UNIVERSITÉ DE MONTPELLIER

FACULTÉ DES SCIENCES MONTPELLIER

M2 Modélisation et Analyse Numérique
UE Programmation 2 - 2022/2023

CC 4 - Templates

les fichiers à rendre à l'issue de cette évaluation sont indiqués en rouge, alors que les fichiers fournis sont indiqués en bleu (dans le dossier /CC2). merci de respecter la dénomination demandée.

A class point2d is provided as two files class_Point2d.hpp and class_Point2d.cpp. Here is the declaration of this class:

```
class point2d{

protected:
  double* coord;

public:
  point2d(double* vv);
  inline double x() const{return coord[0];};
  inline double y() const{return coord[1];};
  void print() const;
  ~point2d();   //  destructor
  //point2d(const point2d& p);   //  copy constructor
};
```

We realize that this class is poorly designed and lacks flexibility. Indeed for some applications, we do not need points made of **double** components (x, y) but rather points made of **int** coordinates (p, q). We also realize that it makes no sense to design one class for points in 1D (located with x), one class for points in 2D (located with (x, y)) and one class for points in 3D (located with (x, y, z)).

Hence, the goal of this evaluation is to design a new class pointXd **so that:**

(i) the type of the component is a template parameters T,

(ii) the dimension Ndim of the space in which these points lie is an integer template parameter (which should take the values Ndim= 1, 2 or 3).

To reach this goal, please follow this guidelines:

(1) modify the proposed class so that it becomes a template class as suggested above,

(2) uncomment the line *//point2d(const point2d& p); // copy constructor* and modify it so that it works with the new template framework,

(3) add a new method that overloads **operator**= for pointXd ,

(4) compile and link your new class against the provided main() program in main.cpp.
(Please, be aware that lines 30-33 should be un-commented only if question (2) above is correctly answered, and that lines 36-40 should be un-commented only if question (3) above is correctly answered.)

The resulting new class should be provided as a file class_pointXd.hpp, together with your version of the main.cpp program.

Fin du sujet.