

↑ 2.13 Binary

Students:
Section 2.14 is part of 2 assignments: [CSC108 CH02.11-2.24 C2B](#) ▾
This assignment's due date has passed. Activity will still be recorded, but will not count towards this assignment (unless the due date is changed). See [this article](#) for more info.

Includes: CA
Due: 02/06/2025, 11:59 PM EST

2.14 Characters

Basics

A variable of `char` type, as in `char myChar;`, can store a single character like the letter m. A **character literal** is surrounded with single quotes, as in `myChar = 'm';`

Figure 2.14.1: Simple char example: Arrow.

```
#include <iostream>
using namespace std;

int main()
{
    char arrowBody;
    char arrowHead;

    arrowBody = '>';
    arrowHead = '>>';

    cout << arrowBody << arrowBody << arrowRead << endl;
    cout << arrowBody << 'o' << endl;
    cout << arrowBody << arrowBody << arrowRead << endl;

    return 0;
}
```

Feedback?

PARTICIPATION ACTIVITY | 2.14.1: char data type.

1) Declare a character variable middleInitial.
[] Check Show answer

2) Assume char variable userKey is already declared. Write a statement that assigns userKey with the letter a.
[] Check Show answer

Getting a character from input

`cin` can be used to get one character from input. Ex: `cin >> myChar;`

Figure 2.14.2: Getting a character from input.

```
#include <iostream>
using namespace std;

int main()
{
    char bodyChar;
    char headChar;

    cout << "Type two characters: ";
    cin >> bodyChar;
    cin >> headChar;

    // Output arrow body then head
    cout << bodyChar << bodyChar;
    cout << headChar << endl;
}

return 0;
}
```

Type two characters: ->
-->
...
Type two characters: * /
*/

Feedback?

zyDE 2.14.1: char variables.

This program gets a character from input. Press Run to see how that character is used. Try changing the input character and pressing Run again.

Load default template... *

```
1 #include <iostream>
2 using namespace std;
3
4 int main() {
5     char userChar;
6
7     cin >> userChar;
8
9     cout << userChar << endl;
10    cout << " " << userChar << endl;
11    cout << userChar << userChar << userChar << endl;
12
13 } return 0;
14 }
```

Run

Feedback?

Captions: ^

1. A char is encoded and stored as a number.
2. When outputting a char variable, the compiler converts the number to the appropriate letter.

Feedback?

PARTICIPATION ACTIVITY | 2.14.2: A char variable stores a number.

Type a character: A ASCII number: 65

Feedback?

ASCii is an early standard for encoding characters as numbers. The following table shows the ASCii encoding as a decimal number (Dec) for common printable characters (for readers who have studied binary numbers, the table shows the binary encoding also). Other characters such as control characters (e.g., a 'line feed' character) or extended characters (e.g., the letter 'n' with a tilde above it as used in Spanish) are not shown. Source: <http://www.asciitable.com/>

Table 2.14.1: Character encodings as numbers in the ASCii standard.

Binary	Dec	Char	Binary	Dec	Char	Binary	Dec	Char
010 0000	32	space	100 0000	64	@	110 0000	96	'
010 0001	33	!	100 0001	65	A	110 0001	97	a
010 0010	34	*	100 0010	66	B	110 0010	98	b
010 0011	35	#	100 0011	67	C	110 0011	99	c
010 0100	36	\$	100 0100	68	D	110 0100	100	d
010 0101	37	%	100 0101	69	E	110 0101	101	e
010 0110	38	&	100 0110	70	F	110 0110	102	f
010 0111	39	'	100 0111	71	G	110 0111	103	g
010 1000	40	(100 1000	72	H	110 1000	104	h
010 1001	41)	100 1001	73	I	110 1001	105	i
010 1010	42	*	100 1010	74	J	110 1010	106	j
010 1011	43	+	100 1011	75	K	110 1011	107	k
010 1100	44	.	100 1100	76	L	110 1100	108	l
010 1101	45	-	100 1101	77	M	110 1101	109	m
010 1110	46	.	100 1110	78	N	110 1110	110	n
010 1111	47	/	100 1111	79	O	110 1111	111	o
011 0000	48	0	101 0000	80	P	111 0000	112	p
011 0001	49	1	101 0001	81	Q	111 0001	113	q
011 0010	50	2	101 0010	82	R	111 0010	114	r
011 0011	51	3	101 0011	83	S	111 0011	115	s
011 0100	52	4	101 0100	84	T	111 0100	116	t
011 0101	53	5	101 0101	85	U	111 0101	117	u
011 0110	54	6	101 0110	86	V	111 0110	118	v
011 0111	55	7	101 0111	87	W	111 0111	119	w
011 1000	56	8	101 1000	88	X	111 1000	120	x
011 1001	57	9	101 1001	89	Y	111 1001	121	y
011 1010	58	:	101 1010	90	Z	111 1010	122	z
011 1011	59	:	101 1011	91	[111 1011	123	{
011 1100	60	<	101 1100	92	\	111 1100	124	
011 1101	61	=	101 1101	93]	111 1101	125	}
011 1110	62	>	101 1110	94	^	111 1110	126	~
011 1111	63	?	101 1111	95	-			

Feedback?

PARTICIPATION ACTIVITY | 2.14.4: Character encodings.

1) 'A' is stored as _____
 65
 97

2) '&' is stored as _____
 38
 (no such encoding)

3) '7' is stored as _____
 7
 55

4) A variable's memory location stores 88. Outputting that value as a character yields _____.
 X
 x

Feedback?

PARTICIPATION ACTIVITY | 2.14.5: Escape sequences.

Type a character: A ASCII number: 65

Feedback?

Table 2.14.2: Common escape sequences.

Escape sequence	Char
\n	newline
\t	tab
\'	single quote
\"	double quote
\\	backslash

Binary	Dec	Char
100 0000	64	@
100 0001	65	A
100 0010	66	B
100 0011	67	C
100 0100	68	D
100 0101	69	E
100 0110	70	F
100 0111	71	G
100 1000	72	H
100 1001	73	I
100 1010	74	J
100 1011	75	K
100 1100	76	L
100 1101	77	M
100 1110	78	N
100 1111	79	O
101 0000	80	P
101 0001	81	Q
101 0010	82	R
101 0011	83	S
101 0100	84	T
101 0101	85	U
101 0110	86	V
101 0111	87	W
101 1000	88	X
101 1001	89	Y
101 1010	90	Z
101 1011	91	[
101 1100	92	\
101 1101	93]
101 1110	94	^
101 1111	95	-

Feedback?

PARTICIPATION ACTIVITY | 2.14.6: Character encodings.

1) Goal output: Say 'Hello'
cout << _____ ;
 "Say Hello"
 "Say ("Hello)"
 "Say \"Hello\""

2) Goal output: OK bye
(Assume a tab exists between OK and bye).
cout << _____ ;
 "OK\tbye"
 "OK \tbye"
 "OK\t bye"

3) Given string "a'b", the first character is stored in memory as 97 (the numerical value for 'a'). What is stored for the second character?
 34
 92

Feedback?

PARTICIPATION ACTIVITY | 2.14.7: Character encodings.

Type a character: A ASCII number: 65

Feedback?

Table 2.14.3: Character encodings as numbers in the ASCii standard.

Binary	Dec	Char
010 0000	32	space
010 0001	33	!
010 0010	34	*
010 0011	35	#
010 0100	36	\$
010 0101	37	%
010 0110	38	&
010 0111	39	'
010 1000	40	(
010 1001	41)
010 1010	42	*
010 1011	43	+
010 1100	44	.
010 1101	45	-
010 1110	46	.
010 1111	47	/
011 0000	48	0
011 0001	49	1
011 0010	50	2
011 0011	51	3
011 0100	52	4
011 0101	53	5
011 0110	54	6
011 0111	55	7
011 1000	56	8
011 1001	57	9
011 1010	58	:
011 1011	59	:
011 1100	60	<
011 1101	61	=
011 1110	62	>
011 1111	63	?

Feedback?

PARTICIPATION ACTIVITY | 2.14.8: Character encodings.

Type a character: A ASCII number: 65

Feedback?

Table 2.14.4: Character encodings as numbers in the ASCii standard.

Binary	Dec	Char
100 0000	64	@
100 0001	65	A
100 0010	66	B
100 0011	67	C
100 0100	68	D
100 0101	69	E
100 0110	70	F
100 0111	71	G
100 1000	72	H
100 1001	73	I
100 1010	74	J
100 1011	75	K