writing worksheet protection
- Support for reading hidden rows
- Cells now manage their styles directly
- ColumnDimension and RowDimension object manage their styles directly
- Use xmlfile for writing worksheets if available - around 3 times faster
- Datavalidation now part of the worksheet package

11.20.2 Minor changes

- Number formats are now just strings
- Strings can be used for RGB and aRGB colours for Fonts, Fills and Borders
- Create all style tags in a single pass
- Performance improvement when appending rows
- Cleaner conversion of Python to Excel values
- PR6 reserve formatting for empty rows
- standard worksheets can append from ranges and generators

11.20.3 Bug fixes

- #153 Cannot read visibility of sheets and rows
- #181 No content type for worksheets
- 241 Cannot read sheets with inline strings
- 322 1-indexing for merged cells
- 339 Correctly handle removal of cell protection
- 341 Cells with formulae do not round-trip

- 347 Read DataValidations
- 353 Support Defined Named Ranges to external workbooks

11.21 2.0.5 (2014-08-08)

11.21.1 Bug fixes

- #348 incorrect casting of boolean strings
- #349 roundtripping cells with formulae

11.22 2.0.4 (2014-06-25)

11.22.1 Minor changes

- Add a sample file illustrating colours

11.22.2 Bug fixes

- #331 DARKYELLOW was incorrect
- Correctly handle extend attribute for fonts

11.23 2.0.3 (2014-05-22)

11.23.1 Minor changes

- Updated docs

11.23.2 Bug fixes

- #319 Cannot load Workbooks with vertAlign styling for fonts

11.24 2.0.2 (2014-05-13)

11.25 2.0.1 (2014-05-13) brown bag

11.26 2.0.0 (2014-05-13) brown bag

11.26.1 Major changes

- This is last release that will support Python 3.2
- Cells are referenced with 1-indexing: A1 == cell(row=1, column=1)

- Use jdcal for more efficient and reliable conversion of datetimes
- Significant speed up when reading files
- Merged immutable styles
- Type inference is disabled by default
- RawCell renamed ReadOnlyCell
- ReadOnlyCell.internal_value and ReadOnlyCell.value now behave the same as Cell
- Provide no size information on unsized worksheets
- Lower memory footprint when reading files

11.26.2 Minor changes

- All tests converted to pytest
- Pyflakes used for static code analysis
- Sample code in the documentation is automatically run
- Support GradientFills
- BaseColWidth set

11.26.3 Pull requests

- #70 Add filterColumn, sortCondition support to AutoFilter
- #80 Reorder worksheets parts
- #82 Update API for conditional formatting
- #87 Add support for writing Protection styles, others
- #89 Better handling of content types when preserving macros

11.26.4 Bug fixes

- #46 ColumnDimension style error
- #86 reader.worksheet.fast_parse sets booleans to integers
- #98 Auto sizing column widths does not work
- #137 Workbooks with chartsheets
- #185 Invalid PageMargins
- #230 Using v in cells creates invalid files
- #243 - IndexError when loading workbook
- #263 - Forded conversion of line breaks
- #267 - Raise exceptions when passed invalid types
- #270 - Cannot open files which use non-standard sheet names or reference Ids
- #269 - Handling unsized worksheets in IterableWorksheet

- #270 - Handling Workbooks with non-standard references
- #275 - Handling auto filters where there are only custom filters
- #277 - Harmonise chart and cell coordinates
- #280- Explicit exception raising for invalid characters
- #286 - Optimized writer can not handle a datetime.time value
- #296 - Cell coordinates not consistent with documentation
- #300 - Missing column width causes load_workbook() exception
- #304 - Handling Workbooks with absolute paths for worksheets (from Sharepoint)

11.27 1.8.6 (2014-05-05)

11.27.1 Minor changes

Fixed typo for import Elementtree

11.27.2 Bugfixes

- #279 Incorrect path for comments files on Windows

11.28 1.8.5 (2014-03-25)

11.28.1 Minor changes

- The '=' string is no longer interpreted as a formula
- When a client writes empty xml tags for cells (e.g. <c r='A1'></c>), reader will not crash

11.29 1.8.4 (2014-02-25)

11.29.1 Bugfixes

- #260 better handling of undimensioned worksheets
- #268 non-ascii in formualae
- #282 correct implementation of register_namepsace for Python 2.6

11.30 1.8.3 (2014-02-09)

11.30.1 Major changes

Always parse using cElementTree

11.30.2 Minor changes

Slight improvements in memory use when parsing

- #256 - error when trying to read comments with optimised reader
- #260 - unsized worksheets
- #264 - only numeric cells can be dates

11.31 1.8.2 (2014-01-17)

- #247 - iterable worksheets open too many files
- #252 - improved handling of lxml
- #253 - better handling of unique sheetnames

11.32 1.8.1 (2014-01-14)

- #246

11.33 1.8.0 (2014-01-08)

11.33.1 Compatibility

Support for Python 2.5 dropped.

11.33.2 Major changes

- Support conditional formatting
- Support lxml as backend
- Support reading and writing comments
- pytest as testrunner now required
- Improvements in charts: new types, more reliable

11.33.3 Minor changes

- load_workbook now accepts data_only to allow extracting values only from formulae. Default is false.
- Images can now be anchored to cells
- Docs updated
- Provisional benchmarking
- Added convenience methods for accessing worksheets and cells by key

11.34 1.7.0 (2013-10-31)

11.34.1 Major changes

Drops support for Python < 2.5 and last version to support Python 2.5

11.34.2 Compatibility

Tests run on Python 2.5, 2.6, 2.7, 3.2, 3.3

11.34.3 Merged pull requests

- 27 Include more metadata
- 41 Able to read files with chart sheets
- 45 Configurable Worksheet classes
- 3 Correct serialisation of Decimal
- 36 Preserve VBA macros when reading files
- 44 Handle empty oddheader and oddFooter tags
- 43 Fixed issue that the reader never set the active sheet
- 33 Reader set value and type explicitly and TYPE_ERROR checking
- 22 added page breaks, fixed formula serialization
- 39 Fix Python 2.6 compatibility
- 47 Improvements in styling

11.34.4 Known bugfixes

- #109
- #165
- #179
- #209
- #112
- #166
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- #223
- #124
- #157

11.34.5 Miscellaneous

Performance improvements in optimised writer

Docs updated

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