1_1

Chapter 1: A Tour of Computer System

1.1 Information is Bits + Context

本节主要介绍了文件信息在计算机系统中是以什么形式存储的,比如我们的hello.c源文件,在计算机系统中是如何识别每个字符。

```
1  #include <stdio.h>
2
3  int main()
4  {
5     printf("hello, world\n");
6     return 0;
7  }
```

- Our hello program begins life as a source program (or source file) that the programmer creates with an editor and saves in a text file called hello.c.
- The source program is a sequence of bits, each with a value of 0 or 1, organized in 8-bit chunks called bytes.
- Each byte represents some text character in the program.
- Most computer systems represent text characters using the ASCII standard that represents each character with a unique byte-size integer value.

Dec	Hx Oct	Char	r	Dec	Нх	Oct	Html	Chr	Dec	Нх	Oct	Html	Chr	Dec	Нх	Oct	Html C	<u>hr</u>
0	0 000	NUL	(null)	32	20	040	@#32;	Space	64	40	100	 4 ;	0	96	60	140	a#96;	8
1	1 001	SOH	(start of heading)	33	21	041	!	1	65	41	101	A	A	97	61	141	a#97;	a
2	2 002	STX	(start of text)	34	22	042	a#34;	**				B		98	62	142	6#98;	b
3			(end of text)				#					C					6#99;	
4	4 004	EOT	(end of transmission)				\$					D					d	
5			(enquiry)				a#37;		ı			E					e	
6			(acknowledge)				&					a#70;					a#102;	
7			(bell)				'					G			70.0		g	
8	8 010		(backspace)				a#40;					H					a#104;	
9	9 011		(horizontal tab))					6#73;					i	
10	A 012		(NL line feed, new line)				6#42;					a#74;					j	_
11	B 013		(vertical tab)				+			_		a#75;					k	
12	C 014		(NP form feed, new page)				,					a#76;					l	
13	D 015		(carriage return)			_	-					M					m	
14	E 016		(shift out)				.					a#78;					n	
15	F 017		(shift in)				6#47;					a#79;		1			o	
			(data link escape)				0		ı			P		1			p	_
			(device control 1)				a#49;		ı			Q	_	1	. –		q	
			(device control 2)				2		ı			R					r	
			(device control 3)				3		I			6#83;					s	
			(device control 4)	ı			4		ı			6#84;					t	
			(negative acknowledge)				6#53;		I			U		1			u	
			(synchronous idle)				6 7		I			V W		1			6#118; 6#119;	
			(end of trans. block) (cancel)				a#56;		I			6#88;		1			%#119; %#120;	
							a#57;					«#89;					x y	
	19 031 1A 032		(end of medium) (substitute)				a#58;					a#90;					y z	
	1B 033		(subscicuce) (escape)				a#59;					a#91;					6#123;	
	16 033 1C 034						«#55,		I			6#92;		1			%#123; %#124;	
	10 034 1D 035		(file separator) (group separator)				«#61;					6#93;		I — — —			6#125;	
	1E 036		(group separator)				«#62;					a#94;	-				}	
	1F 036		(unit separator)				«#63;		I			6#95;					x	
31	IF 037	0.5	(unite separacor)	03	Jr	0//	w#00,	•	1 23	Jr	137	W#20,	-	1221	7 1	1//	α#10/ ,	221

• The hello.c program is stored in a file as a sequence of bytes. Each byte has an integer value that corresponds to some character.

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```

```
ascii value of '#' = 35
1
2
     value in bits: 0b 0010 0011
3
     ascii value of 'i' = 105
4
     value in bits: 0b 0110 1001
5
6
7
     ascii value of 'n' = 110
     value in bits: 0b 0110 1110
8
9
10
11
```

• finally it will be a binary file in computer system:

```
1 0010 0010 0110 1001 0110 1110 ...
```

• The representation of hello.c illustrates a fundamental idea: All information in a system—including disk files, programs stored in memory, user data stored in memory, and data transferred across a network—is represented as a bunch of bits. The only thing that distinguishes different data objects is the context in which we view them.

```
1 0b 0110 1110 can be 110 in integer, 'n' in character ...
```