



## Object Oriented Programming in Python (New Sheet)

**Exercise 26 Programming Task:** This exercise introduces Object Oriented Programming with Python. The goal is to write classes to apply a filter kernel to an image in single and multi-scale filtering. You can find an introduction to OOP in Python here <https://docs.python.org/3.5/tutorial/classes.html>.

Write a class `Filter` that allows to filter an image using a filter kernel. Add methods `set_image(img)` and `set_kernel(kernel)`. Calling `filter()` should filter the image. Since applying the filter kernel close to the image borders may yield undefined results, ignore image pixels when the kernel might cover out-of-image areas. The result should be saved in `filtered_image`. Use the constructor `__init__` to define a default filter kernel.

Write a class `MFilter` that performs image filtering at different image scales. The filtered images should be saved in the list `filtered_images`. Override the method `filter()` from the base class but call the base class version of it for filtering. You can use `super(self.__class__, self).method()` to call a method from a base class. The source image should be scaled down by a factor of 2 after each iteration.