Suggested requirements for Posterization functionality within Darktable

Overall objectives

- to be able to alter aspects of an image by quantising values into a number of discrete values
- to be able to use this functionality flexibly and creatively

Detailed requirements

Requirements are graded as -
M - Must implement for the development to be viable
S - Should implement, so as to include important functionality
W - Would like, but could be omitted

Brightness is used here in the plain-English sense, not any strict photographic definition.
Similarly Hue is used to mean the colour of something.
Saturation also does not refer to a photographic definition and just means how richly coloured something is.
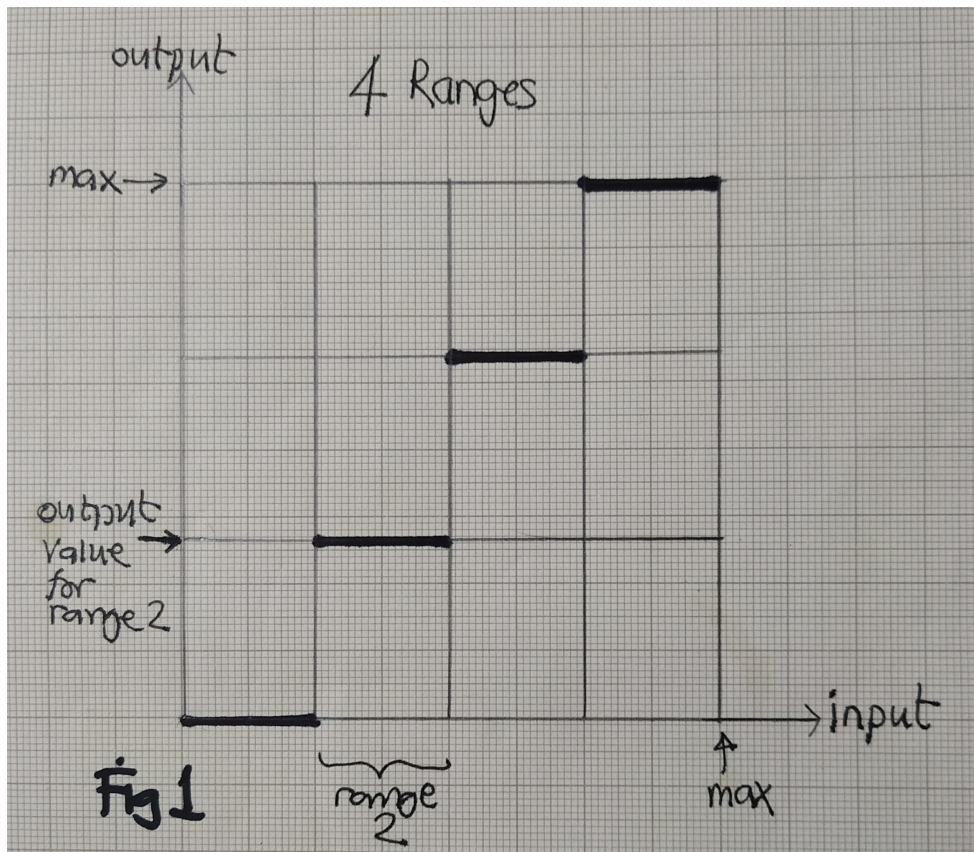
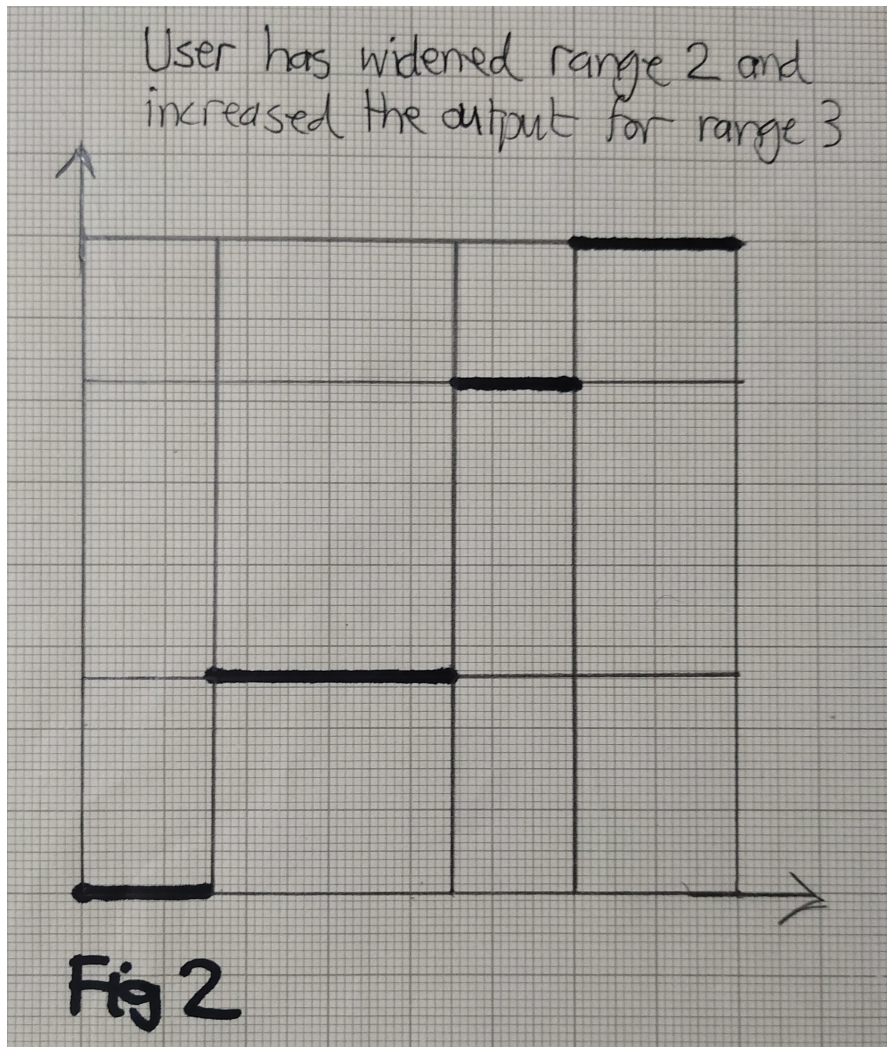## 1   Image brightness

Example – scene with 4 levels of brightness

Req. no.	Grade	Details	
R10	M	The image's range of brightness can be split into 2 or more non-overlapping ranges of brightness. (How the upper limit of brightness might be determined in an unbounded space is left to the developers / experts) (see fig.1)	
R20	M	The user can specify how many ranges are to be used.	

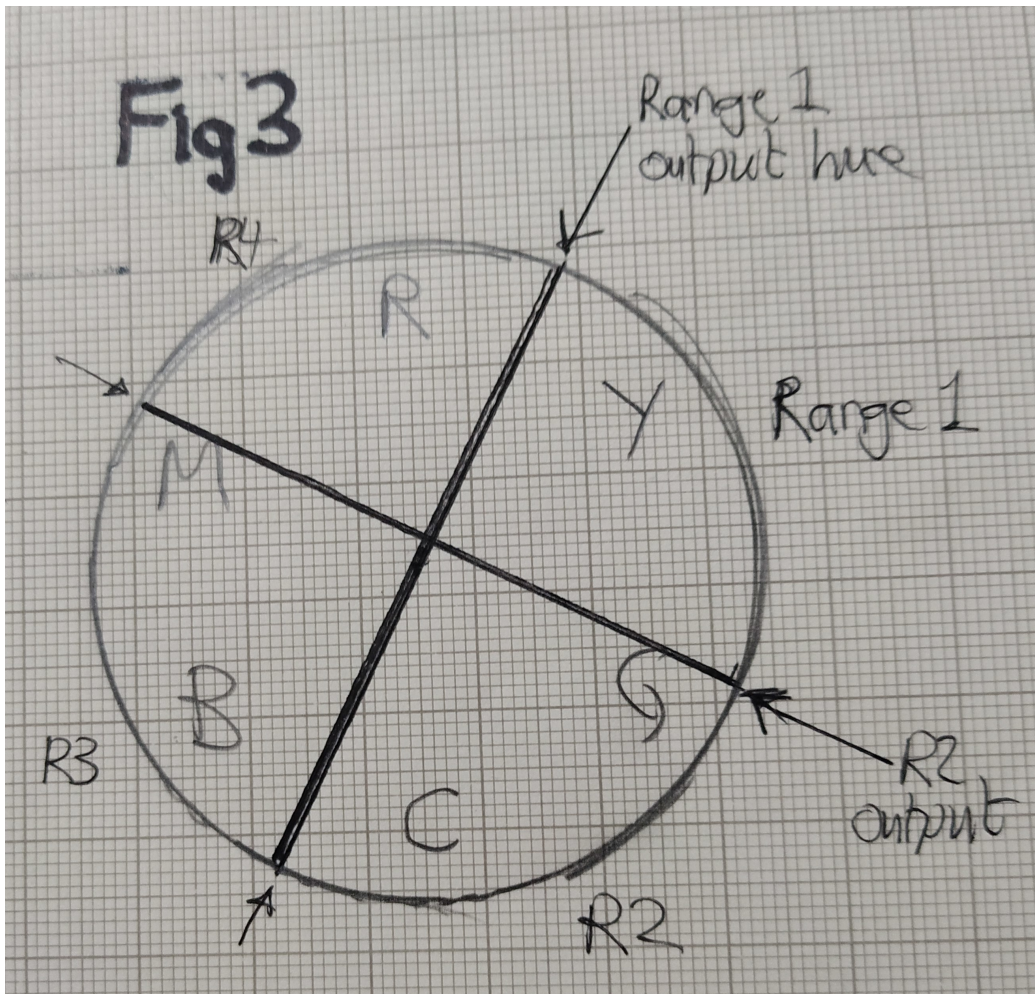| Req. no.	Grade	Details	
R30	M	The system is to be able to determine the ranges so that they are perceptually equal. (That is, the user normally doesn't want very unequal divisions of brightness)	
R40	S	The user is able to define the ranges directly i.e. say where each boundary is, and subsequently adjust ranges. (see fig.2)	
R50	M	The system is to allocate an output brightness to each range. When the user specifies or alters the number of ranges, the system allocates black to the first range, white to the last, and divides the output range equally by the number of ranges minus 1. (see fig.1)	
R60	S	The user is able to define the output brightness for each range directly. (see fig.2)	
R70	M	Colours are to be preserved as far as possible. (Developers / experts to determine the details of this)	
R80	M	Saturation is to be preserved as far as possible. (Developers / experts to determine the details of this)	
R90	W	The user can choose to use an RGB space and specify one or two channels to be the subject of R10 to R60.	

Fig 1

User has widened range 2 and increased the output for range 3

Fig 2

2   Image hue

Example – scene with 4 hues

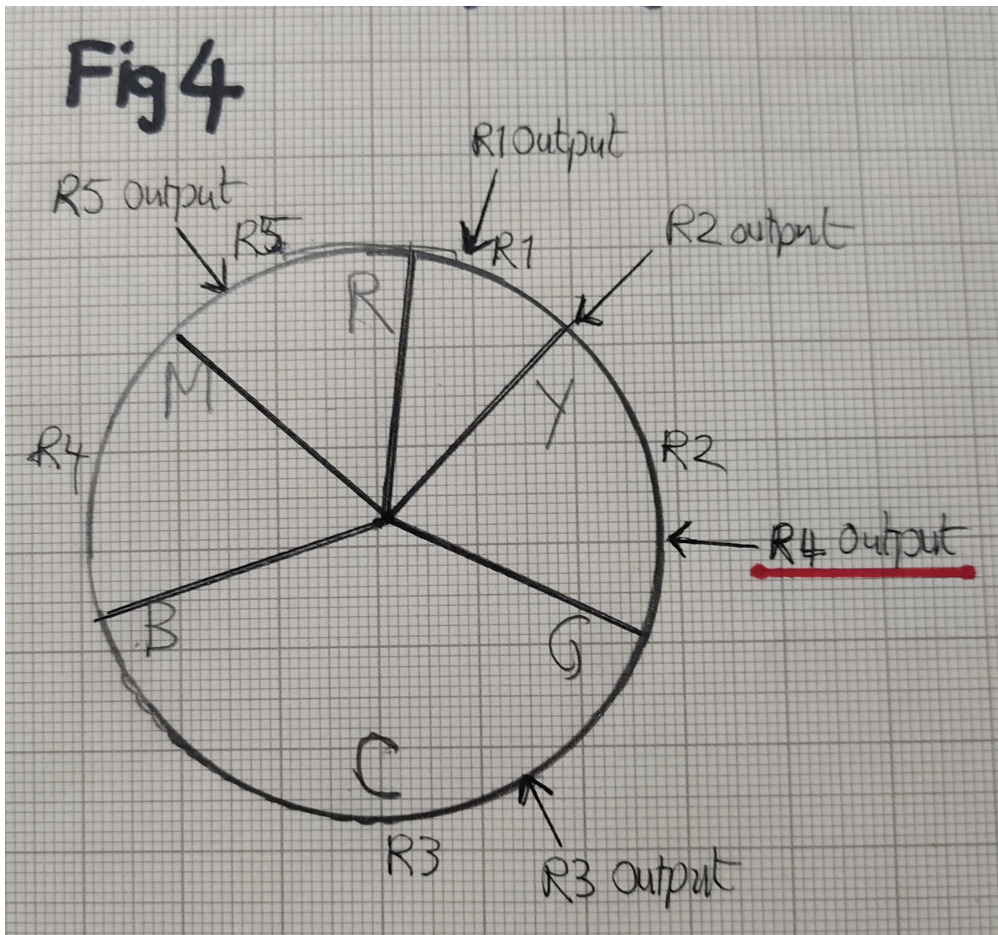| Req. no.	Grade	Details	
R100	M	The range of hues (all hues, not just those in the image), often depicted by a colour wheel, are to be split into ranges. (see fig.3)	
R110	M	The user can specify how many ranges are to be used.	
R120	M	The system is to determine the ranges using the user-specified number.	
R130	M	The system is to allocate an output hue to each range. When the user specifies or alters the number of ranges, the system allocates an appropriate hue from each range as the output hue for that range. (see fig.3) This could be some form of calculated average for the range in question; or one of the limits of the range.	
R140	M	The user is able to define a rotation to the colour wheel so that all the ranges become offset. (see fig.4)	
R150	S	The user is able to define the ranges directly i.e. say where each boundary is, and subsequently adjust ranges. (see fig.4)	
R160	S	The user is able to define the output hue for any range and this can be anywhere on the colour wheel. (see fig.4)	
R170	M	Image brightnesses are be preserved as far as possible. (Developers / experts to determine the details of this)	
R180	M	Saturation is to be preserved as far as possible. (Developers / experts to determine the details of this)	

Fig 3

Fig 4

3　　Image saturation

Here I see little value in posterizing, however, there are creative possibilities in manipulating saturation in ways that I don't think can currently be achieved in darktable.

Here is a "straight" rendition of a scene followed by a version where the saturation has been equalized. That is, areas of low saturation have been increased, whilst high areas have been reduced.

The red car becomes less saturated but the stonework is more saturated. This can help contribute to a more abstract image, or move the focus of the image.

This was done in Rawtherapee using the CC tool in the Lab module.

Req. no.	Grade	Details	
R200	S	The user is able to adjust saturation flexibly regardless of hue or brightness (subject to inherent colour space constraints).	

4   Other requirements

Req. no.	Grade	Details	
R300	M	The user is able to apply combinations of brightness, hue and saturation changes to an image.	

5   Usability / Performance requirements

Req. no.	Grade	Details	
R400	M	When the user makes a change to posterize values, the effect is to be displayed quickly (say within 2 seconds on an average computer)	
R410	M	There are not to be unpleasant artefacts visible at the boundaries between ranges.	

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