

# COMPSCI 375 Assignment 1

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## 1. Files attached

The following files are attached:

```
Ass1Frame.java
ImageCanvas.java
ZoomCanvas.java
Jak3b.bmp
```

The first three files contain the source code to load and display an RGB image in BMP format. The fourth file is a sample bitmap file. Java 1.5.0 is required to compile the program, by placing all three source files in the same directory and typing

```
javac Ass1Frame.java
```

The program can be executed by typing

```
java Ass1Frame [bmp filename]
```

The program treats the top-left pixel of the image as (0,0) and  $y$ -values increase downwards.

## 2. Discussion

Picture values in a window could be said to be "homogeneous" if the variance of picture values in that window is small (or zero), or equivalently if the average deviation from the mean of picture values in that window is small (or zero). Conversely, "inhomogeneous" picture values in a window could be defined as picture values with a large (or non-zero) variance or picture values with a large (or non-zero) average deviation from the mean. In the case of an RGB picture, the variance of intensity is a good indicator of homogeneity.

Some examples of windows with homogenous picture values in the image I have submitted are the  $11 \times 11$  windows centred at (16,60) (variance=0.0), (30,100) (variance=0.42), and (191,68) (variance=12.23). In these windows the picture values (and hence intensity) are fairly constant.

Some examples of windows with inhomogeneous picture values occur at boundaries of "objects" in the picture, such as the  $11 \times 11$  windows centred at (46,71) (variance=1499.55), (135,99) (variance=2515.9) and (190,35) (variance=2057.12).

In terms of histograms, a "spike" in any of the colour channel histograms (or an intensity histogram) could be an indication of a homogeneous region in the picture. A very uniform histogram would indicate that a picture is largely inhomogeneous. In the picture I have supplied, each colour channel seems to have a "spike", indicating that there are significant homogeneous areas.