CHAPTER 16: THE PALETTE MANAGER - UNVEILING THE WORLD OF 256 COLORS

This chapter delves into the realm of the Windows Palette Manager, a tool born out of necessity due to certain hardware limitations.

A paletter lookup table on video boards works like:



While modern video adapters often support higher color depths like 24-bit or 16-bit, certain setups, particularly on laptops or in high-resolution modes, are constrained to 8 bits per pixel. This limitation translates to a palette of only 256 simultaneous colors.

The question arises: What can be accomplished with a palette of 256 colors? While 16 colors are insufficient for displaying realistic images, and thousands or millions of colors are more than ample for such tasks, the middle ground of 256 colors presents unique challenges.

To effectively showcase real-world images with this limited palette, colors must be carefully selected for each specific image. A one-size-fits-all "standard" set of 256 colors isn't feasible, as it won't cater to the diverse needs of every application.

Enter the Windows Palette Manager. This tool is designed for precisely specifying the colors required by a program when operating in an 8-bit video mode.

If your programs exclusively run in higher bit depths, you may not encounter the need for the Palette Manager. Nevertheless, this chapter holds valuable insights, particularly in tying up loose ends related to bitmap handling.

Key Points:

Hardware Limitations: Certain video adapters restrict color depth to 8 bits per pixel, allowing only 256 colors simultaneously.

Palette Manager's Purpose: Tailored for programs operating in 8-bit video modes, the Palette Manager enables the specification of essential colors.

Color Selection Challenge: Unlike higher color depths, where a standard set suffices, 256 colors require careful curation for each application's unique needs.

Understanding the Palette Manager is crucial for developers navigating the constraints of 8-bit video modes.

While it may not be applicable in all scenarios, its insights into color management are invaluable, especially when working with real-world images in resource-limited environments.

The 20 reserved colors in 256-color video modes:



The 20 reserved colors in 256-color video modes are part of the Windows Palette Manager, and they serve as standard colors that are predefined for system use. These colors are reserved to maintain consistency across applications running in an 8-bit video mode. Here is a description of each of the 20 reserved colors:

1. Black (Pixel Bits: 00000000, RGB Value: 00 00 00)
2. Dark Red (Pixel Bits: 00000001, RGB Value: 80 00 00)
3. Dark Green (Pixel Bits: 00000010, RGB Value: 00 80 00)
4. Dark Yellow (Pixel Bits: 00000011, RGB Value: 80 80 00)
5. Dark Blue (Pixel Bits: 00000100, RGB Value: 00 00 80)
6. Dark Magenta (Pixel Bits: 00000101, RGB Value: 80 00 80)
7. Dark Cyan (Pixel Bits: 00000110, RGB Value: 00 80 80)
8. Light Gray (Pixel Bits: 00000111, RGB Value: C0 C0 C0)
9. White (Pixel Bits: 11111111, RGB Value: FF FF FF)
10. Cyan (Pixel Bits: 11111110, RGB Value: 00 FF FF)
11. Magenta (Pixel Bits: 11111101, RGB Value: FF 00 FF)
12. Blue (Pixel Bits: 11111100, RGB Value: 00 00 FF)
13. Dark Gray (Pixel Bits: 11111000, RGB Value: 80 80 80)
14. Medium Gray (Pixel Bits: 11110111, RGB Value: A0 A0 A4)
15. Cream (Pixel Bits: 11110110, RGB Value: FF FB F0)
16. Sky Blue (Pixel Bits: 11110101, RGB Value: A6 CA F0)
17. Money Green (Pixel Bits: 11110100, RGB Value: C0 DC C0)
18. Reserved
19. Reserved
20. Reserved

In 256-color display modes, Windows manages a system palette that mirrors the video card's hardware color lookup table. This system palette controls the available colors for display.

By default, Windows provides a specific set of colors as the system palette, which is depicted in Figure above.

It holds 256 colors, 20 of which are fixed for system elements, while applications can customize the remaining 236.

Applications can adjust these colors using logical palettes. If multiple applications use logical palettes, Windows prioritizes the active window (the one in the foreground with a highlighted title bar), ensuring its color choices take precedence.

In scenarios where multiple applications are using logical palettes simultaneously, Windows gives the highest priority to the active window.

The active window refers to the window that currently has the highlighted title bar and appears in the foreground of all other windows.

This ensures that the active application's color choices take precedence over other applications, providing a consistent and coherent visual experience.

To explore this concept practically, we'll examine a sample program later in this chapter. To align with these examples, consider switching your display to 256-color mode.

Access display settings by right-clicking on your desktop, selecting "Properties," and choosing the "Settings" tab.

Key points:

System palette: Master color table for Windows in 256-color modes.

Logical palettes: Application-specific color customizations.

Active window priority: Windows prioritizes the active application's colors.

Switching to 256-color mode: Recommended for compatibility with examples.

Additional notes:

While modern systems often use higher color depths, understanding system palettes is still relevant for legacy applications and specific development scenarios.

The specific process for adjusting display settings may vary slightly depending on your Windows version.

To effectively run the programs discussed in the remaining sections of this chapter, it may be necessary to switch your video board to a 256-color mode. To do so, follow these steps:

Right-click on the desktop.

From the context menu, select "Properties."

In the Properties window, navigate to the "Settings" tab.

Here, you can adjust the video board settings to enable the 256-color mode.

By following these instructions, you will be able to set up your system to operate in the desired 256-color mode, allowing you to run the programs effectively and observe the intended visual effects.