

# COMP9517: Computer Vision

## 2024 T2 Lab 1 Specification

### Maximum Marks Achievable: 2.5

This lab is **worth 2.5% of the total course mark**.

The lab must be submitted online.

Instructions for submission will be posted closer to the deadline.

**Deadline for submission is Week 3, Friday 14 June 2024, 18:00:00.**

**Objective:** This lab revisits important concepts covered in the Week 1 and Week 2 lectures and aims to make you familiar with implementing specific algorithms.

**Software:** You are recommended to use a Jupyter notebook (see the lab instructions for more details). Submit your code as a Jupyter notebook (see the lab instructions for more details). During the tutorial consultation session this week, you can ask questions, and you can ask any questions you may have.

**Materials:** The sample image is provided in the lab instructions (MS3).

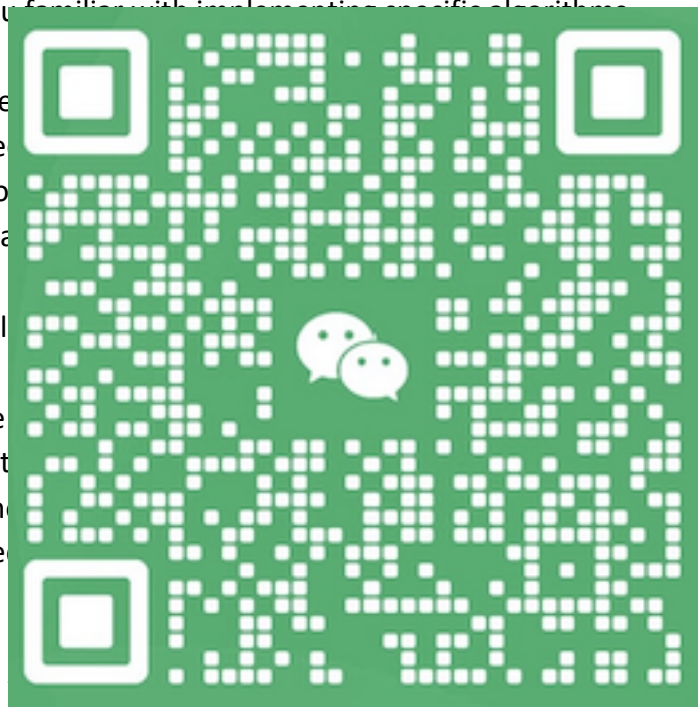
**Submission:** All code must be submitted as a Jupyter notebook. Submit your source code as a Jupyter notebook. You are encouraged to ask questions to all questions (see coding requirements for more details). The submission link will be announced in the lab instructions.

#### Task 1 (0.75 mark)

Your friend has been working on a project called “In Brightness” that involves creating and comparing images with their “antiforms”. He has captured a nice picture of a dark tree against a bright sky and snowy mountains during daylight (see the picture below on the left) and he asks you to help him with his project.

The idea is to create a nighttime version of the picture, where the tree and its immediate surroundings are illuminated but the background is now dark (see the result below on the right). Use intensity inversion and gamma correction to accomplish this task.

In your notebook, display the input and the final output image side by side.



Input



Output



### Task 2 (0.75 mark)

Your friend's family went on a vacation to Europe and took a lot of family photos. When they returned home and looked through their photos, they saw the camera bugged out and one of the photos (see below) was very noisy. You are asked to help them restore the photo.

As you remember from the previous task, you learned how to reduce noise in images using various filtering methods. Experiment with these filtering methods to restore the photo.

In your notebook, describe the results of your experiments by side, mention which filtering method you used and the principles taught in the course why this method works.



Input



### Task 3 (1 mark)

Another one of your friend's vacation pictures (see below) was a bit blurred. You remember from the course that there are different methods to sharpen images, such as unsharp masking and by using the Laplacean filter, so you decide to try these out.

In your notebook, display the blurred input photo and the corrected photo side by side, mention which sharpening method you have used, and explain based on the underlying principles taught in the course why this method is the right choice.

Input



Output



### Coding Requirements

Make sure that in your code, the input image is specified as an argument to the function. The output of the function should be displayed in the notebook environment. The output of the function should be executed so that the output is visible. The output of the function should be displayed in the notebook environment.

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