For this programming assignment you will implement a window based stereo algorithm using sum of squared differences to measure the similarity between windows.

You should turn in your source code, a writeup, and the result of running your program on the test images on the class webpage. Please turn in a ZIP file via email with the subject “ENGN1610 HOMEWORK 2”.

Part 1

Your main program should take two input images (left and right) and a window size. The output of the function should be the computed disparity map for the left image. Your program should use integral images to run in time independent of the correlation window size. Test the stereo algorithm using different window sizes and comment on how the window size affects the quality of the output. Is there an optimal size? And if so what is it?

Part 2

Devise a method that can use windows of different sizes or shapes for each pixel. You should devise a method to automatically select a “good” window for each pixel. For example, big windows lead to problems near object boundaries. But for a pixel in an area of the image with little texture, we may need to use a bigger window. This part of the assignment is fairly open and there is no single correct answer. You should come up with some theory on how to choose the window size for each pixel, then experiment with it. Your writeup should explain how your method works and the motivation behind it. You should also give an assessment of how well the approach works in practice.