A
The ASCII Code

Table A.1 shows the 128 ASCII codes. Each code is shown in both octal (leftmost column and top row) and hexadecimal (rightmost column and either the top or bottom rows). Octal numbers are typeset in italics, preceded by a quote ('). Hex numbers are typeset in a fixed-width font, preceded by a double-quote ("). To find the code of a character, substitute the code from the top or bottom row for the x. The octal code of "A," for example, is found by substituting the *'1* from the top row for the x in the *'10x* from the left column. Thus, the code is octal 101 or binary 1000001. Similarly, the hexadecimal code of "A" is a combination of "4x and *'1*, i.e., it is "41.

◇ **Exercise A.1:** What is the hex code of "I"?

The first 32 codes (0–31) as well as the last one (DEL) are control characters. SP (code 32) stands for a blank space. The other codes are for the letters, digits, and punctuation marks.

A.1 ASCII Features

1. The first 32 codes, and also the last code, are the control characters. Those are characters used in input/output and computer communications, and have no corresponding graphics, i.e., they cannot be printed out. They are described in Table A.2.

2. The ASCII codes are arbitrary. The code of "A" is 41_{16}, but there is no special reason for assigning that particular value, and almost any other value would have served as well. About the only rule for assigning codes is that the code of "B" should follow, numerically, the code of "A." Thus "B" has the code 42_{16}, "C" has 43_{16}, and so on. The same is true for the lower-case letters and for the ten digits.

There is also a simple relationship between the codes of the upper- and lower-case letters. The code of "a" is obtained from the code of "A" by setting the 7th bit to 1.

3. The parity bit in Table A.1 is always 0. The ASCII code does not specify the value of the parity bit and any value can be used. Different computers use the ASCII code with even parity, odd parity, no parity, or even a fixed parity of 1.

4. The code of the control character `DEL` is all ones (except the parity that is, as usual, unspecified). This is a tradition from the old days of computing (and also from telegraphy), when punched paper tape was an important medium for input/output. When punching information on a paper tape, whenever the user noticed an error, they would delete the bad character by pressing the `DEL` key on the keyboard. This worked by backspacing the tape and punching a frame of all 1's on top of the holes of the bad character. When reading the tape, the tape reader would simply skip any frame of all 1's.

	´0	*´1*	*´2*	*´3*	*´4*	*´5*	*´6*	*´7*	
´00x	NUL	SOH	STX	ETX	EOT	ENQ	ACK	BEL	″0x
´01x	BS	HT	LF	VT	FF	CR	SO	SI	
´02x	DLE	DC1	DC2	DC3	DC4	NAK	SYN	ETB	″1x
´03x	CAN	EM	SUB	ESC	FS	GS	RS	US	
´04x	SP	!	"	#	$	%	&	’	″2x
´05x	(	)	*	+	,	-	.	/	
´06x	0	1	2	3	4	5	6	7	″3x
´07x	8	9	:	;	<	=	>	?	
´10x	@	A	B	C	D	E	F	G	″4x
´11x	H	I	J	K	L	M	N	O	
´12x	P	Q	R	S	T	U	V	W	″5x
´13x	X	Y	Z	[	\	]	ˆ	_	
´14x	‘	a	b	c	d	e	f	g	″6x
´15x	h	i	j	k	l	m	n	o	
´16x	p	q	r	s	t	u	v	w	″7x
´17x	x	y	z	{	|	}	˜	DEL	
	″8	″9	″A	″B	″C	″D	″E	″F	

Table A.1: The ASCII Code.

NUL (Null): No character, Used for filling in space in an I/O device when there are no characters.

SOH (Start of heading): Indicates the start of a heading on an I/O device. The heading may include information pertaining to the entire record that follows it.

STX (Start of text): Indicates the start of the text block in serial I/O.

ETX (End of text): Indicates the end of a block in serial I/O. Matches a STX.

EOT (End of transmission): Indicates the end of the entire transmission in serial I/O.

ENQ (Enquiry): An enquiry signal typically sent from a computer to an I/O device before the start of an I/O transfer, to verify that the device is there and is ready to accept or to send data.

ACK (Acknowledge): An affirmative response to an ENQ.

BEL (Bell): Causes the I/O device to ring a bell or to sound a buzzer or an alarm in order to call the operator's attention.

BS (Backspace): A command to the I/O device to backspace one character. Not every I/O device can respond to BS. A keyboard is a simple example of an input device that cannot go back to the previous character. Once a new key is pressed, the keyboard loses the previous one.

HT (Horizontal tab): Sent to an output device to indicate a horizontal movement to the next tab stop.

LF (Line feed): An important control code. Indicates to the output device to move vertically, to the beginning of the next line.

VT (Vertical tab): Commands an output device to move vertically to the next vertical tab stop.

FF (Form feed): Commands the output device to move the output medium vertically to the start of the next page. some output devices, such as a tape or a plotter, do not have any pages and for them the FF character is meaningless.

CR (Carriage return): Commands an output device to move horizontally, to the start of the line.

SO (Shift out): Indicates that the character codes that follow (until an SI is sensed), are not in the standard character set.

SI (Shift in): Terminates a non-standard string of text.

DLE (Data link escape): Changes the meaning of the character immediately following it.

DC1–DC4 (Device controls): Special characters for sending commands to I/O devices. Their meaning is not predefined.

NAK (Negative acknowledge): A negative response to an enquiry.

SYN (Synchronous idle): Sent by a synchronous serial transmitter when there is no data to send.

ETB (End transmission block): Indicates the end of a block of data in serial transmission. Is used to divide the data into blocks.

CAN (Cancel): Tells the receiving device to cancel (disregard) the previously received block because of a transmission error.

EM (End of medium): Sent by an I/O device when it has sensed the end of its medium. The medium can be a tape, paper, card, or anything else used to record and store information.

SUB (Substitute): This character is substituted by the receiving device, under certain conditions, for a character that has been received incorrectly (had a bad parity bit).

ESC (Escape): Alters the meaning of the immediately following character. This is used to extend the character set. Thus ESC followed by an "X" may mean something special to a certain program.

FS (File separator):
GS (Group separator):
RS (Record separator):
US (Unit separator):

The four separators on the left have no predefined meaning in ASCII, except that FS is the most general separator (separates large groups) and US, the least general.

SP (Space): This is the familiar blank or space between words. It is non-printing and is therefore considered a control character rather than a punctuation mark.

DEL (Delete): This is sent immediately after a bad character has been sent. DEL Indicates deleting the preceding character (see note 4 earlier).

Table A.2: The ASCII Control Characters.

ASCII stupid question, get a stupid ANSI.
Anonymous