

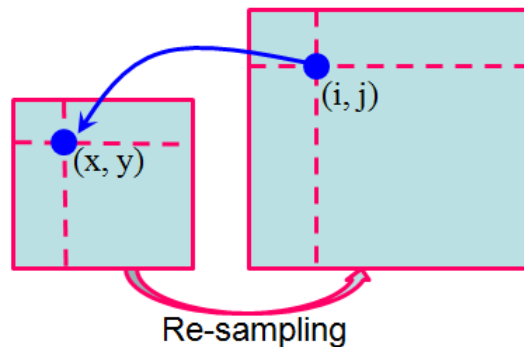
Project 1: Digital Image Re-Sampling (10 points)

Assigned: February 5, 2026 (Thursday)

Due: 11:59pm February 15, 2026 (Sunday)

In this project, you are asked to **re-sample** a 2D digital image. Specifically, you are asked to re-sample an input image by t times in both x-axis and y-axis, where t is an arbitrary positive **float-type** scale factor. Please consider bi-linear (BL) interpolation at (x, y) in case x or y is not at a grid point (or integer).

Hint: Assume the input image has a size of $M * N$. First you need to determine the size of the output image by multiplying both M and N by t . That is, $M' = M * t$ and $N' = N * t$.



Please submit the following files to Canvas drop-box:

- (1) The source code (C/C++ or Matlab) and a readme file
- (2) Two output images in PGM format or others (BMP, JPG, etc.): one for down-sampling ($t < 1$) and one for up-sampling ($t > 1$), where t is a floating-point number. You should indicate in the readme file what t values are used for the two output images.

Additional notes:

- (1) In case you are using C for this project, a sample code written in C is available on Canvas. It tells you how to read and write a PGM image.
- (2) A sample image is provided on Canvas for you to use as input.
- (3) The scaling factor t must be generally defined as a variable in your code so that a user can simply change its value to generate another scaled image.
- (4) You must implement the bi-linear interpolation algorithm by yourself – calling any built-in functions provided by a 3rd party library is NOT allowed.