Exercise 1.2

The program is implemented in C#. To build it, open the project in Visual Studio.net and press F5.   Click the open button to select an image. Supported file types are bmp, tiff, and jpeg. The histograms are displayed below the image.

The display of the 11x11 window is as follows:

(X Co-ordinate, Y Co-ordinate) R, G, B

INTENSITY   MEAN   VARIANCE

NB: Clicking the mouse will invert the pixels inside the window, and update the displayed data accordingly.

If the picture window is over the interior of an object in the image, the region enclosed by the window will be a homogeneous area, and the variance of the region will be small. The histogram of the pixels in this region will be 'sharp' meaning that all gray-level values will be localized around the mean of the region.
If there is noise in the image, the variance will increase.
If the window straddles an edge or corner in the image, the variance will be high, and the histogram will be more spread out. If the high variance is cause only by noise, then the histogram will be a soft peak. If the window contains two or more homogeneous regions, then there will be more than one peak on the histogram (NB the converse is not necessarily true). A simple edge or corner extracting algorithm could be constructed on the principle of finding local maxima of region variance within the image (an edge detector would find local maxima in one dimension, and a corner detector would find local maxima in two dimensions).