

NAME

`pcomb` - combine RADIANCE pictures and/or float matrices

SYNOPSIS

`pcomb` [**-h**] [**-w**] [**-ff**] [**-x xres**] [**-y yres**] [**-f file**] [**-e expr**] [[**-o**] [**-s factor**] [**-c r g b**] **input ..**]

DESCRIPTION

Pcomb combines equal-sized RADIANCE pictures or raw float matrices and sends the result to the standard output. By default, the result is just a linear combination of the input pixels multiplied by *-s* and *-c* coefficients, but an arbitrary mapping can be assigned with the *-e* and *-f* options, similar to *rcalc(1)*. (The variable and function definitions in each *-f source* file are read and compiled from the RADIANCE library where it is found.) Negative coefficients and functions are allowed, and *pcomb* will produce color values of zero where they would be negative unless the *-ff* option is used to specify floating-point matrix output.

The variables *ro*, *go* and *bo* specify the red, green and blue output values, respectively. Alternatively, the single variable *lo* can be used to specify a brightness value for black and white output. The predefined functions *ri(n)*, *gi(n)* and *bi(n)* give the red, green and blue values for input *n*. To access a pixel that is nearby the current one, these functions also accept optional x and y offsets. For example, *ri(3,-2,1)* would return the red component of the pixel from input 3 that is left 2 and up 1 from the current position. Although x offsets may be as large as width of the input, y offsets are limited to a small window (+/- 32 pixels) due to efficiency considerations. However, it is not usually necessary to worry about this problem -- if the requested offset is not available, the next best pixel is returned instead.

For additional convenience, the function *li(n)* is defined as the input brightness for input *n*. This function also accepts x and y offsets.

The constant *nfiles* gives the number of input files present, and *WE* gives the white efficacy (lumens/brightness) for pixel values, which may be used with the *-o* option or the *le(n)* values to convert to absolute photometric units (see below). The variables *x* and *y* give the current output pixel location for use in spatially dependent functions, the constants *xmax* and *ymax* give the input resolution, and the constants *xres* and *yres* give the output resolution (usually the same, but see below). The constant functions *re(n)*, *ge(n)*, *be(n)*, and *le(n)* give the exposure values for input *n*, and *pa(n)* gives the corresponding pixel aspect ratio. Exposure values will be set to 1.0 for inputs with the *-o* option set. Finally, for inputs with stored view parameters, the functions *Ox(n)*, *Oy(n)* and *Oz(n)* return the ray origin in world coordinates for the current pixel in input *n*, and *Dx(n)*, *Dy(n)* and *Dz(n)* return the normalized ray direction. In addition, the function *T(n)* returns the distance from the origin to the aft clipping plane (or zero if there is no aft plane), and the function *S(n)* returns the solid angle of the current pixel in steradians (always zero for parallel views). If the current pixel is outside the view region, *T(n)* will return a negative value, and *S(n)* will return zero. The first input input with a view is assumed to correspond to the view of the output, which is written into the header.

The *-h* option may be used to reduce the information header size, which can grow disproportionately after multiple runs of *pcomb* and/or *pcompos(1)*. The *-w* option can be used to suppress warning messages about invalid calculations. The *-o* option indicates that original pixel values are to be used for the next input, undoing any previous exposure changes or color correction.

The *-x* and *-y* options can be used to specify the desired output resolution, *xres* and *yres*, and can be expressions involving other constants such as *xmax* and *ymax*. The constants *xres* and *yres* may also be specified in a file or expression. The default output resolution is the same as the input resolution.

The *-x* and *-y* options must be present if there are no input files, when the definitions of *ro*, *go* and *bo* will be used to compute each output pixel. This is useful for producing simple test inputs for various purposes. (Theoretically, one could write a complete renderer using just the functional language...)

The standard input can be specified with a hyphen ('-'). A command that produces a RADIANCE picture or float matrix can be given in place of a file by preceding it with an exclamation point ('!').

EXAMPLES

To produce a picture showing the difference between *pic1* and *pic2*:

```
pcomb -e "ro=ri(1)-ri(2);go=gi(1)-gi(2);bo=bi(1)-bi(2)" pic1 pic2 > diff
```

Or, more efficiently:

```
pcomb pic1 -s -1 pic2 > diff
```

To precompute the gamma correction for a picture:

```
pcomb -e "ro=ri(1)^.4;go=gi(1)^.4;bo=bi(1)^.4" inp.hdr > gam.hdr
```

To perform some special filtering:

```
pcomb -f myfilt.cal -x xmax/2 -y ymax/2 input.hdr > filtered.hdr
```

To make a picture of a dot:

```
pcomb -x 100 -y 100 -e "ro=b;go=b;bo=b;b=if((x-50)^2+(y-50)^2-25^2,0,1)" > dot
```

Use a depth buffer to superimpose 3-D gridlines on rendered image:

```
rcollate -hi -ff -o 3000x3000 raw_orig.zbf | pcomb -e "frac(x):x-floor(x);EPS:.0001" -e
"t=gi(2);Px=Ox(1)+t*Dx(1)-EPS;Py=Oy(1)+t*Dy(1)-EPS;Pz=Oz(1)+t*Dz(1)-EPS" -e
"Rg:0;Gg:0;Bg:1;gsiz:0.03" -e "ingr=gsiz-min(frac(Px),frac(Py),frac(Pz))" -e
"ro=if(ingr,Rg,ri(1));go=if(ingr,Gg,gi(1));bo=if(ingr,Bg,bi(1))" raw_orig.hdr -> trans_def_grid.hdr
```

ENVIRONMENT

RAYPATH the directories to check for auxiliary files.

AUTHOR

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SEE ALSO

getinfo(1), icalc(1), pcompos(1), pfilt(1), pvalue(1), pvsum(1), rcalc(1), rcollate(1), rcomb(1), rmtxop(1), rpict(1)