Lab 5 – Temperature Converter

Instructions:

Provide your solutions in a file named **lab5.py**. Make sure you run the doctest on your solutions..

Problems:

1. Write a `Temperature` class to represent Celsius and Fahrenheit temperatures. Your goal is to make this client code work:

```
>>> #constructors
>>> t1 = Temperature()
>>> t1
Temperature(0.0,'C')
>>> t2 = Temperature(100,'f')
>>> t2
Temperature(100.0,'F')
>>> t3 = Temperature('12.5','c')
>>> t3
Temperature(12.5,'C')

>>> #convert
>>> t1.convert()
Temperature(32.0,'F')
>>> t4 = t1.convert()
>>> t4
Temperature(32.0,'F')

>>> #__str__
>>> print(t1)
0.0°C
>>> print(t2)
100.0°F

>>> #==
>>> t1 == t2
False
>>> t4 == t1
True

>>> #raised errors
>>> Temperature('apple','c')
Traceback (most recent call last):
```

```
…
ValueError: could not convert string to float: 'apple'
>>> Temperature(21.4,'t')
Traceback (most recent call last):
…
UnitError: Unrecognized temperature unit 't'
```

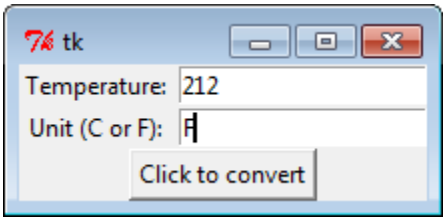
Notes:

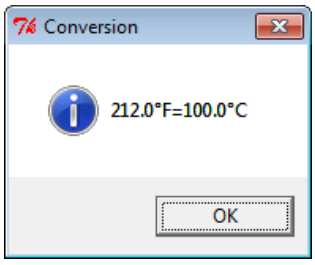
- In addition to the usual `__repr__`, you should write the method `__str__`. `__str__` is similar to `__repr__` in that it returns a `str`, but is used when a 'pretty' version is needed, for example for printing.
- Unit should be set to 'C' or 'F' but 'c' and 'f' should also be accepted as inputs.
- you must create an error class `UnitError` that subclasses `Exception` (it doesn't have to anything additional to that). This error should be raised if the user attempts to set the temperature unit to something other than 'c','f','C" or 'F'
- if the user tries to set the degree to something that is not understandable as a float, an exception should be raised (you can get this almost for free)

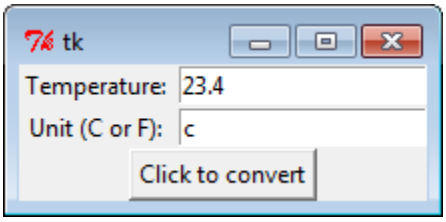
2. In the same module/file, implement a class `TempConverter` that that provides a GUI for converting temperatures. `TempConverter` should be a usable widget, to do this it MUST subclass `Frame` (similar to the `Calculator`). The GUI can be made visible by executing:

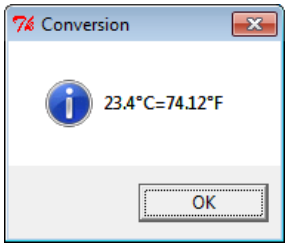
   ```
   >>> TempConverter().pack()
   >>>
   ```

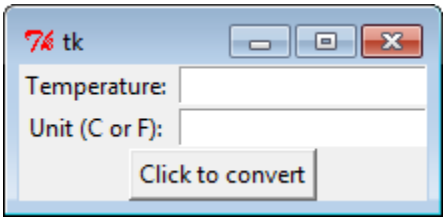
   Here are some examples of how it responds to various valid and invalid inputs (use try except):

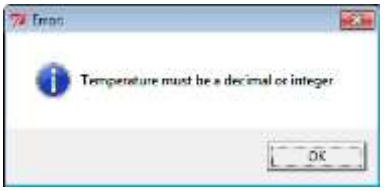


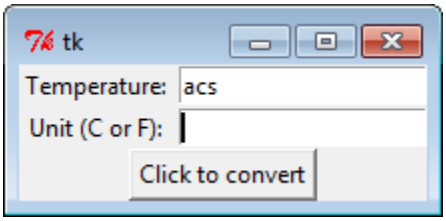


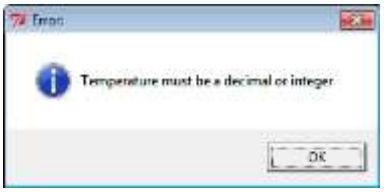

tk
Temperature: 23.4
Unit (C or F): c
Click to convert

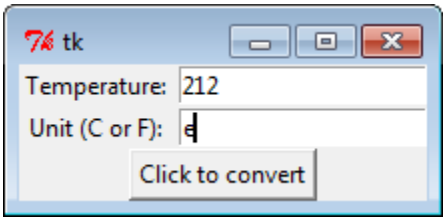

Conversion
23.4°C=74.12°F
OK

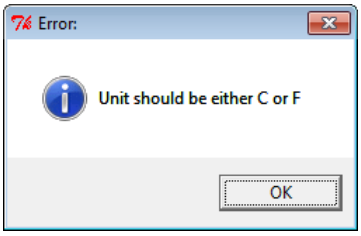

tk
Temperature:
Unit (C or F):
Click to convert


Temperature must be a decimal or integer
OK


tk
Temperature: acs
Unit (C or F):
Click to convert


Temperature must be a decimal or integer
OK


tk
Temperature: 212
Unit (C or F): e
Click to convert


Error:
Unit should be either C or F
OK