Text Mode

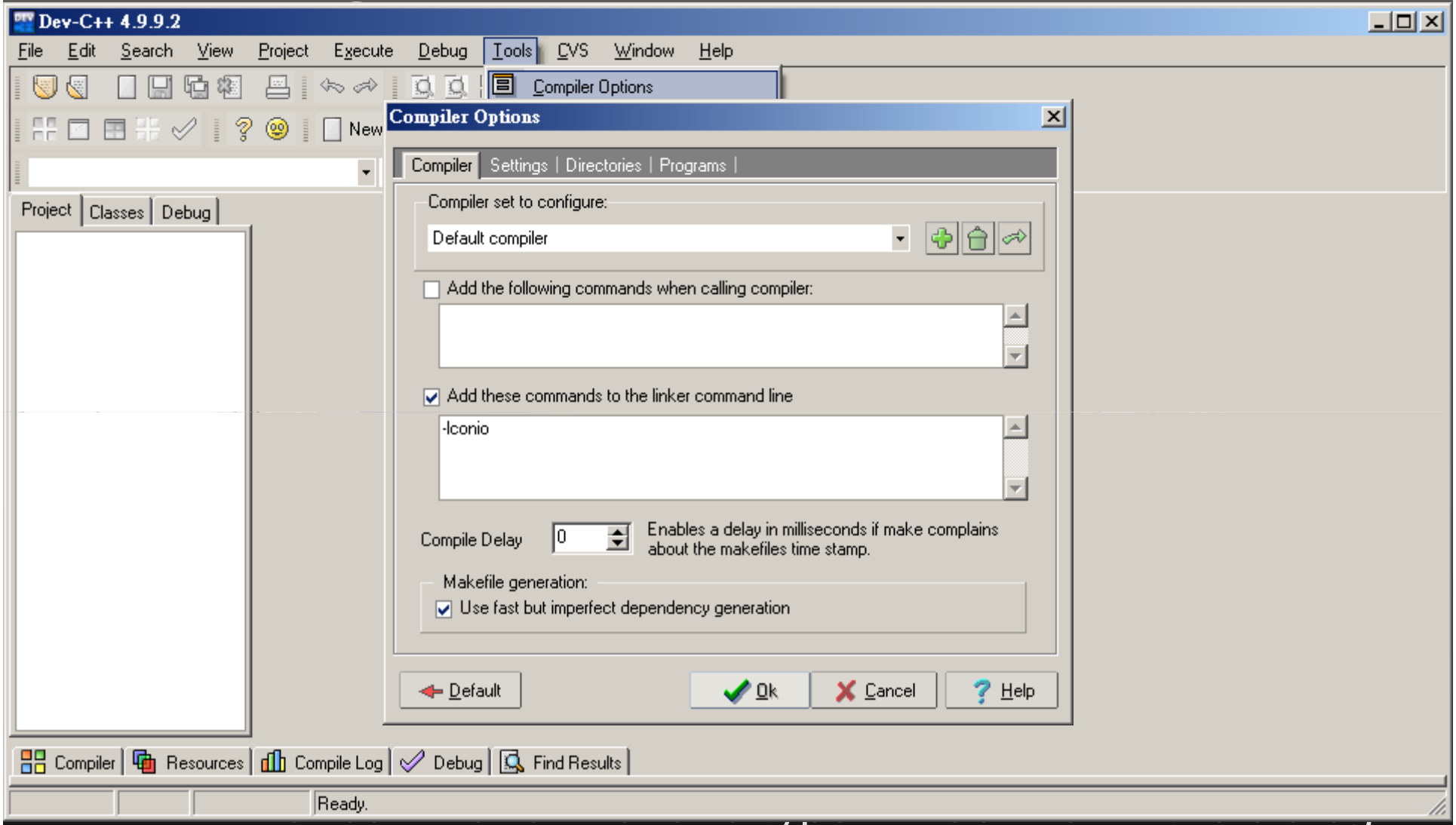
2009/12/1

by poem

Introduction

- Text Mode
  - Console mode for text displaying with specific attributes
    - Unix, DOS, Win32 console, BBS, terminal, ...
- Environment
  - Turbo C++ family and some other C/C++ compilers
    - Suggestion: for TC, running under full screen or DOSBox
  - Dev-C++: need extra packages
- Header
  - `conio.h` (TC)
  - `conio2.h` (“Devpak for Dev C++” package)

Introduction (cont)



box below

Introduction (cont)

- List of text modes (`textmode(int)`, not in Dev-C++)

Constant	Value	Text Mode
LASTMODE	-1	Previous text mode
BW40	0	Black and white (40 col.)
C40	1	16 colors (40 col.)
BW80	2	Black and white (80 col.)
C80	3	16 colors (80 col.)
MONO	7	Monochrome (80 col.)
C4350	64	EGA (43 col.) & VGA (50 col.)

- `textmode(MONO)` → using monochrome (80 col.)
- Usually automatically detected when beginning to run a program

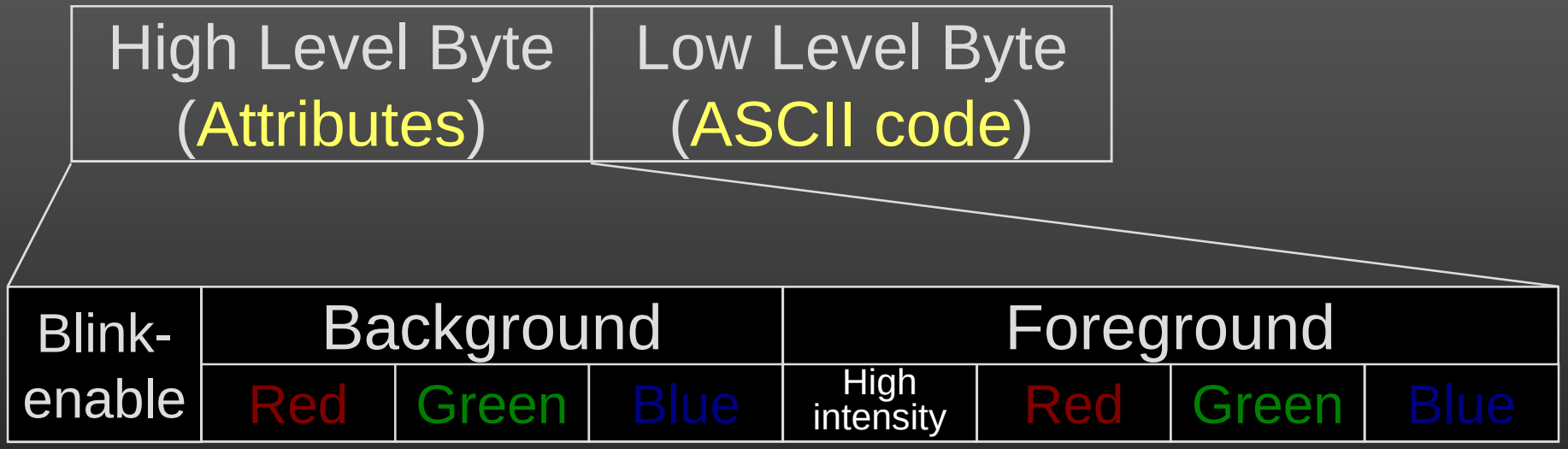
Introduction (cont)

- Window and Coordinate
  - Taking a 80-col. mode for example...

(1, 1)	(2, 1)	(x, y)	(80, 1)
(1, 2)	(2, 2)		(80, 2)
(1, 25)	(2, 25)		(80, 25)

Showing the Text

- Character Storage in IBM or PS/2 Compatible Computers
  - Using 2 bytes to store a character (**`char`**)



  - Notes:
    - No “blink-enable” in Dev-C++
    - Foreground ➔ color of a character

Showing the Text (cont)

- Colors in Foreground and Background
  - Background: 7 6 5 4 3 2 1 0
  - Foreground: 7 6 5 4 3 2 1 / 15 14 13 12 11 10 9 8

  (Using with `cprintf()` and `cputs()`)
- Color Constants

0: BLACK	1: BLUE	2: GREEN	3: CYAN
4: RED	5: MAGENTA	6: BROWN	7: LIGHTGRAY
8: DARKGRAY	9: LIGHTBLUE	10: LIGHTGREEN	11: LIGHTCYAN
12: LIGHTRED	13: LIGHTMAGENTA	14: YELLOW	15: WHITE

- Blink-Enable: BLINK (128). Foreground Only
  - 11100111 ➔ foreground: gray, background: brown, blinking text

Showing the Text (cont)

- Functions
  - `void clrscr()`
    - Clearing text mode window, filling with background color
    - Moving cursor to (1, 1)
  - **`void`** `gotoxy(int x, int y)`: positioning cursor at (`x`, `y`) in a text window
    - `gotoxy(10, 26)`: moving cursor to (10, 26)
  - **`int`** `wherex()`, `int wherey()`: gives current horizontal/vertical cursor position
    - Cursor at (12, 34), `x = wherex(); y = wherey();`

      ➔ x = 12, y = 34

Showing the Text (cont)

- Functions (cont)
  - `void clreol()`: clearing to end of line in text window
    - `abcde`***`fghijkl`***, cursor between e and f ➔ `abcde` left
  - `void delline()`: deleting a line in text window
    - `1234567`
`abcde`***`fg`***, cursor between e and f ➔ `1234567`
`ABCDEFG`
`ABCDEFG` left
  - `void insline()`: Inserting blank line in text window at cursor position
    - `1234567`, cursor between E and F ➔ `1234567`
`ABCDE`***`FG`***
`ABCDEFG`

☞ text01.cpp

Showing the Text (cont)

- Functions (cont)
  - `void textcolor(int newcolor)`: selecting a new character color (foreground) in text mode
    - `textcolor(YELLOW)`: setting text to yellow
    - `textcolor(WHITE + BLINK)`: setting text to white & blinking
      - Note: no blinking texts when using Dev-C++
  - `void textbackground(int newcolor)`: selecting a new text background color
  - `textbackground(CYAN)` : setting text to cyan background

Recaps

- Bit Operation
  - <<, >>: left- and right- shift
  - a = 5
    - a << 4 = $(101)_2$ << $(4)_{10}$ = $(1010000)_2$ = $(80)_{10}$
    - a >> 2 = $(101)_2$ >> $(2)_{10}$ = $(1)_2$ = $(1)_{10}$
- Character Storage in IBM or PS/2 Compatible Computers

Blink-enable	Background			Foreground			
	Red	Green	Blue	High intensity	Red	Green	Blue

Showing the Text (cont)

- Functions (cont)
  - `void textattr(int newattr)`: setting text attributes (foreground & background) for text-window functions
    - Using (BLINK) + (background << 4) + (foreground) to set the attributes
      - For example, try to set the background color to `LIGHTGRAY` (111) and foreground to `LIGHTBLUE` (1001):
      - Foreground: set to 1001 (the first 1 means high intensity)
      - Background: 111xxxx = 1110000 + xxxx = (111 << 4) + xxxx
    - `textattr(BLINK + (BROWN << 4) + WHITE)`: Setting white foreground, brown background, blinking text
  - ☞ text02.cpp

Showing the Text (cont)

- Functions (cont)
  - `void lowvideo()`
    - Selecting low-intensity text characters (clearing the high-intensity bit)
  - `void highvideo()`
    - Selecting high-intensity text characters (setting the high-intensity bit)
  - `void normvideo()`
    - Selecting normal-intensity text characters (using pre-setted text attributes)

☞text03.cpp

Showing the Text (cont)

- Exercise
  - Writing a program to output the following text. Referring to slide 7 for the colors

```
Climb every mountain
Ford every stream
Follow every rainbow
Till you find your dream
```