Pixel Map (PMAP) File Format Specification

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DPX

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DESCRIPTION
A simple, human-readable image format for pixel-based graphics, designed to be transparent, editable, and accessible.

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Overview

Pixel Map (PMAP) is a simple, human-readable image format designed to make pixel-based graphics transparent, editable, and accessible. It supports basic canvas definition, background colouring, and explicit pixel data, all encoded in a plain-text structure.

The PMAP format is a lightweight, human-readable image specification designed for simplicity and manual editing. It enables developers, artists, and educators to easily understand and manipulate image data without the need for complex tools or binary encoding. Each PMAP file is a plain-text document that defines image dimensions, a default background colour, and a set of explicitly specified pixels. The format is designed to be easy to parse programmatically and straightforward to construct by hand.

A complementary command-line utility, `pmap`, allows users to convert between standard image formats and PMAP, view PMAP files visually, and export to other formats. The goal of PMAP is to provide a transparent and minimal interface to image data that can be version-controlled, reviewed, and composed similarly to code.

File Type Specification

Overview

PMAP files use a strict but simple syntax composed of three parts:

- Canvas size declaration
- Background fill colour
- A pixel definition block

The structure supports use cases where only a few pixels need to be specified explicitly, minimizing visual and data complexity.

File Syntax

Example PMAP File:

```
s:3x1
f:0,0,0
--PIXELS--
0,0:255,0,0
1,0:0,255,0
2,0:0,0,255
--END--
```

Line-by-Line Breakdown:

- `s:3x1` — Declares the canvas size as width 3, height 1.
- `f:0,0,0` — Sets the default background fill colour to black (RGB).
- `--PIXELS--` — Begins the section for explicit pixel definitions.
- `X,Y:R,G,B` — Defines a pixel at position X,Y with an RGB colour value.
- `--END--` — Marks the end of the pixel section.

Components

Canvas Size

Format:

`s:<width>x<height>`

- Width and height must be positive integers.

Fill colour

Format:

`f:<red>,<green>,<blue>`

- Values must be integers from 0 to 255.
- This colour is used for all pixels not explicitly set in the `--PIXELS--` section.

Pixels

Format:

`X,Y:R,G,B`

- X and Y are zero-based coordinates within the defined canvas.
- R, G, B are integers in the 0–255 range.
- Only specified pixels will differ from the background colour.

Constraints

- The pixel coordinates must fall within the defined canvas dimensions.
- All colour values must be valid RGB values (0–255).
- A file must contain only one size and one fill colour declaration.
- Pixel section must be clearly marked by `--PIXELS--` and `--END--`.

Command-Line Utility

Overview

The `pmap` tool is a reference utility for interacting with PMAP files. It supports converting between image formats and PMAP, previewing PMAP files, and exporting to standard formats like PNG.

Usage

```
pmap [options] <input> <output>
```

Options

Flag	Description
`-a`	Convert a standard image to PMAP
`-b`	Convert a PMAP file to an image
`-v`	View a PMAP file interactively

Examples

Convert a PNG image to a PMAP file:

```
pmap -a input.png output.pmap
```

Render a PMAP file to a PNG image:

```
pmap -b input.pmap output.png
```

Preview a PMAP image:

```
pmap -v sample.pmap
```

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