

# Project 4: A Class for the Data Blobs in Convolutional Neural Networks

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Please use C++ to design a class, and test it in a `main()` function to make sure it can work properly.

## Requirements

1. Design a class for the **data blobs** in Convolutional Neural Networks. It can be used for the **input, output and kernels of a convolutional layer**. The class should contain the **data** of a data blob and related information such the **number of rows, the number of columns, the number of channels**, etc.
2. The class **should support different data types**. It means that the elements can be **unsigned char, short, int, float, double**, etc.
3. **Do not use memory hard copy if a data blob is assigned to another**. Please carefully handle the memory management to avoid memory leaks and to release memory multiple times.
4. Implement some frequently **used operators including but not limited to =, ==, +, -, \*, etc.**
5. [Optional] Test your program on **X86 and ARM platforms**, and describe the differences.
6. [Tip] Class `cv::Mat` is a good example for this project.  
[https://docs.opencv.org/master/d3/d63/classcv\\_1\\_1Mat.html](https://docs.opencv.org/master/d3/d63/classcv_1_1Mat.html)
7. [Key point] The most important part of this project is **memory management**. The class should be robust and easy to use.

## The Report

1. The submitted report should contain the design, implementation, and evaluation of the function.
2. Presentation of the project highlighting the key features and results.

## Rules:

1. The project report and the source code must be submitted before the deadline. Any submission after the deadline (even by 1 second) will result in **a score of 0**. The deadline is 23:59 on May 14.
2. The files should be submitted as report.pdf, xxx.cpp, yyy.cpp zzz.h. The files should **NOT** be compressed into one.
3. The score will depend on the quality of both the source code and the report. The report should be easy to understand and provide a clear description of the project, especially the highlights.

4. Attention should be paid to code style. Adequate time is given for code to be written correctly and with good style. Deductions will be made for poor code style. Code style guides, such as the Google C++ Style Guide (<http://google.github.io/styleguide/cppguide.html>), can be used as a reference.