Assignment 1 Report

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Introduction

This report documents the development and testing of a C program designed to generate Portable Bitmap (PBM), Portable Graymap (PGM), and Portable Pixmap (PPM) images. The program supports generating images in both ASCII and raw formats, with custom dimensions and image types specified via command-line arguments.

Implementation Details

The program, main.c, utilizes the provided PNM library for reading and writing PBM, PGM, and PPM files. It accepts five command-line arguments: image type code, image width, image height, output image name (including extension), and image format code. Error handling is implemented to ensure that the image dimensions meet the specified requirements.

Program Structure

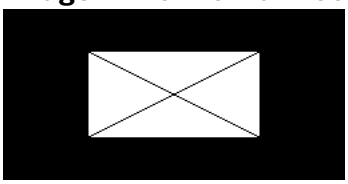
Main: Parses command-line arguments and directs the flow to the appropriate image generation function based on the image type code.
Functions: Three separate functions are implemented to generate images of Programs 1, 2, and 3, with the use of some helper functions. This includes different logic for generating the specified pbm image where one is for a vertical format, and one for horizontal images.
Error Handling: Checks for valid dimensions and format codes, displaying error messages and exiting gracefully when necessary.

Testing and Results

The program was tested with various input parameters to generate the required test images. Below are the details of the generated images along with their captions.

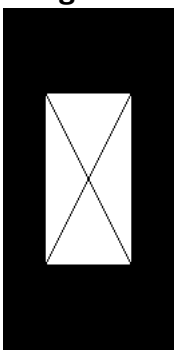
PBM Images (Program-1)

Image 1: Horizontal Rectangle



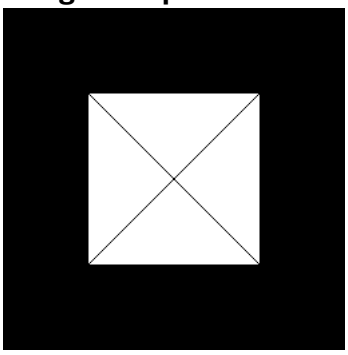
This image showcases a binary rectangle with a white rectangle in the center and diagonal black lines touching the rectangle's edges with a black border.
1 (PBM), Width: 256, Height: 128, Format: ASCII
Image Name: pbm_256x128.pbm

Image 2: Vertical Rectangle



This image displays a tall binary format with a central white rectangle and diagonals touching the rectangle's corners.
1 (PBM), Width: 128, Height: 256, Format: ASCII
Image Name: pbm_128x256.pbm

Image 3: Square



with a white square in the center and diagonal black lines touching the squares edges with a black border.
1 (PBM), Width: 256, Height: 256, Format: ASCII
square.pbm

Image 4: Vertical splice:

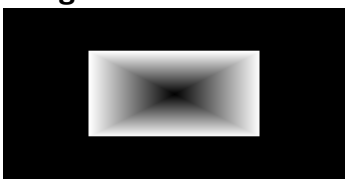
This is a stretched version of program 1 with the dimensions of 4x120
1 (PBM), Width: 4, Height: 120, Format: ASCII
pbm_4x120.pbm

Image 5: Horizontal Splice

This is a stretched version of program 1 with the dimensions of 120x4
1 (PBM), Width: 120, Height: 4, Format: ASCII
pbm_120x4.pbm

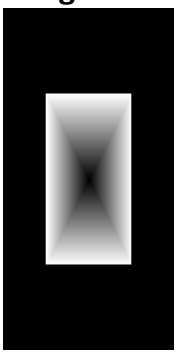
PGM Images (Program-2)

Image 6: Horizontal Rectangle



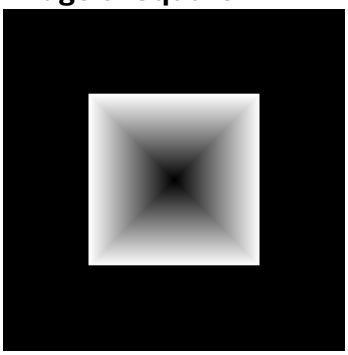
Illustrates a gray-scale gradient within four triangles, converging at the image's center, with a black border.
2 (PGM), Width: 256, Height: 128, Format: ASCII
Image Name: pgm_256x128.pgm

Image 7: Vertical Rectangle



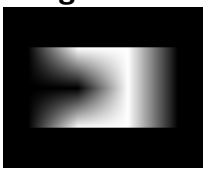
Depicts vertical gray-scale gradients within triangles centered in the image.
2 (PGM), Width: 128, Height: 256, Format: ASCII
Image Name pgm_128x256.pgm

Image 8: Square



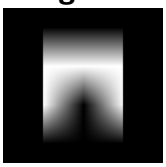
gray-scale gradient within four triangles in centre of image, converging darker at the image's center, with a black border.
2 (PGM), Width: 256, Height: 256, Format: ASCII
square.pgm

Image 9: Vertical Splice



This is a stretched version of program 2 with the dimensions of 4x120
2 (PGM), Width: 4, Height: 120, Format: ASCII
pgm_4x120.pgm

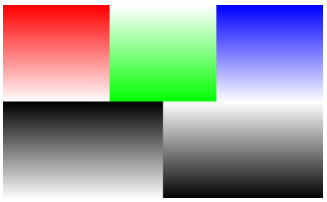
Image 10: Horizontal Splice



This is a stretched version of program 2 with the dimensions of 120x4
2 (PGM), Width: 120, Height: 4, Format: ASCII
pgm_120x4.pgm

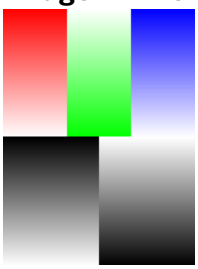
PPM Images (Program-3)

Image 11: Horizontal Rectangle



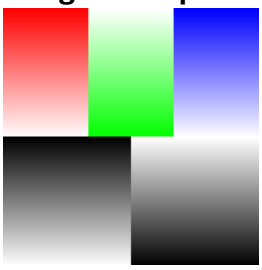
This color image is divided into distinct zones with gradient transitions from red to white, white to green, and blue to white in the upper half; and from black to white and vice versa in the lower half.
3 (PPM), Width: 120, Height: 72 Format: ASCII
Image Name: ppm_120x72.ppm

Image 12: Vertical Rectangle



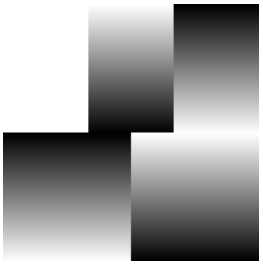
Vertical image of distinct zones with gradient transitions from red to white, white to green, and blue to white in the upper half; and from black to white and vice versa in the lower half.
3 (PPM), Width: 72, Height: 120, Format: ASCII
Image Name: ppm_72x120.ppm

Image 13: Square

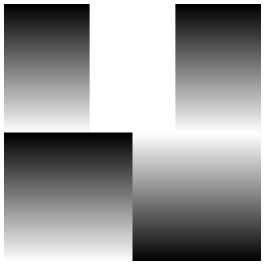


In square format, distinct zones with gradient transitions from red to white, white to green, and blue to white in the upper half; and from black to white and vice versa in the lower half.
3 (PPM), Width: 192, Height: 192, Format: ASCII
square.ppm

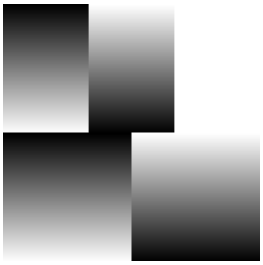
13.1



13.2

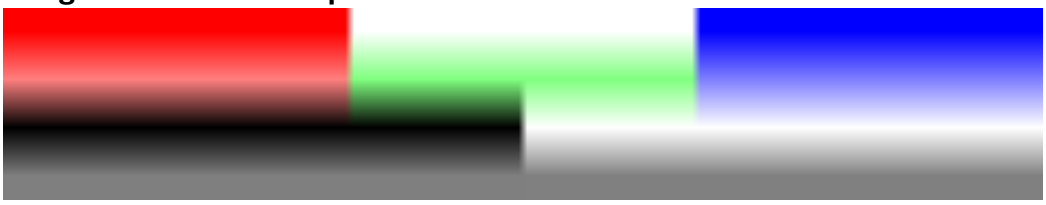


13.3



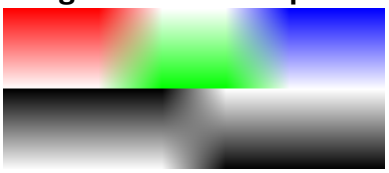
Here is the greyscale images of square.ppm, which were generated with the ppm image.
13.1 (Square.ppm_red_gray.pgm) is shown to have the red coloured section to white.
13.2 (Square.ppm_green_gray.pgm) is shown to have the green coloured section to white.
13.3 (Square.ppm_blue_gray.pgm) is shown to have the blue coloured section to white.

Image 14: Horizontal Splice



This is a stretched version of image width to 120 and image height to 4
3 (PPM), Width: 120, Height: 4, Format: ASCII
ppm_120x4.ppm

Image 15: Vertical Splice



This is a stretched version of image width to 6 and image height to 120
3 (PPM), Width: 6, Height: 120, Format: ASCII
ppm_6x120.ppm