

# Exam Simulation Solution

Scientific Programming Algolab

Wednesday 21 Dec 2016

## 1) Insertion sort solution

In [2]:

```
import unittest

def insertion_sort(A):
    """ Sorts in-place list A with insertion sort. """
    for i in range(1, len(A)):
        temp = A[i]
        j = i
        while j > 0 and A[j-1] > temp:
            A[j] = A[j-1]
            j -= 1
        A[j] = temp

class InsertionSortTest(unittest.TestCase):

    def test_zero_elements(self):
        v = []
        insertion_sort(v)
        self.assertEqual(v, [])

    def test_return_none(self):
        self.assertEqual(None, insertion_sort([2]))

    def test_one_element(self):
        v = ["a"]
        insertion_sort(v)
        self.assertEqual(v, ["a"])

    def test_three_elements(self):
        v = [1, 3, 2]
        insertion_sort(v)
        self.assertEqual(v, [1, 2, 3])

    def test_two_elements(self):
        v = [2, 1]
        insertion_sort(v)
        self.assertEqual(v, [1, 2])

    def test_piccinno_list(self):
        v = [23, 34, 55, 32, 7777, 98, 3, 2, 1]
        insertion_sort(v)
        vcopy = v[:]
        vcopy.sort()
        self.assertEqual(v, vcopy)
```

In [3]: