Quiz Section for Program Design (I)

Exercise #5

Alex is a junior programmer who has been learning how to convert binary to decimal numbers. He has created a simple tool to allow users to input binary numbers and get the corresponding decimal output. However, Alex knows that not all users will be kind, and some might input invalid characters intentionally to break the system. To prevent this, Alex wants to write a program that can handle both valid binary inputs and malicious or incorrect inputs without crashing.

- **Input Format**
  - The *line* may include a sequence of characters such as '0', '1', letters, digits, and symbols
  - Use *'\n'* to determine the end of input.

- **Output Format**

  If the *line* is a valid binary number:

  - Output the original binary number and its corresponding decimal number.
  - don't need to consider the possibility of binary decimals or negative numbers.

  If the *line* contains invalid characters (anything other than '0' and '1'):

  - Convert any uppercase letters to lowercase.
  - For any symbols or special characters, output the ASCII value of the character, prefixed by %.

- **Technical Specifications**

  - $1 \leq line.length \leq 64$ **(** $2^{64} = 18446744073709551616$ **)**

- **Hint**

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ASCII value	Character	Control character	ASCII value	Character	ASCII value	Character	ASCII value	Character
000	(null)	NUL	032	(space)	064	@	096	
001	☺	SOH	033	!	065	A	097	a
002	☻	STX	034	"	066	B	098	b
003	♥	ETX	035	#	067	C	099	c
004	♦	EOT	036	$	068	D	100	d
005	♣	ENQ	037	%	069	E	101	e
006	♠	ACK	038	&	070	F	102	f
007	(beep)	BEL	039	'	071	G	103	g
008	◘	BS	040	(	072	H	104	h
009	(tab)	HT	041	)	073	I	105	i
010	(line feed)	LF	042	*	074	J	106	j
011	(home)	VT	043	+	075	K	107	k
012	(form feed)	FF	044	,	076	L	108	l
013	(carriage return)	CR	045	-	077	M	109	m
014	♫	SO	046	.	078	N	110	n
015	☼	SI	047	/	079	O	111	o
016	►	DLE	048	0	080	P	112	p
017	◄	DC1	049	1	081	Q	113	q
018	↕	DC2	050	2	082	R	114	r
019	!!	DC3	051	3	083	S	115	s
020	¶	DC4	052	4	084	T	116	t
021	§	NAK	053	5	085	U	117	u
022	▬	SYN	054	6	086	V	118	v
023	↨	ETB	055	7	087	W	119	w
024	↑	CAN	056	8	088	X	120	x
025	↓	EM	057	9	089	Y	121	y
026	→	SUB	058	:	090	Z	122	z
027	←	ESC	059	;	091	[	123	{
028	(cursor right)	FS	060	<	092	\	124	|
029	(cursor left)	GS	061	=	093	]	125	}
030	(cursor up)	RS	062	>	094	^	126	~
031	(cursor down)	US	063	?	095	_	127	⌂

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The table below shows the example input and output.

Input	Output
1010	1010 is a binary number, 10
01010101	01010101 is a binary number, 85
Printf()	printf%40%41 is not a binary number
0123456789	0123456789 is not a binary number
123 Hello,World!	123%32hello%44world%33 is not a binary number