

AI201 Programming for AI
Assignment 03: Classes and Operator Overloading
Due : 23h55 Monday 13 December, 2021.

FCSE
GIKI
Fall 2021

1 Objectives

- (a) Test the student's ability to do operator overloading in Python.
- (b) Test the student's ability to follow written instructions.

2 Instructions

- This is an individual assignment.
- You will be using the Python programming language to do this assignment. You can't use any external libraries meaning no `import` statements allowed.
- Write clean, readable, and well commented code.
- The submission will be on MS Teams. Late submission will lose marks.
- You should submit one file named `u2020xxx_a03.py`, `xxx` being last 3 digits of your reg.no.
- Reading about `Python Data Model and Operator Overloading in Python` will help you do the assignment.
- This assignment comprises 5% of your total grade.

3 Task 0: Make a class MyVector

Define a class called `MyVector` which will behave a little - not exactly - like mathematical vectors.

It should have a constructor which should take arbitrary number of integers to initialize a vector. In case of anyother type it should raise the "ValueError" exception.

4 Task 1: Builtins

T1. Make some builtin functions work with MyVector.

Python has builtin function like `len()`, `print()`, `bool()`, `abs()`, etc., which work with the builtin data types. Your job is to make all these functions work with `MyVector` class. See the `a03_0p0verload.py` for their expected behavior; the comments against each `print()` statement should give you an idea of the behavior:

- the builtin `print()` function should print your object as shown in comments

- the builtin `len()` function should give the number of elements
- your objects should behave as iterables in `for` loops giving access to each subsequent element in each iteration
- the index operator `[]` should be able to access and modify an element at a certain index
- the builtin `abs()` should return the absolute value of the vector as shown in code
- your object should be useable as a boolean in `if` condition as shown in code

5 Task 2: Arithmetic Operators

T2. Make arithmetic operators work with `MyVector`.

The basic arithmetic operators `+`, `-`, `*` should work with `MyVector` class. See the `a03_0p0verload.py` for their expected behavior.

- define the `+` operator to sum two objects of type `MyVector` of equal length as shown in code
- define the `+=` operator as shown in code
- define the `*` operator to multiply each element of `MyVector` with a scalar
- define the `<<` operator to left-rotate the elements of `MyVector` by a scalar amount.

Testing your code: Once you have implemented your class, you can put the class definition in the attached `a03_0p0verload.py` file and the provided code will work.

6 Rubric

To discourage plagiarism and encourage academic honesty, if you've been unable to do any thing you can submit a program saying Hello World before the deadline by following submission instructions (name your file `u2020xxx_a03_hw.py`), and get 25% of the marks.

Category	Marks
Code was readable + Compiled without warnings + Does not crash + Program handles errors well	10 marks
Task 1 working correctly	25 marks
Task 2 working correctly	15 marks
Total	50 marks