Sound

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by poem

Introduction

- Sound
  - Playing sound at specific frequencies and duration via the speaker on the motherboard
- Environment
  - Turbo C++ family and some other C/C++ compilers
  - Suggestion: running under full screen
- Header File
  - `dos.h`

Function

- Functions (p. 13-19 in Chinese textbook)
  - `void sound(unsigned freq)`
    - Turning the PC speaker on at the specified frequency
    - Human's ears: able to hear sound with freq between 20 Hz ~ around 20 KHz
  - `void nosound()`
    - Turning the PC speaker off
  - `void delay(unsigned milliseconds)`
    - Suspending execution for interval (milliseconds, 1/1000 sec)
  - `void sleep(unsigned seconds)`
    - Suspending execution for interval (second)

Function (cont)

- Functions (cont, p. 13-19 in Chinese textbook)
  - `delay()`and `sleep()`: with similar function
    - "*With a call to `xxxxx()`, the current program is suspended from execution for the time specified by the argument xxxxx*"
  - Difference: accuracy (TC's documentation)
    - `sleep()`
      - Accurate to the nearest 0.01 sec
      - "*The interval is only accurate to the nearest hundredth of a second or the accuracy of the DOS clock, whichever is less accurate.*"
    - `delay()`: accurate to 0.001 sec
    - In current PC, the accuracy doesn't matter

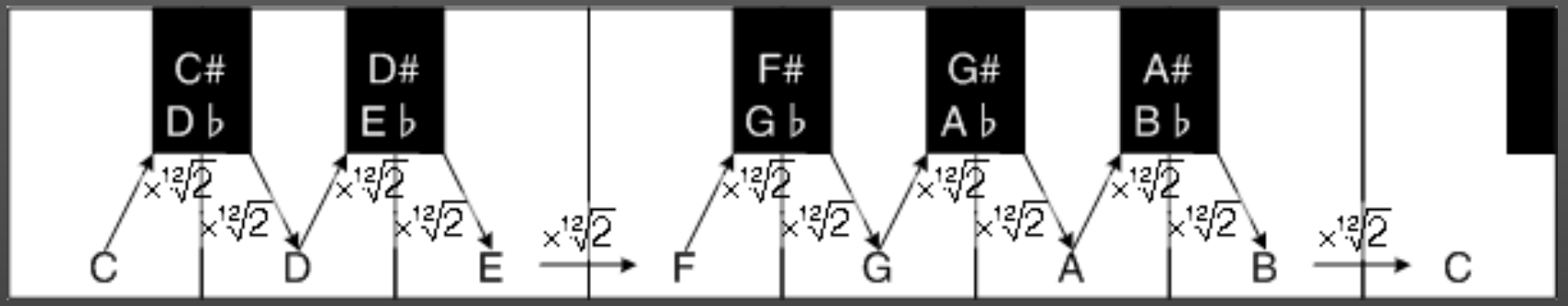
Pitch

- Pitch and Frequency (used in sound( ))

Name	Freq	Name	Freq	Name	Freq	Name	Freq
C (Do)	131	C	262	C	523	C	1047
D (Re)	147	D	294	D	587	D	1175
E (Mi)	165	E	330	E	659	E	1319
F (Fa)	175	F	349	F	698	F	1397
G (Sol)	196	G	392	G	784	G	1568
A (La)	220	A	440	A	880	A	1760
B (Ti)	247	B	494	B	988	B	1976

Pitch (cont)

- Pitch and Frequency (cont)
  - In music,



  - `sound(262)`: playing the middle C
  - `sound((int)(262 * pow(2, 1./12)))`: playing C#

☞ sound01.cpp sound02.cpp

Exercise

- Exercise
  - Writing a program to play a diatonic scale from middle C (that is, Do, Re, Mi, Fa, So, La, Ti, Do). The length of each note is 500 msec. You have to use loop and cannot use array.

Advanced Method for Playing a Song

- Array
  - Use array to store all pitches and pauses of a song
  - Then, use loops to read this array
- File
  - Use file to store all pitches and pauses of a song
  - Then, read this file to play this song
  - More flexible

References

- Online Help in Turbo C++

References

- List of frequencies with 88 piano notes.

B0 31	C1 33	CS1 35	D1 37	DS1 39
E1 41	F1 44	FS1 46	G1 49	GS1 52
A1 55	AS1 58	B1 62	C2 65	CS2 69
D2 73	DS2 78	E2 82	F2 87	FS2 93
G2 98	GS2 104	A2 110	AS2 117	B2 123
C3 131	CS3 139	D3 147	DS3 156	E3 165
F3 175	FS3 185	G3 196	GS3 208	A3 220
AS3 233	B3 247	C4 262	CS4 277	D4 294
DS4 311	E4 330	F4 349	FS4 370	G4 392
GS4 415	A4 440	AS4 466	B4 494	C5 523
CS5 554	D5 587	DS5 622	E5 659	F5 698
FS5 740	G5 784	GS5 831	A5 880	AS5 932
B5 988	C6 1047	CS6 1109	D6 1175	DS6 1245
E6 1319	F6 1397	FS6 1480	G6 1568	GS6 1661
A6 1760	AS6 1865	B6 1976	C7 2093	CS7 2217
D7 2349	DS7 2489	E7 2637	F7 2794	FS7 2960
G7 3136	GS7 3322	A7 3520	AS7 3729	B7 3951
C8 4186	CS8 4435	D8 4699	DS8 4978	